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Report on Global Environmental Competitiveness (2013)

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Green Book Editorial Committee for Report on Global Environment Competitiveness

Introduction of the Main Editors

Li Jianping was born in 1946 in Wenzhou of Zhejiang Province. He is a former President of Fujian Normal University, Director of FJNU Branch of National Research Center of Comprehensive Economic Competitiveness, Professor, Ph.D. supervisor, an expert of Fujian Province, receiver of the State Council Special Allowance and National Young & Mid-aged Expert with Outstanding Contribution. He is also an academic leader of Fujian university key discipline "Political Economics," a Ph.D. program in the discipline of Theoretical Economics and sub-discipline of Fundamentals of Marxism. He is Vice Chairman of China Association of Capital Studies, the National Association of Marxist Economics History, China Association of Historic Materialism, Fujian Province Association of Social Sciences, and Fujian Province Association for Science and Technology, as well as economic adviser of the People's Government of Fujian Province. Li Jianping has been doing research on Marxist economic ideological history, capital and socialist market economy, economic reform methodology, and regional economic development. He has taken charge of over 20 national and provincial/ministerial key research projects, compiled/wrote more than 60 such academic books (including those he coauthored) such as *Dialectic Exploration on Volume I of Capital* and *A Report of Overall Competitiveness of China's Provincial Economy* and published over 100 academic papers in periodicals like *People's Dail*y and *Economics Information*. He is receiver of seven first prizes and two second prizes in Fujian Province Excellent Philosophy and Social Sciences Research Result Award, as well as the Excellent Theoretical Paper Award in the 7th National "Five-One" Project.

Li Minrong was born in 1955 in Anze of Shanxi Province; he holds a Ph.D. in Economics. He is Director of Development Research Center of the People's Government of Fujian Province, Adjunct Professor of Fujian Normal University, doctoral supervisor and Vice President of China Regional Economics Society. Li Minrong has been researching macroeconomics, regional economic competitiveness, and modern logistics, and has published more than 20 books (including those he coauthored), such as *A Study of the Overall Competitiveness of China's Provincial Economy (1998–2004)*, *Annual Report on Competitiveness of China's Provincial*

Agriculture, Annual Report on Competitiveness of China's Provincial Forestry, and West Shore of Taiwan Straits and Taiwan published in Taiwan; he has also contributed more than 240 academic papers in periodicals like *People's Daily, Qiushi Journal, Management World, and Economics Information*. Recently he has taken charge of several provincial key research projects, including the National Social Science Fund project, A Research of Forecasting and Evaluation of Overall Competitiveness of China's Provincial Economy, Application of the Empirical Economics Theories and Methodology in Regional Economy, and A Study on the Several Key Issues in Constructing Western Taiwan Straits Economic Zone during the "Eleventh Five-year" period. His research achievements include more than 10 provincial/ministerial awards, including third prizes of the second and third Excellent Achievements in Social Sciences award of Xinjiang Uygur Autonomous Region, as well as first prize of Provincial Prize for Progress in Science and Technology (third place), first prizes of the 7th and 8th Excellent Achievements in Social Sciences, second prize of the 6th Excellent Achievements in Social Sciences, and third prize of the 7th Excellent Achievements in Social Sciences in Fujian Province; over another 20 papers and research reports have won him provincial awards.

Wang Jinnan was born in 1963 in Wuyi, Zhejiang Province. He has successively won the bachelor, master and doctoral degrees in Tsinghua University. He is now Vice President and Chief Engineer of Chinese Academy for Environmental Planning (CAEP), Director of the State Environmental Planning and Policy Simulation Key Laboratory, a doctoral supervisor, Adjunct Professor at the Peking University, Nanjing University, City University of Hong Kong. Central Committee of Chinese Peasants and Workers Democratic Party, Director of the Central Working Committee of Ecological Environment, Vice Chairman of Beijing Municipal Committee, Vice Chairman of Beijing Urban Construction and Environmental Protection Committee of the Standing Committee of Beijing Municipal People's Congress. He is member and consultant of more than 20 academic institutions including the team leader and specialist of overall experts group of National Science and Technology Major Project on Treatment and Control of Water Pollution, specialist of overall experts group of National Clean Air Research Programme, Chairman of the Professional Association for China's Environment, Member of the Science and Technology Committee of Department of Environmental Protection, Executive Director of Chinese Society for Environmental Sciences, Executive Director of the East Asian Environment and Resources Economics Association, Member of Environmental and Economic Accounting Committee of the United Nations, Senior Adviser of International Natural Resources Defense Council. He serves as Editor and Editorial Board Member of seven magazines both at home and abroad including "China Environmental Policy"; He has published 15 monographs and four sets of books including *Environmental Economics*, *Environmental security: Assessment and Early Warning*, *Emission Performance: The New Power Saving Mechanism*, and *Green National Accounting*, and published more than 200 papers. In 1997, he won the first Youth Science and Technology Award of the Chinese Society for Environmental Sciences. In 1998, he was approved as one of the first-level candidates

of "Millions of Talents Project". Also in 1998, he was appointed as a senior expert of the CPC contact. In 1998, he received the State Council Special Allowance. In 2001, he won the China Youth Science and Technology Award. In 2002, he was awarded as advanced individual of the National Environmental Legal award. In 2006, he won the Special Award for Green Chinese Characters. In 2008, he won the 30th Anniversary Award of the China Environmental Science Society. In 2009, he won the advanced individual of the Ministry of Environmental Protection. In 2010, he won the Globe Award for Sustainable Development. In 2011, he was awarded as advanced worker of the National Environmental Technology. He mainly engaged in environmental planning, environmental economics and environmental policy research. He has hosted more than 50 national research and international cooperation projects, won 18 science and technology awards at national and ministerial levels since 1988.

Li Jianjian, Doctor of Economics, was born in 1954 in Xianyou of Fujian Province. He is now Dean of the School of Economics at Fujian Normal University, doctoral supervisor, and an expert receiving the State Council Special Allowance and one of the academic pacesetters in political economics in Fujian Normal University. His major fields of academic research are capital and socialist market economy, history of economic thought, and urban land economy. He successively has taken charge of or participated in over 20 research projects supported by the Natural Science Foundation of China, Fujian Province Social Science Planning Fund, Fujian Province Development and Reformation Commission, and Fujian Provincial Department of Education, as well as other international cooperation projects. He has also published more than 10 monographic and/or co-authored books including *Studies on China's Urban Land Market Structure, Application and Development of Capital in Socialist Market Economy* and *Socialist Market Economy and the Reform & Opening up*, compiled multiple textbooks such as *Textbook for Selected Readings on Capital, Political Economics, Discourse on Development Economics and Chinese Economic Development*, and published over 70 papers in periodicals like *Economic Research Journal, Contemporary Economic Research,* and *China Real Estate*. He was honored as Excellent CPC Member in Fujian Provincial Universities, Outstanding Teacher of Fujian Province, and Advanced Teaching & Research Worker. His research results won many provincial and ministerial awards, including second prize of Excellent Teaching Achievement of the State Education Commission (collaborate), first prize of Fujian Province Excellent Philosophy and Social Science Research Result Award (collaborate), second prize and third prize of Fujian Province Excellent Social Science Research Result, and first prize of Fujian Normal University Excellent Teaching Achievement Award.

Huang Maoxing was born in 1976 in Putian City, Fujian Province of China, holds a Ph.D. in Economics. He is Vice President of the School of Economics in Fujian Normal University, and Executive Deputy Director of the FJNU Branch of National Research Center of Comprehensive Economic Competitiveness, also he is Professor and Doctoral Supervisor, Academic Leaders of the Direction of Regional Economic Statistics of Statistics Primary Discipline Doctoral Programs,

Executive Director of Chinese Association of Quantitative Economics, Executive Director of China's Regional Economic Association, Executive Member of the Youth Annual Meeting of Political Economics, Experts Member of Environmental Economics Branch of Chinese Society For Environmental Science, Director of Chinese Industrial Economic Association, Deputy Editor of the *Journal of Comprehensive Competitiveness*, etc. He is mainly engaged in technology economy, regional economy and competitiveness research and also has taken charge of more than 40 research projects such as the national social science fund, the ministry of education humanities and social science fund. Huang Maoxing is the author or coauthor of 23 books including, *Technical Choice and Upgrading Industrial Structure* and *Research on Technique Choice and Economic Growth*. He has published more than 120 academic papers in key periodicals such as *Economic Research Journal*, *Management World* and *Economics Perspectives*. His research achievements have won over 10 awards of different levels, including one second prize (cooperation) in the 6th Excellent Social Science Award of the Ministry of Education, one first prize (coauthor) in the First National Excellent Papers on Economic Census Award of the State Council, four first prizes (coauthor) in the 7th–9th Fujian Excellent Social Science Researches Award, two second prizes in the 8th–9th Fujian Excellent Social Science Researches Award. He was a candidate of Central Organization Department of the First 'Million Program' Youth Talent Support Program, the 2011 Program for New Century Excellent Talents in University of Ministry of Education of China, the 2008 New Century Million Talent Project, and the 2010 Program for New Century Excellent Talents in University of Fujian Province, honored as the Sixth Excellent Young Social Science Expert of Fujian Province in 2010, and was awarded the Seventh Fujian Youth 54 Medal in 2010.

Preface

Environment is the foundation and support of human existence and survival and the guarantee of sustainable human development; environmental protection has undoubtedly become a common understanding and development strategy of all countries of the world. The influence of environment on economic and social development has never been so obvious and people's understanding on environmental issues has neither been as profound as it is today. In particular, with the heavy attack by global financial crisis and the progress of industrialization, people begin to seek rebalancing between humankind and environment at a higher stage of development. In the world today under the tide of economic globalization full of challenge and competition, the focus of competition is no longer only limited in the economic, political and military fields; competition in the environmental field has also attracted wide attention from all over the world. Environmental management and climate change resilience have been recognized by all countries and regions as important leverage in participation in international competition. So to speak, environmental competitiveness has become a key component of the comprehensive competitiveness of a nation or region.

Researches on environment competitiveness and environmental issues are in the same line. The results of researches on environmental issues over the past hundreds of years have provided precondition and foundation for the research on environmental competitiveness, while environmental competitiveness researches integrate both environment and competitiveness, breaking the limitation of studies on environmental issues alone and making in-depth discussions on environmental competitiveness from multiple disciplines of economics, management science, operation research and sociology; it emphasizes exploration into environmental ability and leads to new economic model, development pattern and life style. In summary, doing environmental competitiveness research not only further deepens and advances the theories about environment and competitiveness, but also fits into the trends of global environmental protection, and thus having important theoretical and practical significance.

At present, environmental impact has gone beyond the regional and national scope, changed from a local issue to a regional and global issue. Due to the pervasion and uncontrollability of environmental damage and pollution, the environmental pollution or safety accident in one country or region might very often endanger the surrounding countries and regions or even cause global environmental disaster. Therefore, to enhance global environment competitiveness requires all countries to consider the issue from the basis of common benefit of the globe, strengthen dialogue and negotiation, jointly combat and solve global environmental challenges and promote the coordinated advancement of global environment competitiveness. In the meanwhile, after experiencing the hit of global financial crisis and the debt crisis in the euro zone, global economy has also come to a stage of bumpy speeding down for transformation. This has set an urgent need to break the bondage on traditional development pattern, change the mode of relying on high input in return for high output, seek the engine to lead the new round of economic growth, focus on synchronized economic growth, social progress and environmental improvement, enhance all countries' ability to face with environmental problems and crisis and strengthen international environmental protection agreement execution and collaboration, so as to enhance global environment competitiveness and realize the happy vision of global sustainable development.

Environmental issue is a global issue. Governments of all countries of the world must have the wisdom and courage to go beyond the bondage of narrow national interest; walk towards the directions of international cooperation, collective security, common benefit and rational negotiation that are pursued by humankind; adopt effective environmental measures; jointly build a continuingly progressing world, a low-carbon and harmonious world; apparently enhance global environment competitiveness; and realize global sustainable development. Therefore, the Fujian Normal University Branch Center of National Research Center of Comprehensive Economic Competitiveness initiated the research on the first green book Report on Global Environment Competitiveness (2013), with the strong support and help of United Nations Environment Programme (UNEP) senior economist Sheng Fulai. During 25–26 March in 2013, United Nations Environment Programme, Chinese Academy for Environmental Planning of Ministry of Environmental Protection of China, Policy Research Center for Environment and Economy of Ministry of Environmental Protection of China and Fujian Normal University jointly organized the "International Workshop on Green Economic Transformation and Environmental Competitiveness indicators" in Fuzhou City, China. More than 40 well-known experts in the field of environmental economics, from the UNEP, World Economic Forum, World Wide Fund For Nature, Global Green Alliance, Institute for International Environmental Strategies, International Labour Organization, Indonesian Ministry of Environment, Ministry of Finance of Uruguay, Commission on Sustainable of Mauritius, Institute for Green of Korea, Central European University, University of Malta, Ministry of Environmental Protection of China, Chinese Academy of Sciences, Chinese Academy of Social Sciences, China Center for International Economic Exchanges and Beijing Normal University, attended the workshop and deeply discussed the discussion paper "Global Environment Competitiveness

Indicator System and Evaluation". The experts believe that "Report on Global Environment Competitiveness" is the first report on global competitiveness evaluation led and introduced by the developing country, and it is an important breakthrough and innovation. In order to further deepen the study of this project, after the workshop, the research group organized the research again for more than 4 months. We fully absorbed the valuable comments and suggestions proposed by experts and strived to make the research ideas, research methods and so on of the book effectively converge with the international rules. So far, we finally show the study in front of the readers on schedule.

Since 2008, the research group embarked on the study of Global Environment Competitiveness and got the guidance and help of leaders and experts of Chinese Academy for Environmental Planning. We released two green books, i.e. *Report on China's Provincial Environment Competitiveness Development (2005–2009)* and *Report on China's Provincial Environment Competitiveness Development (2009–2010)*. The former won the first prize of Fujian Excellent Social Science Achievement Award and the second prize of the sixth Universities Excellent Achievement Award (Humanities and Social Sciences) Award. In the meanwhile, the research group also studied China's Provincial Economic Comprehensive Competitiveness and National Innovation Competitiveness. During the NPC & CPPPCC period in the years from 2007 to 2013, we successively released seven blue books of *Report on Overall Competitiveness of China's Provincial Economy*, the yellow books of *Report on Group of Twenty (G20) National Innovation Competitiveness Development (2001–2010), Report on Group of Twenty (G20) National Innovation Competitiveness Development (2011–2013)* and *Report on World Innovation Competitiveness Development (2001–2012)* jointly with the Science and Technology Section of Chinese Mission to the UN; part of the research was also published in the English version in Paths of UK to the globe. The release of this series immediately attracted wide attention from government authorities at both central and local levels as well as the academic and theory circles and aroused wild reporting about the research in mass media in China and other countries, producing big social impact. It is worth mentioning that the blue book series of *Report on Overall Competitiveness of China's Provincial Economy* won the "Biggest Impact Award of the 1st China's Excellent Book Series Award" and "China's Excellent Book Series Award" and that the book series is the only research result presented by a local university among the 10 award winners. Another two reports prepared by the Branch Center, "General Evaluation Report on the Overall Competitiveness of Provincial Economies of China 2009–2010" and "Overall Evaluation and Comparative Analysis of G20 National Innovation Competitiveness 2001-2010", again won the first prize of the 3rd "China's Excellent Book Series Award-Report Award". The Branch Center is also the only research group throughout the nation that won two first prizes in the award.

This first edition of the green book of *Report on Global Environment Competiti-veness (2013)* is the latest research result of FNU Branch Center. We hope that, through furthering the research on global environment competitiveness, environmental economy will carry new connotations and we will make in-depth discussions about the development and future of GEC from theoretical, methodological and empirical dimensions so as to make our contribution to

promote global sustainable development. Based on adequate reference to the previous results of related researches both in China and abroad, this study kept tight tracking on the leading research edge of multiple disciplines covering environmental science, economics, ecology, management, statistics, econometrics and human geography, analyzed the level, features of change as well as trends and driving force of environment competitiveness of world countries and established global environment competitiveness indicator system and mathematical model. We also collected the latest released data of environmental economy of 133 countries of the globe. After scientific evaluation and comparative analysis on the processed data, the study finally revealed the features and differences of environment competitiveness of the countries of different type and at different stage of development, defined the environmental competitive advantage and weak links of each country and did follow-up study on the evolution track and path of enhancement of environment competitiveness. It will provide valuable theoretical guidance and practical measures for all countries to enhance environment competitiveness. The whole book is composed of three parts and annex; its framework is as follows:

Part I is Theory and Methodology, which makes clear the research contents and methodology used in the study. This part fully explains the significance, contents and evaluation methodology used in GEC research and establishes the evaluation indicator system and mathematical model of global environment competitiveness according to the characteristics; the technical roadmap and analytical approach of this study are also introduced in this part, hence forming a complete analytical framework for global environment competitiveness.

Part II is General Report, i.e. general evaluation report on global environment competitiveness. General report evaluates and analyzes the environmental competitiveness of 133 nations in 2012 using the evaluation system composed of 1 index, 5 sub-indexes, 14 pillars and 60 individual indicators. Based on comprehensive analysis, the report makes in-depth analysis on the trends of GEC, introduces the regional distribution of environment competitiveness of the countries, reveals the environmental advantages/disadvantages and relative position of all the countries and regions, summarizes the characteristics of GEC during the evaluation period and presents the elementary path and policy advice to enhance GEC, thus providing valuable decision-making reference for all countries in establishing environment development strategy.

Part III is Sub Reports, i.e. evaluation and analysis on environment competitiveness by country. This part is special reports that give comparative analysis and evaluation on the environment competitiveness of 133 countries covered by this study in 2012. It shows the characteristics and relative differences of environment competitiveness of the countries of different types and at different stages of development, defines respective competitive advantages and weaknesses and makes follow-up studies on the evaluation track and way of enhancement of environment competitiveness in each country.

Annexes list the evaluation scores of environment competitiveness and five sub-indexes in the 133 countries in the evaluation period, which will be good reference for readers who want to do quantitative analysis.

This book refers to an area of research crossing multiple disciplines and also a study of international issues involving 133 countries. Due to the constraints of both subjective and objective factors, such as knowledge structure and academic ability of the team and data availability, the research is far from thorough and complete in certain aspects and there are still many subjects requiring further study. We wish to join the intellectuals from governmental agencies, international organizations, academic institutions and universities of the world and environmentalists who have interest in global environmental issues to continue the research on GEC, thus making the evaluation objective and providing valuable decision-making reference for the sustainable development of economy and society in all countries.

August, 2013 Writers

Abstract

Since the 1970s, environmental issues have gradually transcended national boundaries, and evolved into regional and global issues from local issues, also caused great concern in the international community. Especially in recent years, in the face of the global financial crisis, countries around the world view the green transformation of economic development as a breakthrough point, and actively participate in and promote international negotiations on environmental issues and global cooperation to ensure the sustainable development of economy, society, and environment for our planet and future generations.

Global environmental competitiveness is a whole new way to measure the competitiveness in the context of the contradiction between world economic development and environmental protection has become increasingly intensified. Global environment competitiveness covers five aspects of ecological environment, resources environment, environmental management, environmental impacts and environmental harmony, highlighting the environment as a basic element of human production and life, paying attention to the coordinated development between human and the environment. At the same time, it also gives full consideration to the economic system and social system's impact on the environment, comprehensively reflecting and embodying a country's development ability of environment through a variety of means such as economy and administrative. In a word, global environment competitiveness is an important content to measure the competitiveness of a country.

This book uses longitudinal study and horizontal analysis, combining qualitative and quantitative analysis methods, so as to conduct in-depth study of theoretical, empirical and methodological issues of the global environmental competitiveness. This book includes three main parts. The first part is divided into the theory and method, which expounds comprehensively the important significance, the main content and the technical route of global environmental competitiveness research, and then according to the characteristics of global environmental competitiveness it establishes the global environmental competitiveness evaluation index system and the mathematics model, forming a relatively comprehensive global environmental competitiveness analysis framework. The second part is the total report which

selects the global 133 representative countries as evaluation objects, analyzing the development status of global environmental competitiveness as a whole, revealing the strengths and weakness of each country's environmental competitiveness and providing the basic paths and strategies of enhancing the competitiveness level. It will provide valuable analysis basis and policy reference for all countries in the world to realize sustainable development. The third part is sub-report, which evaluates environmental competitiveness respectively for 133 countries around the world, revealing the characteristics and relative differences of environmental competitiveness of different development types and levels of the countries around the world, in order to provide important decision-making reference for making environmental economic policies, accelerating the green economic transformation and enhancing the environmental competitiveness.

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Part II General Report

Part I
Theory and Methodology

Chapter 1
Global Environmental Issues and Human Wellbeing

Environment is the foundation and support of human existence and survival and the guarantee of sustainable human development; environmental protection has undoubtedly become a common understanding and development strategy of all countries of the world. Now humankind is striving into the historical process of postindustrial society and is trying to reach rebalance with environment in later stage of development. All countries need to perform respective duties and obligations in environment governance, in joint efforts to plan economic development, social progresses and environment protection to realize mutual wins and sustainable development of the world and to create an Earth homeland for harmonious coexistence of humankind and environment.

1.1 Key Global Environmental Problems

1.1.1 Global Warming

Global warming refers to the phenomenon of gradual temperature rise of atmosphere, soil, water and vegetative cover on Earth's surface year by year, major cause of which is "greenhouse effect" due to emission of such greenhouse gases (GHG) as carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O). On one hand, GHG absorbs the outward long-wave radiation emitted by Earth; it has no any resistance against the inward shortwave radiation from the sun on the other, which causes temperature rise in Earth surface and the lower atmosphere and results in global warming. Among the GHGs, carbon dioxide makes over 50 % of contribution to global warming. For a long period before the Industrial Revolution, the concentration of carbon dioxide in atmosphere stabilized at 270–290 ppm. With the accelerated industrialization and urbanization after the nineteenth century, CO_2 concentration started the process of escalation at faster and faster speed. In 2007, Intergovernmental Panel on Climate Change (IPCC) released the IPCC Fourth

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Table 1.1 Global greenhouse gas concentration 2010 and WHO-GAW global greenhouse gas trend

	CO_2 (ppm)	CH_4 (ppb)	N_2O (ppb)
Global abundance in 2010	389.0	1,808	323.2
2010 abundance in relative to year 1750	139 %	258 %	120 %
2009–2010 absolute increase	2.3	5	0.7
2009–2010 relative increase	0.59 %	0.28 %	0.25 %
Mean annual absolute increase during last 10 years	2.00	2.7	0.77

Source: WMO greenhouse gas bulletin 2010
Note: The figures for pre-industrialization are: 280 ppm for CO_2, 700 ppb for CH_4 and 270 ppb for N_2O

Assessment Report (AR4); it is pointed out that the CO_2 volume fraction was 379 ppm in the year 2005, which has gone far beyond the scope of spontaneous change in the past 650,000 years. In 2011, the annual Greenhouse Gas Bulletin released by World Meteorological Organization indicates that the greenhouse gas abundance in global atmosphere in 2010 has made a new high in industrialized era. Table 1.1 reflects the general situation of global greenhouse gases concentration and the trends of change in the last decade. Since the Industrial Revolution, the average air temperature of the globe has increased by about 0.7 °C and is increasing at the speed of 0.2 °C every 10 years.[1] Global warming will has far-reaching influence on the world, such as polar glacier partial thawing, rise of sea level, submergence of some foreland regions, etc.; global warming will cause precipitation change and abnormal climate, damage to the ecosystem and droughts and floods, threaten both the production and daily life of humankind and trigger diseases related to heat wave.

1.1.2 Ozone Depletion and Destruction

Ozone depletion and destruction is caused by ozone-depleting substances, mainly chlorofluorocarbons (CFCs). Ozone layer can absorb over 99 % of the UV ray from solar radiation and thus protect the lives on Earth from UV injury as a natural "Umbrella" of Earth. Since 1950s, ozone layer has showed trend of concentration reduction found during observation and research. In 1974, Professor Rowland and Dr. Molina from the University of California in USA published their paper "Chlorofluorocarbons in Environment" and firstly put forward the causal relation between CFCs emission and ozone depletion. In the 1980s, UK scientist found the "ozone hole" over Antarctica, which was proved by the observation data from U.S. satellite Nimbus-7. After that, Germany scientist again found similar ozone hole over Arctic. With the full unfolding of ozone sounding and further findings in

[1] HU An-gang, China: Innovation of Green Development [M]. Beijing: China Renmin University Press, 2012. P82.

scientific research, phenomena of ozone layer depletion appear all over the globe. As forecasted by the USEPA, if no restrictions are set on CFCs emission, by 2075 stratospheric ozone will decrease by 40 % compared with 1985. In that case, there will be 150 million of skin cancer patients, 18 million of cataract patients, 7.5 % of crop harvest decrease, 25 % of aquatic product loss and decline of human immunologic function, which will bring about tremendous hazards. As ODS is very stabilized that can live as long as 50–100 years, even if the globe absolutely stopped any emission of ODS, it would take rather long time to see any restoration phenomena on ozone layer. The Scientific Assessment of Ozone Depletion 2010 released by the UN indicates that Earth's atmospheric ozone layer has stopped depletion and will gradually recover. In recent years, however, observational data showed that from the actual indicators like ozone hole area, depth and time lapse, the atmospheric ozone depletion over Antarctic is still severe. For instance, since 2000 the ozone hole over Antarctic has maintained at high level of depletion in large area and the ozone hole area has exceeded 25 million square kilometers in 2003, 2006 and 2008; especially in 2008, the area has reached 27.2 million square kilometers, even larger than the entire North America. In 2009, the size of ozone hole over Antarctic was still at the level of the last few years. Therefore, it's quite clear that the ozone depletion over Antarctic does not stop and there will be a long way to go for the recovery of atmospheric ozone layer.[2]

1.1.3 Sharp Decrease of Forest Cover

Forest is an important ecological resource having effects of air purification, adjusting climate, water conservation, resisting wind and stabilizing sand, biological diversity protection and promoting ecological stability. At the infancy of human civilization, the virgin forest on the globe covered two thirds of the continent, reaching 76 million km^2; in the mid-nineteenth century, the covered area was 56 million km^2; by the end of twentieth century, the area was reduced to 34.4 million km^2, coverage falling to 27 %; and in 2003, the forest cover area was left as some 28 million km^2. It is obvious that since the Industrial Revolution in the eighteenth century, the global forest cover has been seriously damaged. Figure 1.1 shows the forest changes in world countries during 2005–2010, which tells that forest loss is rather severe in regions like Oceania, South America and Africa. And, the latest report of Food and Agriculture Organization of the United Nations (FAO) indicates that there are 130,000 km^2 of forest lost or converted into land for other purposes every year during 2000–2010, while the decade before the period the magnitude has been 160,000 km^2. Reduction of forest cover has brought about severe adverse impact on the global ecosystem, causing water loss and soil erosion and land desertification, damaging biological diversity, intensifying greenhouse effect and threatening the sustainable development of human society.

[2] WANG Geng-chen, Good News for Ozone Layer Protection [N]. The People's Daily, 2010-10-26.

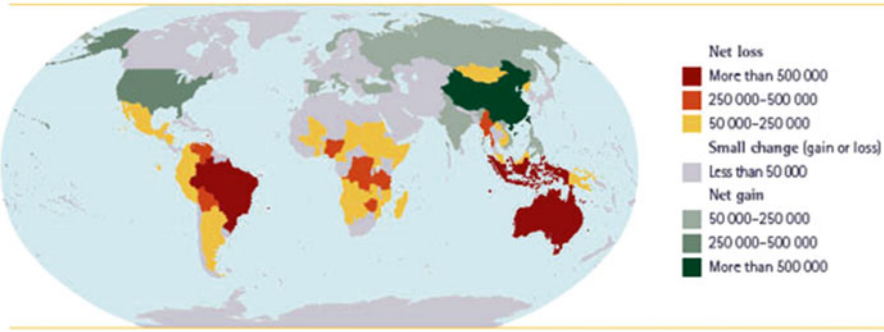

Fig. 1.1 Net change in forest area by country, 2005–2010 (ha/year) (Picture via FAO)

1.1.4 Declining of Biological Diversity

Biodiversity includes genetic (biological genes) diversity, species diversity and ecosystem diversity; it is the core component of Earth's life-support system and the material basis of human survival and development. However, in the past hundreds of years, due to the adverse impact of human activity, species extinction rate has been 1,000 times that of natural species extinction rate in history.[3] Now there are about 12 % of birds, 23 % of mammals and 25 % of conifers faced with the risk of extinction.[4] As UNEP forecasts, there will be 1/4 of biologic species on the earth trapped in the danger of extinction for the forthcoming two or three decades; by 2050, about half of all animals and plants will disappear from the earth. In order to protect biodiversity, the globe has been devoted to finding a roadmap for protection of biodiversity since 2010 and the 10th Conference of Parties of the Convention on Biological Diversity held in October 2010 in Japan approved the Strategic Plan for Biodiversity 2011–2020, which established the goal of global biodiversity by 2020 and designed the roadmap and time schedule for global biodiversity protection.[5]

1.1.5 Acid Rain Pollution

The academic term of acid rain is acid deposition, mainly caused by emission of acidoids into the atmosphere due to human activity, such as sulfur dioxide, nitrogen oxides, etc. During the period from 1950 to 1990, global sulfur dioxide emissions

[3] Millennium Ecosystem Assessment. Ecosystems and Human Well-Being: Biodiversity Synthesis [M]. Washington DC: World Resources Institute, 2005:3.

[4] HU An-gang, China: Innovation of Green Development [M]. Beijing: China Renmin University Press, 2012. P85.

[5] XU Hai-gen, DING Hui, WU Jun, et al. Interpretation of the 2020 Global Biodiversity Targets and Its Assessment Indicators [J]. Journal of Ecology and Rural Environment, 2012(1).

increased by 100 %, exceeding 150 million tons per year now and nitrogen oxides emissions also arrived at about 100 million tons per year. The Scandinavian region in North Europe, the European Continent and North America are the top three central areas with severe acid rain pollution. Since the 1980s, acid rain pollution in some Asian developing countries like India and China have become increasingly severe too. In 1998, the area of acid rain region in China has covered over 30 % of its territory and the total annual loss due to acid rain reached USD 13 billion. In 2005, China's sulfur dioxide emissions reached as high as 25.49 million tons, ranking first in the world. The major hazard of acid rain is damage to forest ecosystem resulting in water and soil acidification, causing death of aquatic animals and plants, reduction of crop production and erosion on buildings.

1.1.6 Land Desertification

Land desertification is also known as "land degradation", meaning the degradation of land in arid and semi-arid areas mainly due to climate change and irrational human economic activities. Up to 1996, global area of land desertification has reached 36 million km^2, influencing 1/6 of world population from over 100 countries and regions. At present, there are still about 60,000 km^2 of land becoming desertification every year on the globe. Land desertification has caused severe hazards, threatening human living environment, speeding up deterioration of ecological environment and limiting socioeconomic development. The loss caused by desertification in agricultural productivity only would be roughly as high as USD 42 billion. With the increasingly severe global land desertification as target, the United Nations has launched the Decade for Deserts and the Fight against Desertification 2010–2020 on August 16, 2010, in the hope to further enhance global awareness of the hazard by desertification and land degradation and meanwhile urging all countries to take effective steps to prevent land desertification.

1.1.7 Marine Pollution and Damage

Marine pollution and damage primarily refers to the pollution to marine environment and the damage to marine ecosystem due to over development of marine resources. Major sources of marine pollution include sewage, pesticide, petroleum, household garbage, industrial solid waste and certain heavy metals. The most severely polluted sea areas are in Baltic Sea, Mediterranean Sea, Tokyo Bay, New York Bay and Gulf of Mexico. "The largest accidental marine oil spill" happened in 2010 – Gulf of Mexico oil spill has caused 11 deaths, 5 million gallons of oil spill and almost 1,500 km of ocean beach contaminated, resulting in thousands of billion dollars of economic loss. Over development of marine resource is also intensifying. Now there are globally 70 % of all oceanic life, including 77 % of

fishes, encountering extreme or over development, which has big impact on the fertility of the ocean and diversity of oceanic life. As indicated by the UNEP, with the increasingly severe threaten on ocean from environmental pollution, heavy fishing and climate change, global marine ecosystem will be facing the danger of collapse in the few coming decades.

1.1.8 Water Pollution and Freshwater Resource Shortage

Water is the source of life, and one of the indispensable physical resources for the survival and development of human society. Globally, the freshwater that can be utilized by humankind only accounts for 0.325 % of the total water volume on Earth. In company with the economic development and population growth, human demand for water resource is also increasing, followed by freshwater resource shortage because of water pollution problems. Discharge of household wastewater and industrial wastewater as well as surface runoff of agricultural pollutants like fertilizer and pesticide, is the leading cause for water pollution. According to the estimates of related international organizations, the population of countries with water resource shortage will increase from 132 million in 1990 to 653 million by 2025 (estimated as per low population growth) or 904 million (estimated as per high population growth); by 2050 the figure will further amount to something between 1.06 billion and 2.43 billion, accounting for about 13–20 % of the estimated world population.[6] Lack of safe drinking water and sanitary facilities has resulted in hundred million cases of disease related to water and at least 5,000,000 deaths every year.[7] WHO's investigation also indicates that 80 % of human diseases are related to water pollution. Therefore, rational development and utilization of water resources and strengthening water resource conservation has become a priority.

1.1.9 Toxic Chemical Pollution and Cross-Border Transfer of Dangerous Waste

There are about 35,000 types of chemicals on global market that are harmful to human health and ecological environment, in which more than 500 types causes cancer, teratogenesis and mutagenesis. Use of toxic chemical may lead to contamination to the atmosphere, water mass, soil or even life to varying degrees. Dangerous waste refers to those wastes carrying chemical activity or toxicity, explosiveness,

[6] LIU Xiang-lian, PANG Zhen-je and ZHAO Rui-ping. Protection of Water Resources: Allowance of No Delay [J]. Journal of Environmental Management College of China, 2005(2).

[7] XU Zai-rong, Global Environmental Issues and International Response [M]. Beijing: China Environmental Science Press, 2007. P47.

corrosivity and other properties that are harmful to human living environment, not including radioactive waste. Currently the quantity of hazardous waste generated globally every year is about 330 million tons. Because hazardous waste means severe pollution and high disposal cost, developed countries are transferring hazardous wastes to developing countries at the rate of 50 million tons per year to shift the pollution.

1.2 Influencing Factors of Global Environmental Issues

1.2.1 Economic and System Influence

First and foremost, the traditional economic development pattern focusing solely on economic growth is the immediate cause of environmental issues. History shows that after the Industrial Revolution, countries like UK, USA and Germany have created miracles of rapid economic development, but accompanied with the global environmental issues that threaten human development. This is because the traditional economic development pattern focused more on the achievements made in economic sphere with primary target at pursuit of growth in total output value and economic profit and increase of material wealth. Under such traditional pattern, people sacrificed resource consumption and environment damage in return for economic growth, regardless of resource utilization efficiency; ecosystem is exposed to destruction because of lack of rational resource development and utilization. On one hand, development and utilization of renewable resources went beyond the limit of regeneration rate of resources and even beyond the development level of their substitutes, with ever increasing consumption of non-renewable resources. On the other hand, owing to weak awareness of ecological environment protection and pursuit of economic interest maximization, low-cost production methods that are harmful were adopted, having no regard for pollution-free technologies and scientific environmental resource management. Such development pattern has directly led to increasingly severe environmental problems worldwide. Just as Engels pointed out in Dialectics of Nature, "Let us not, however, flatter ourselves overmuch on account of our human victories over nature. For each such conquest takes its revenge on us. Each of them, it is true, has in the first place the consequences on which we counted, but in the second and third places it has quite different, unforeseen effects which only too often cancel out the first."[8]

Secondly, capitalist system in developed countries and the inequitable international order under that system are the root causes for global environmental problems. Under capitalism, environment does not exist as a natural domain where humankind must coexist with other species, but as a domain to be developed in the

[8] Compilation and Translation Bureau of the CPC Central Committee. Marx and Engels Gesamtausgabe (Vol. 20) [M]. Beijing: People's Publishing House, 1973: P519.

ever expanding process of economy.[9] Ecological socialists argue that capitalism is the root cause for Western or even global ecological crisis and environmental problems. The expansion of capitalism goes without limitation; the trends of infinite accumulation of capital and the dominating logics of maximization of added value implies impulsive consumption of earth's resource and destruction of natural environment and has inherently decided the unsustainability of economic development and the inevitability of ecological colonialism.[10] With the formation and development of world economic system, developed capitalist countries tried to protect their vested interest through domination of the old international economic and political order. The old international political and economic order is typically reflected as environmental hegemonism and colonialism in environmental issues. The establishment and execution of rules regarding global environmental problems also focus on the interest of Western great powers with one standard for the developed countries and another standard for the developing countries, which excessively emphasizes that developing countries should undertake equal responsibilities as developed countries in environment protection. As a matter of fact, developed countries are the main responsible party of today's global environmental issues: first for the ecological cost of spoliation and expansion and diversion during the 300 years of industrial civilization and secondly for the ecological loss due to the global production and consumption in the past few decades. Developed countries have controlled over 85 % of global resources with 15 % of population, whereas more than 60 % of the consumer goods produced in developed countries especially in China are exported to developed countries. 95 % of world's toxic waste are generated in the 20 plus developed countries. Also, developed countries utilize their advantage in economic globalization to divert the ecological and resource crises to developing countries.[11] They have financial, technical and management advantages in global environment governance, but unwilling to undertake historical responsibility; instead, they try to maintain dominance of global interest and future resource through dominant position in establishment of international system and environmental negotiation, so as to increase the environmental capacity limit for developing countries. Moreover, the commitment of financial and technical support for developing countries is very often "shown more by words and less by actions". But developing countries are faced with dual role in both economic development and environmental protection; it is rather unpractical to solely emphasize their responsibility in environmental protection while sacrificing the right to development. The old international environmental order of the dominant leading powers not only can't solve the global environmental problems, but also will further intensify the contradictions, leading governance

[9] Fred Magdoff. On Capitalism and the Environment [J]. WU Xuan and LIU Ren (Translate). Foreign Theoretical Trends, 2011(10).

[10] YU Jin-yao. Capitalism and the Global Ecological Environment since Modern Era [J]. Academic Research, 2009(6).

[11] CHEN Liang. Changing International Political and Economic Pattern and Establishing New Global Environmental Order [N]. China Environmental News, 2009-12-24.

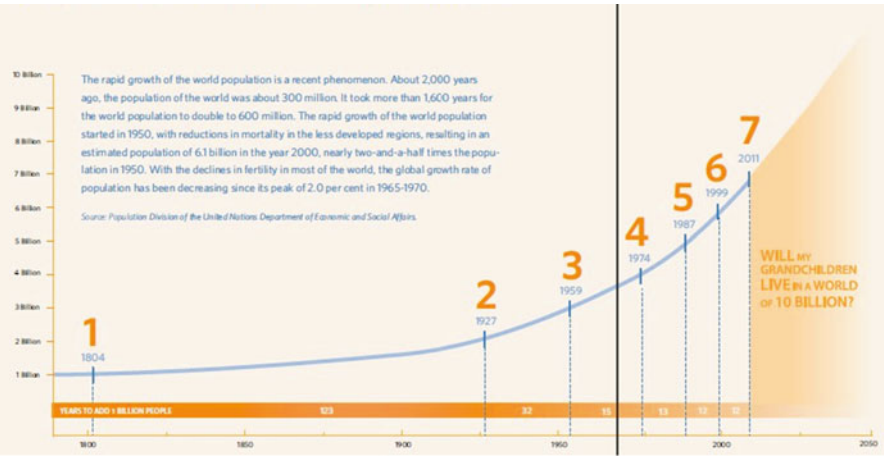

Fig. 1.2 Years when world population reached increments of one billion (Source: State of World Population 2011, UNPFA)

of global environmental issues into the predicament of benefit and policy coordination. Therefore, although both developed countries and developing countries are aware of the importance of these issues and have established a global environmental governance network with the UN as central and national governments and public society as participating, response to these issues is not yet really based on the benefit of the entire humankind and no substantial steps are made in global environmental governance. Only global environmental collaboration based on mutual confidence can make ideal achievements.

1.2.2 Influence from Population and Society

First, the growing population has been a great pressure for the resource environment. Excessive growth of population in spite of ecological environment load-bearing limitation is another important cause for global environmental problems. In history, many scholars have already been aware of the causal relation between the surplus of population and environmental crisis. A huge population size and higher natural growth rate of population have brought about great pressure for global resource environment. The demand and consumption of material goods by ever growing population increasingly grow too, which will eventually exceed the capacity of environment to supply resources and dispose wastes, leading to over taking from nature and thereby resulting in various resource and environmental problems. Since the nineteenth century, particularly after the twentieth century, the rapid growth of population has triggered series of environmental problems, such air pollution, scarcity of resource, piles of household garbage, etc. Figure 1.2 shows the trends of

world population change. In 2011, world population has reached seven billion, which posed a big challenge for global resource environment and should awake the awareness of the entire humankind of the crisis in their living environment.

Secondly, environmental issues are also influenced by people's awareness of the natural world and changes of practice in the different times of human society. In the primitive society when productivity is relatively low, population size was small and human activities were mainly collection of natural food and hunting, environment was less a problem. When human society entered agricultural civilization, productivity was improved, population size grew faster, people's ability to reform nature was strengthened, and development and utilization of resources like land, forest and water increased; during this stage, environmental issues began deteriorating. During the industrialized civilization period, science and technology made great strides, productivity increased by a wide margin, and population expanded rapidly; humankind tried to conquer nature and started accumulation of material and wealth at the cost of over development of resources and pollution of environment. These caused intensification of contradiction between population and resource & environment and deterioration of ecological environment threatens the existence and development of humankind. Under such context of crisis, people became aware of the severity of environmental issues and strived for harmonious development of both humankind and nature with emphasized consideration of population and resource and sustainable development of environment; thus human society may step into the era of ecological civilization and the environmental problems could be controlled and improved to certain degree.

1.2.3 Influence from Cultural Tradition and Ethnic Consciousness

Cultural tradition and ideological consciousness show important influence on economic development pattern and thus influence ecological environment. The cultural tradition dominant in UK and USA and taking "individualism" as core value has put individuals on the center society and history and emphasizes individual right to pursuit of economic benefits; especially after the 1980s when neo-liberalism advocated extreme individualism and highly liberalization became the main-stream ideology worldwide, such value orientation undoubtedly got adapted to the need of infinite extension of capital,[12] but it also brought in destruction to ecological environment. The US scholar Spretnak points out in his The Resurgence of the Real: Body, Nature and Place in a Hypermodern World that ecological environmental issues is a way to reflect the modern civilization crisis and argues that the modernistic egoism of economic man, the social order of industrialism, the hierarchal

[12] HAN Yi. Cultural Tradition Influences Economic Development Pattern [N]. Chinese Social Sciences Today, 2011-7-15.

arrangement under patriarchy, the centralized pattern of thinking as well as the absolute anthropocentrism all together form a powerful anti-natural culture force that leads to severe environmental pollution and ecological damage. An Australian thinker Plumwood also believes the intrinsic logic relation between ecological crisis, environmental pollution and the malady of modern civilization.[13] The cultural ethics that spares no sacrifice of ecological environment for egocentric purpose makes global environmental protection consciousness generally weakened and causes many environmental issues.

1.2.4 Influence from Alienation of Science and Technology

Advance of science and technology is double-edged sword that can not only benefit humans and promote social development, but also be accompanied with environmental problems that endangers the entire globe. The US scholar Commoner and Capra argue that science and technology are the root cause of global environmental problems. After investigation into the impacts of nuclear pollution, fertilizer, plastic material, synthetic fiber and automobiles on environment, Commoner argues that the root cause of environmental problems is modern science and technology that not only brings about economic benefit but also destructs ecological environment. In The Closing Circle: Nature, Man and Technology, Commoner indicates that the facts seem apparent that the leading cause of crisis that swallowed the American Environment is the unprecedented production technology reformation since World War II. Capra indicates in The Turning Point that pollution of air, drinking water and food is only the distinct and direct manifestation of the effects of human science and technology on natural environment, and the less distinct but perhaps much more dangerous effects have not been fully understood by people so far. Science and technology has severely disturbed, or may be even destructing the ecosystem that human survival depends on.[14,15] Undoubtedly, alienation of science and technology is one of the important cause for global environmental issues, but not the root cause. However, we could see that some technological invention in the area of environmental protection could play a major role in solving global environmental problems. Therefore, such alienation should be avoided during the course of technological development, making science and technology to take positive effects and realizing unification of both technological development and the development of human society.

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[13] LIU Jian-tao and JIA Feng-zi, Overview of Studies on the Root of Environmental Problems. Frontier, 2012(1).

[14] JI Zhen-hai, On Ecological Civilization [M]. Beijing: People's Publishing House, 2007: 81–82.

[15] LIU Jian-tao and JIA Feng-zi, Overview of Studies on the Root of Environmental Problems. Frontier, 2012(1).

1.3 Global Ecological Environment and Human Wellbeing

Ecological environment provides various services for humankind through the process of interaction and inter-constraint between economic and environmental system. Such services are the gains from the economic-environmental system, including supply service, regulation service, cultural service and support service (See Fig. 1.3). Supply service refers to the various product resources obtained from ecological environment, such as material resources like food, raw material, energy material, etc. and non-material resources like biological inheritance. Regulation service refers to the gains from regulating effect of ecological environment, such as maintenance of air quality, regulating climate and moisture, erosion control, water purification and waste disposal, human diseases regulation and control, biological control, pollination and protection from storm attacks. Cultural service means the non-material gains from ecological environment through intellectual life, development cognition, brain thinking, recreation & entertainment and aesthetic enjoyment; it includes multiplicity of culture, spiritual and religious value, knowledge system, educational value, source of inspiration, aesthetic value, social relation, sense of location, cultural heritage value, recreation, and

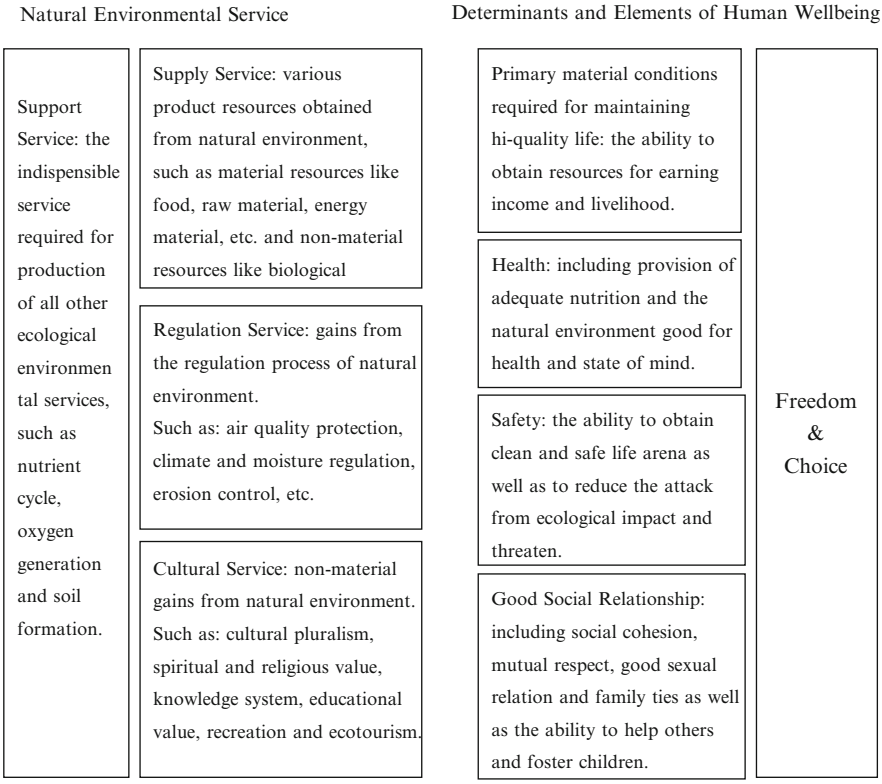

Fig. 1.3 Natural environmental service & its relationship with human wellbeing

ecotourism. Support service refers to the indispensible service required for production of all other ecological environmental services. Compared with the relatively direct short-term effect of other services of ecological environment, this service's effect on humankind is either indirect or occurs in a very long period, such as nutrient cycle, oxygen generation and soil formation.

Human wellbeing is a concept with complexity that is consisted of multiple elements and multiple ingredients, including the primary material conditions required for maintaining high-quality life, freedom and choice, health, good social relations as well as safety and security. The elements that constitute wellbeing are closely related with surrounding environment and can reflect the status of local geography, culture and ecology.[16] As a matter of fact, ecological environment increases human wellbeing through provision of supply, regulation, culture and support services, satisfying human needs for material, health and safety; in a sense, it is indispensible for human wellbeing (See Fig. 1.3). First of all, supply and regulation services have strong tie with the primary material conditions required for maintaining high-quality life by humans. For example, the food supplied by ecological environment is the material basis for human survival, raw material and energy material are the basic input for human production, while clean water resources are provided through like purification service. Secondly, human health also has strong tie with the supply, regulation and cultural services. For instance, the quality of food supplied by ecological environment directed decides human health status; regulation service can take effect on the dissemination of insect pests that transmit diseases and hence indirectly influence human health; while cultural service provides benefits in the recreation and spiritual life of humans and thus improves human health. Moreover, safety is also affected by supply service, regulation service and cultural service. Changes in supply service may affect provision of various materials, and, due to decrease of resources, may possibly lead to conflict; changes in regulation service will affect the laws, frequency and distribution of different types of natural disasters; differences of ecological environment itself may also cause differences in religious ritual or spiritual nature, which will influence the relationship among the different ethnic groups within the community. Thirdly, human social relationship is mainly affected by the changes in cultural service: it may affect the character related to human experience. Finally, freedom and choice are largely established on basis of the other elements of human wellbeing and therefore also affected by changes in ecological environment.

Ecological environment is nothing that never changes; there are many factors that may directly or indirectly cause changes in ecological environment, its systematic services and human wellbeing. Such natural or human factors which caused direct or indirect changes in the ecological environment system are referred to as driving force. Changes of ecological environment system services may be affected by multiple driving forces that have interactions in between; at the same time, the changes of ecological environment system services will show feedback effects on the driving forces.

[16] Millennium Ecosystem Evaluation Project Team. Ecosystem and Human Wellbeing: Evaluation Framework [M]. Beijing: China Environmental Science Press, 2006: 11.

Driving forces can be classified into different types according to different criteria. According to the path by which various influencing factors take effect on ecological environment, they can be classified into direct driving force and indirect driving force. Direct driving force directly influence the course of ecological environment and is the physical, chemical and biological driving forces for changes in ecological environment and its services; we may identify and measure them by different accuracy. Direct driving forces include climate change, regional land utilization and land coverage change, species introduction or elimination, technological improvement and application, external input (such as fertilizer application, insect pest control, irrigation, etc.), various natural, physical and biological driving forces (such as volcanic mountain), harvest and resource consumption. Indirect driving forces have wider effects, often take effect by changing one or more direct driving forces; they are the different kinds of signals stimulating decision making process and thus their influence can be understood through how they affect the direct driving forces. Direct and indirect driving forces often produce synergistic effect. Indirect driving forces mainly include population driving force (such as population quantity, age and gender structure, educational level, spatial distribution), economic driving force (such as economic scale, structure of import and export), sociopolitical driving force (such as democratization, status of private social organization, mechanism for solving international frictions), cultural and religious driving force (such as choice of personal consumption concept), technological driving force (such as rate of investment in scientific research and development, rate of new technology adoption, status of development in biotechnology).

According to if the various factors could be under the direct control of decision makers, driving force can be classified into internal and external driving force. Decision makers may change internal driving forces, but they can't change external forces; therefore, internal driving forces are under the direct control of decision makers, but external driving forces are not under their control. Decision is generally made via three levels of organization: local level (such as certain farmland or standing forest), regional level (municipal, provincial and national) and global level. The same influencing factor may show changing controllability at different level and different timeframe.[17] Some of the influencing factors are exogenic and uncontrollable for decision makers at local level, but turn to be endogenic and controllable at regional level; for instance, national policies are uncontrollable for local government, but controllable for central government. Similarly, some other influencing factors are unchangeable and uncontrollable in short term, but changeable and controllable in the long term, such as technology, which can hardly achieve breakthroughs in short term but can be always changing from the long run. This book mainly addresses the driving forces at regional level. At this level, the internal driving forces of decision making generally include: various systems (such as property right system), service and commodities' price and market, technological innovation,

[17] Millennium Ecosystem Evaluation Project Team. Ecosystem and Human Wellbeing: Evaluation Framework [M]. Beijing: China Environmental Science Press, 2006: 91.

different types of economic policies, etc. External driving forces include: changes in land utilization and land coverage pattern, climate change, fundamental science development, ecosystem features, etc.

There have been many causes for the declining of ecological environmental services, some of them are natural and others are human, with the latter as major cause, including economic growth, population change and excessive demand for services of ecological environment system due to personal choice. The limitation of technological level and various institutional flaws are the root cause of excessive demand for ecological environment system services. First, due to the limitation of technological level, people's understanding of natural laws is far from sufficient, which leads to formation of the outlook like unsustainable production and consumption; but technological limitation means, on one hand, low efficiency of resource utilization resulting in more resource service input to satisfy the same demand, and inadequate human ability to improve ecological environment system service, on the other. Secondly, system factor causes low efficiency of resource service allocation, which is another important reason for the declining of current ecological environment system services. Theoretically, perfect free market mechanism may guarantee the services for ecological environment system services. But the fact is not necessarily so. In fact, either there is no such market existing for certain ecological environment system services, or, although the market is there, allocation of the system services is biased due to market failure and policy failure.

Generally speaking, human intervention against natural system may enhance the gains from ecological environment by human society. With necessary supports like instrument, system, organization and technology and through sustainable good interaction with ecological environment, humans can improve the level of their own wellbeing. Among these, technological innovation and system insurance are the most rooted measures to build up the service ability of ecological environment. First, advancement in science and technology can make people better understand natural laws and better know the interaction between ecological environment and human economic society, and can help the formation of sustainable production and consumption concepts by humans. Secondly, technological innovation can increase the unit satisfaction efficiency of resource, minimize the resource consumption for each unit of human welfare and thus increase the supply ability of nature, which is favorable for sustainable utilization. Thirdly, technological innovation can improve the structure and functions of ecological environment, hence increase the supply ability of the system and promote sustainable development of both environment and economic harmony. System innovation is the ultimate guarantee for improving ecological environment for humans. Environmental service can improve human wellbeing and therefore environmental resources are valuable. Some of these services are traded in market and some are indirectly related to market, but many environmental resource services do not have a market due to their nature of externality and publicity or other causes, the so called market failure; together with the other two even more ultimate causes of incomplete property right system and government failure, environmental problems like environmental

resource abuse, exhaustion and pollution have thus occurred.[18] Therefore, to solve these problems requires government sector to correctly understand the publicity nature of environment, correctly assess the value of environmental resource, establish necessary system to promote internalization of external influence and implement correct policy to regulate people's behavior, so as to realize coordinated development of economy and environment.

1.4 Hard Exploration in Global Environmental Protection

Since the advent of humankind, she has established an inalienable close tie with environment. As early as 5,000 years ago, especially after the start of human civilization, the area coverage by human colonization has been continually widened with the increase of population and progress of production technology, and environmental problems followed. Throughout the process of human development, the entire history is actually a process during which humankind kept fighting against and got adapted to environment. The Industrial Revolution of the UK occurred in the middle of eighteenth century indicates the coming of an industrial society era; when industrialization was providing the benefits of industrialized civilization and economic growth for humans, series of important environmental problems worsened in company with industrial globalization. From the Industrial Revolution in the eighteenth century to 1950, developed countries accounted for 95 % of CO_2 emission. During the 50 years from 1950 to 2000, emission by developed countries still took up 77 % of world total. Once indicated by the General Assembly of the United Nations, "The major cause of the continued deterioration of the global environment is the unsustainable pattern of consumption and production, particularly in industrialized countries." Especially after the 1940s when the unbalance between ecology and economy in fields like resource, energy and environment became increasingly out-standing, the issue of environmental protection began one of the biggest concerns of the public. Researches on environmental issues also broke the geographic restriction of nation or region, from catchwords to concrete course of action; certain organizations of developed countries even launched "strong initiatives" for global environmental protection. The representative ones include International Union for Conservation of Nature (IUCN) founded in Switzerland in 1948 devoted to influencing, encouraging and assisting social organizations of the world to protect the integrity and diversity of nature and to realize sustainable development of ecology; World Wildlife Fund (WWF) founded in 1961 that advocates protection of biodiversity, ensuring sustainable utilization of renewable natural resources and promoting reduction of pollution and waste-type consumption and that has now established connections in more than 100 countries and completed over 10,000 environmental protection projects; Club of Rome, the first social group established for the purpose of solving the ecological

[18] XIAO Dai-ji, ZHENG Hui-yan, WU Pei-ying, QIAN Yu-lan, et al. A Cost-Benefit Analysis on Environmental Protection [M]. Taiwan: Junjie Publishing Co., Ltd., 2002: 13–15.

dilemma in April 1968, which, through release of series report like The Limits to Growth and The Global 2000 Report to the President, protested and criticized industrial revolution that had led to severe ecological consequences; Greenpeace International, established in 1971 in Canada with 43 branches in over 30 countries now, aiming at realization of a more green, peaceful and sustainable future and devoted to promoting government, corporation and the public to jointly seek solutions to environmental problems and protect earth environment and world peace through research, education and persuasion; and World Commission on Environment and Development (WCED), established by the UN in 1983 to counter the economic and social development consequences caused by deterioration of human environment and natural resources. In 1987, WCED submitted an initiative report Our Common Future to UN General Assembly and firstly put forward the concept of sustainable development. In addition to the above, there are Friends of the Earth founded in 1983, Global Environment Facility (GEF) launched in 1991 and International Environmental Protection Organization Association (IEPOA), all very influential advocator and implementer of environmental protection throughout the world and having made progressive contribution to the undertaking of global environmental protection.

We should also see, however, these organizations are mostly advocated or established by developed countries and initial participants are also developed countries; only at a later stage did developing countries and underdeveloped countries absorbed join in. But, standing on the moral highland of "Save the Homeland for Human Beings", some developed countries attempted to become the leader of global environmental protection, control the "right to speak" and maintain the global supremacy of developed countries. In recent years, Western developed countries led by USA were unwilling to accept the bondage set by international climate "within the system" and tried again to control the voice in the issue of global environment change. With regard to issues concerning environmental protection rights and responsibilities, there are many divergences between developed countries and developing countries considering respective benefits. For instance, in all previous climate summits, developed countries and developing countries have always show divergence in key issues such as emission reduction goals, fund and technical support, and every round of negotiations has been very hard. Although the 17th contracting parties conference of the United Nations Framework Convention on Climate Change held in 2011 in Durban of South Africa reached an agreement on climate and emission reduction, details like its legal effect, quantization of emission reduction indicator and time span were not finally decided; there is still a long, long way to go to reach uniformly agreed global environmental protection action. Undoubtedly, such fighting about environmental issues is essentially fighting about benefits. In spite of the divergence and conflict within the group of developed countries, they have common benefits in how to maintain the wide gap between them and developing countries and how to restrict emerging great powers from rising. Therefore, only by mutual support and cooperation between all countries of the world with an eye to the tied common benefit in global environmental protection can the divergence be substantially removed and agreed actions be reached.

1.5 Enhancing Environmental Protection as a Common Understanding

Wide spread of environmental problems beyond national border and globe-wide occurrence of environmental pollution have decided that the protection of environment is the common responsibility of the entire human beings, something not completed simply by the developed countries or individual organization; it requires full participation of the vast developing countries and underdeveloped countries to actively push the negotiations about international environment issues and carry out global collaboration. Since the 1960s, in order to strengthen environmental protection, series of environment conference have been held all over the world, which have approved series of environment declarations and environmental protection conventions and reached comprehensive common understanding. Among these, there are seven global environment conferences of significance deserve focal attention: (1) United Nations Conference on Human Environment held in 1972 in Stockholm of Sweden, which passed Declaration of United Nations Conference on Human Environment, for the first time put the issue of global environment before the world and determined the "top-down" global environment governance pattern of inter-national cooperation and coordinated actions inside and outside the UN system. (2) United Nations Conference on Environment and Development held in 1992 in Rio de Janeiro of Brazil, which reached world's first international covenant regarding the issue of climate change for the purpose of overall control of emission of greenhouse gases like CO_2 and combating the adverse effects on human economy and society due to global warming – United Nations Framework Convention on Climate Change, and produced three documents of principle, including Rio Declaration on Environment and Development, Agenda 21 and Statement of Forest Principles. (3) The World Summit on Sustainable Development held in 2002 in Johannesburg of South Africa, which released the Johannesburg Declaration on Sustainable Development and Plan of Implementation of the World Summit on Sustainable Development. (4) Bali Climate Change Conference 2007, which approved Bali Roadmap, initiated the negotiation process for strengthening full implementation of the Convention and Kyoto Protocol, and hammered at completing the first commitment period of Kyoto Protocol by the end of 2009 and the negotiations about new arrangement against global climate change in 2012 when the Protocol expires. (5) Copenhagen Climate Change Conference 2009, which reached the Copenhagen Agreement that maintained the principle of common but different responsibility established in the United Nations Framework Convention on Climate Change and Kyoto Protocol, made arrangement regarding compulsory emission reduction by developed countries and voluntary mitigation by developing countries, and reached wide common understanding on focal issues like global environment long-term objectives, fund and technical support and transparency. (6) Durban Climate Change Conference 2011, which established the Ad Hoc Working Group on the Durban Platform for Enhanced Acton, decided implementation of the second commitment period of Kyoto Protocol and launched framework cooperation agreement like

Green Climate Fund. (7) Rio +20 Earth Summit held in 2012 in Rio de Janeiro of Brazil, which proposed system framework for promotion of sustainable development and concrete ways to realize it.

We could see that after years of hard negotiations and efforts of all countries, the world has reached a common understanding with respect to global environmental protection: social progress and economic development must be in coordination with environmental protection and ecological equilibrium, to improve the standard and quality of living for humans and promote the prosperity and thriving of entire human society must be accomplished through global sustainable development. The existence of global environmental problems has their historical background and also the reason of flaws in international system; a responsible attitude is not to blame each other, but to positively cooperate with joint efforts. Therefore, to solve issues like global ecological environment destruction and climate warming up, governments must show wisdom and bravery to shatter the narrow concept bondage of national interests and work towards international cooperation, collective security, common benefit and rational negotiation. Only through mutual efforts of international community can the sustainable development objectives be realized with harmony between economic development on one side and population, resource and environment on the other. Global climate change, perhaps, will provide great prospect for strengthened cooperation and mutual benefits for the entire international community, though it also brings about potential crisis.

Chapter 2
Theoretical and Reality Basis of GEC Research

Looking at environment, economy and social development, to promote sustainable development through global partnership must enhance environmental competitiveness to solve the global ecological environmental crisis. This is not only the premise and foundation to establish the argument of this research, but also where essential value and significance of this research lie in. Whether the sustainable development of human beings needs to enhance environmental competitiveness is an issue related to economic development, environmental protection and government function, and requires profound analysis and argumentation.

2.1 Theoretical Basis of GEC

Global Environment Competitiveness (GEC) is a comprehensive across-discipline research subject involving sustainable development economics, natural resource and environmental economics, environmentology, competitiveness theories and econometrics. Among these, the theories of such disciplines as natural resource and environmental economics, sustainable development economics, environmentology and competitiveness economics are the theoretical basis of environmental competitiveness research, while competitiveness evaluation methodology, econometric analytical approach and related analysis method in environmental economics also provide methodology reference.

2.1.1 GEC Is a Key Component of Environmental Economic System

Ever since industrialization, especially after the 1950s, science and technology have made fast progress and humankind's ability to conquer the nature were also enhanced enormously. The industrialized civilization has brought about great

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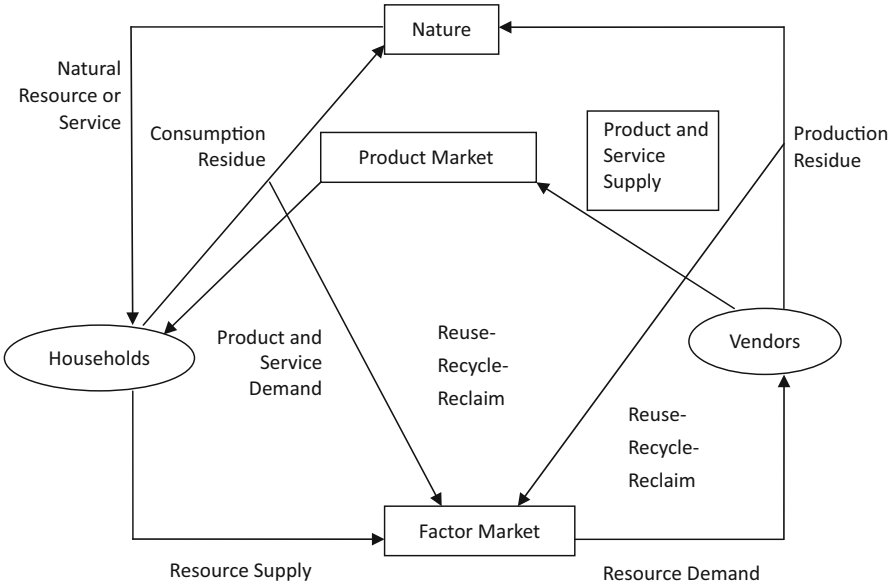

Fig. 2.1 Economy-environment system model: interdependence between economic activity and nature

material wealth as well as problems like deterioration of ecological environment and resource depletion. The problems are now rather severe, but the mechanism of interaction in natural environment is so intricate that the future is full of uncertainty as for how natural environment change, and so far human beings know few about it, or even know nothing. The austerity, complexity and uncertainty in environmental problems have made the research on GEC more important in the environmental economic system.

Economy and environment are mutually influential and interactive, constituting an interdependent economy-environment system. First, in the economy-environment system (See Fig. 2.1), economy and environment influence each other, with natural environment providing various natural resources (such as oil, mineral products and water) and different types of services (such as life support service and comfortableness service) for human economic system and at the same time economic system also influencing natural environmental system; natural resources entering economic system will eventually become byproduct or residue and return to the natural world. Secondly, economy and environment are mutually conditional; without the resources and services provided by natural environment, human beings can't survive or develop and human economic system can't operate well; meanwhile, if humans take too much from and discharge too much residue into nature as beyond the affordability of natural environment, then natural environment system will be damaged.

If human beings can correctly manage their behavior according to the laws of development in natural environment, rationally utilize natural resources, harmoniously

co-exist and friendly develop with ecological environment and continue enhancing global environmental competitiveness, then natural environment can provide not only good life support, comfortableness services, but also various natural resources, and help with the sustainable development of human economic society to realize the maximization of human wellbeing. Otherwise natural environment quality would be damaged, polluted environment quality would directly cause big loss in health, life, production, public facility, construction and property; and any preventive or compensative expenditure for such loss has an opportunity cost, which would reduce economic development. It is to say, natural environment shouldn't be regarded as an issue that has nothing to do with economics, but the core of economics and economic decision; global environmental competitiveness should be an important component of the comprehensive competitiveness of all regions of the world.

2.1.2 GEC Supplemented and Developed Environmental Economic Theories

The theoretical basis for the existence and development of global environment competitiveness are manifested in the theories of sustainable development economics, natural resource and environmental economics, environmentology, competitiveness economics and econometrics. It should be particularly noted that environmental economic theories are completely applicable to the research on environmental competitiveness; they constitute the theoretical basis of the intentional logic of environmental competitiveness. Sustainable development economics says that regional sustainable development system can be summarized into society, ecological environment and economy such three subsystems.

Ecological environment can provide production means for human society as well as life support and comfortableness services, which is the efficacy and benefit from ecological environment. Human beings will respond to the changes in such efficacy and benefit by improving social system and regulating social behavior and thus influence the pattern, speed and scale status of economic development; different status will impose different pressure on ecological environment and ultimately leads to different development in the latter. What the different status of ecological environment will provide is also different efficacy and benefit, and human beings will in turn adjust their behavior according to the changes in such efficacy and benefit. In a word, regional sustainable development system is a combination of three synthetically interlinking subsystems of ecological environment, economy and society.[1] This system is an integrated system under cyclic motion and dynamic development. Thus, the interaction process between ecological environment and its efficacy and benefit is very much similar to the mechanism between force and action in physics: the dynamic system of ecological environment under cyclic

[1] CHEN De-min. Regional Economic Growth and Sustainable Development [M]. Chongqing: Chongqing University Press, 2000: 25–29.

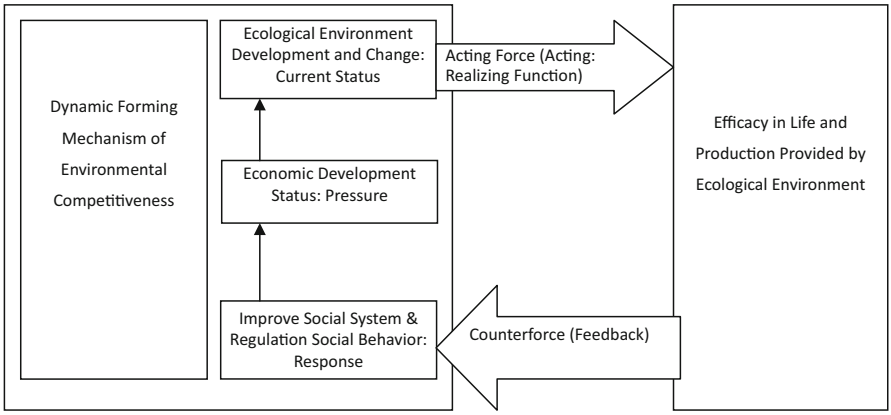

Fig. 2.2 Dynamic forming & acting mechanism of environmental competitiveness

change and composed of social response, economic development pressure and changes in ecological environment eventually forms a environmental force, which acts on human society and realizes its efficacy and benefits for human beings. And, the result of action by the force will be fed back to the dynamic system of ecological environment cyclic change and forms again another new environmental force that acts on human society. Environmental force and its efficacy and benefit for humans are a dynamic developing process with cyclic change. Comparison of the environmental force in different regions will show the environmental competitiveness in these regions. We see, therefore, the relationship between environmental force and environmental competitiveness is like the relationship between absolute value and relative value; thus the dynamic mechanism of formation for environmental force – the dynamic system of ecological environment cyclic change, is also the dynamic mechanism of formation for environmental competitiveness (See Fig. 2.2). To sum up, the theories of sustainable development economics is the basis for establishment of the concept of environmental competitiveness. Besides, other environmental economic theories also become the theoretical basis of the operation mechanism of environmental competitiveness. First, natural resources and environment allocation theories argue that environmental resource services do not have a market for trading due to their nature of externality and publicity or other causes, or the so called market failure; together with the other two even more ultimate causes of incomplete property right system and government failure, environmental problems like environmental resource abuse, exhaustion and pollution have thus occurred.[2] Therefore, to solve these problems requires government sector to correctly understand the publicity nature of environment, correctly

[2] XIAO Dai-ji, ZHENG Hui-yan, WU Pei-ying, QIAN Yu-lan, et al. A Cost-Benefit Analysis on Environmental Protection [M]. Taiwan: Junjie Publishing Co., Ltd., 2002: 13–15.

assess the value of environmental resource, establish necessary system to promote internalization of external influence and implement correct policy to regulate people's behavior, so as to realize coordinated development of economy and environment. This is an analysis of how social system influences economic behavior and further influences the status of ecological environment, or the analysis of the social response mechanism for dynamic formation of environmental competitiveness. Secondly, the econometric theories about environmental resource analyze the relationship between economic development and ecological environment from empirical angle. Environmentological theories and environmental status assessment theories are the basis of analysis on the development and changes in ecological environment status. Finally, environmental value theories and environmental accounting theories analyze and estimate the efficacy and benefit of ecological environment from micro and macro levels respectively.

Environmental competitiveness theory greatly enriches and develops environmental economic theories. First, environmental competitiveness comprehensively evaluates the dynamic development of ecological environment. Natural resources and environment allocation theory emphasizes particularly the analysis of how resource allocation system acts on ecological environment, the econometric analytical theory of environmental resource emphasizes analysis on the relationship between economic development and ecological environment from empirical angle, and environmentological theory and environment status assessment theory emphasizes the assessment of the status ecological environment; these theories almost all focus on certain angle in analyzing the dynamic system of cyclic change in ecological environment, but environmental competitiveness integrates three subsystems of social response, economic development pressure and change in ecological environmental status, which constitute a thorough evaluation of the dynamic development of ecological environment. Secondly, environmental competitiveness is a relative evaluation of the dynamic status of ecological environment. For any subject, only when the analysis on both the absolute value and the relative value are covered can we say that it is an overall analysis of the subject. Previous environmental economic theories mostly focused on analysis on the absolute value of environmental status, but environmental competitiveness analyzes the relative dynamic situation of ecological environment through comparison of different regions. Thirdly, environmental competitiveness cuts in from a very special angle to analyze ecological environment by borrowing the mechanism of force and action. Environmental value theory and environmental accounting theory analyze the efficacy and benefit of ecological environment, but environmental competitiveness analyzes the driving source of how ecological environment provides such efficacy and benefit, which not only allows prediction of changes in the efficacy and benefit, but also can find the cause for such changes. Finally, environmental competitiveness can do overall static and dynamic analysis on the regional ecological environment. Such comparative analysis could be against different regions in the same period of time as static analysis, or against the same region in different periods of time as dynamic analysis.

2.1.3 GEC Is the Continuation and Deepening of Competitiveness Theory

GEC inherits and continues competitiveness theory; at the same time, it deepens the contents of competitiveness theory. First, ecological environment system is a complex dynamically changing system. It is influenced by not only the variables within the system, but also by external factors such as human social system and economic development level; and, these influences show nonlinear relation, which makes the evaluation of the absolute status of ecological environment very difficult, or even impossible. Competitiveness evaluation methodology puts emphasis on the evaluation of the relative and comparative ability of certain property of different matters by layer analysis, which means breaking down the various complex factors that influence such property, followed by analysis of each of them, and after adding weight, the comparative ability of this property of different matters will be obtained. Such feature of the evaluation suits well with the complexity and dynamic state of the system and therefore can appropriately evaluate the dynamic development of ecological environment in different regions. Secondly, GEC enriches and develops competitiveness theory. A review of the available literature shows that so far there has been not complete analysis on the connotation, mechanism formation, evaluation indicator system and projection methodology of GEC as a concept and neither there is complete analysis on the environmental competitiveness of different regions of the world. This study, therefore, will greatly enrich and develop the related competitiveness theory and analysis methodology.

2.1.4 GEC Is the Ability for Sustainable Development Worldwide

Environmental effect is actually the process of how natural environment acts on human beings and also human ability of how to protect and kindly treat the nature, which is ultimately expressed as how natural environment support and facilitate human survival and development and as an ability for regional sustainable development; it is the result of the operation of the dynamic system of the cyclic change of ecological environment. GEC is the result of comparing the environmental effects of different countries of the world; the relationship between GEC and environmental effect is the relationship of relative value and absolute value, sharing identical inherent connotation. First, GEC is natural environment's effect on humankind. Economy and environment are mutually influential and interactive, constituting an interdependent economy-environment system. Natural environment acts on humankind from three aspects: (1) Natural environment provides various material resources for human economic system (such as oil, mineral

products and water); (2) Natural environment provides various services for human economic system (such as life support service and comfortableness service); (3) Natural environment is at the same time a place of purification for the residues of economic system. Therefore, evaluation of the current status of the natural environment's effect on humankind should include the evaluation of the capacity of natural environment to provide all kinds of resources (reflecting the resource supply capacity of environment), the capacity of natural environment to provide ecological service (reflecting the ecological service supply capacity of environment) and the capacity of natural environment to provide environmental purification (reflecting the purifying capacity of environment). Secondly, GEC is the capacity of humankind to protect and kindly treat the nature. Human economic activities will impose great pressure on natural environment and environmental governance and protection by human beings will also improve natural environment. Therefore, the evaluation of human capacity to protect and kindly treat the nature should include evaluation of the pressure of economic activity by human on natural environment (reflecting the coordinating capacity of environment and economic system) and human capacity to govern and protect environment (reflecting human capacity for environmental governance). In the end, GEC is the interactive force between humankind and environment, appearing as natural environment supporting and facilitating human survival and development and the sustainable development capacity worldwide.

2.2 Reality Basis of GEC

The existence and development of GEC not only has sufficient theoretical basis, but also turns out to be necessary from the development realities faced by the world. The history of human development tells us that environment has always been the key factor for human survival and development, especially after industrialization when productivity witnessed unprecedented progresses and human influence over environment continued extending; thus environmental problems appeared and threatened the survival and sustainable development of human beings, with global climate change as the biggest problem. The world community has been well aware of the seriousness of these problems and started aggressive actions with some achievements, but there is still a long way to go to find the final solution for environmental problems. At present, solving environmental problem and realizing sustainable development are the common understanding and a development strategy for all countries of the world; it is foreseeable that environmental competitiveness will be a key component of national comprehensive competitiveness. To realize sustainable development must enhance global environmental competitiveness. The constraints of related environmental theories in practice call for new theory to provide guidance. These together constitute the practical basis of global environmental competitiveness.

2.2.1 Enhancing GEC Is Related to Human Survival and Development

In retrospection of the historical process of human development, we can find that the entire human history is the course during which humankind continues fighting with environment and get adapted to environment. Only by harmoniously co-existing with environment, can human beings survive and all countries can thrive; otherwise, death and declining wait. In the Quaternary Ice Age about three million years ago, the earth once encountered climate crisis, and it is during the process of solving this crisis that humankind came into being. At that time, climate was extremely cold and forest area decreased in large scale, which seriously threatened the survival of ancient ape and caused large quantity of deaths. But a few number of ancient apes changed habits of life. They stepped down from trees, learned to make and use tools, rebuild the environment and fight against coldness and hunger; thus humankind came into being.

Ancient humans could only live on collection and hunting and fishing during the very long process of development. As they didn't know how to build a well, they couldn't be far away from water source and thus the biotic resources available for collection and hunting or fishing were very limited; very often, depletion of biotic resource occurred because of excessive collection and fishing or hunting. Therefore, food crisis occurred too. This is an environmental problem that directly influenced production. Food crisis forced ancient humans to change again the lifestyle and production mode. In about 8,000 years ago, humans learnt farming and raising livestock; human society entered a new stage, i.e. from primitive society to agricultural society.[3]

In agricultural society, production developed, living conditions were improved, and social civilization progressed in big steps; there appeared even great ancient civilizations like ancient Egypt, ancient Babylon, ancient Greece, ancient India and ancient China. But at the same time, new environmental problems occurred too. Owing to increasing growth of population, expansion of farming land destroyed vegetative cover, forests were laid down and grasslands were cultivated, followed by soil erosion and desertification; irrational irrigation further caused salinization. These were all destruction to land resources and in turn damaged the economic foundation of agricultural society. Thus some ancient civilizations declined, or forced to migrate to other areas. So, another environmental problem occurred – land crisis. So far the human society is still in the trouble of land crisis.

Entering industrial society, human capacity of production has made unprecedented progresses. In order to satisfy the unlimited desire, humans exploited enormous natural resources and the "three wastes" were recklessly discharged into environment. When the amount of discharge has accumulated to the degree beyond environmental capacity, pollution would be the result. Now environmental pollution and recession in the entire globe is already rather severe. According to the data in

[3] CHEN Ying-xu. Environmentology [M]. Beijing: China Environmental Science Press, 2001: 8–9.

UNEP Yearbook 2009, there are currently 25 countries where the entire forest ecosystem has disappeared and another 29 countries with 90 % of decrease in that. Since the 1960s, the biomass of major economic marine fishes has been reduced by 90 %. Till the middle of this century, the available agricultural acreage per capita might be less than 0.1 hectare, which requires increase in agricultural productivity; yet that is not possible to be realized simply relying on traditional method. Climate change is another painful example. As the continually discharged greenhouse gases can't be "internally consumed", we have paid so high a cost that could hardly be imagined even a few years ago: the water reservoirs located in the Mediterranean and the Midwestern USA would soon be dried up; and the ice cover on Greenland is possibly disappearing at the speed of 100 cubic kilometers per year, leading to rising of sea level. The North Pole is no less than a big storage of methane. In the northwest of Svalbard, there are now more than 250 seething mantle plumes, a signal warning the coming of the "critical" point of earth's climate.[4] All these indicate one thing that the present environmental problems have become a bigger threaten to the survival and development of human beings.

2.2.2 Enhancing GEC Is a Definite Requirement of Combat Against Climate Change

Although humans kept records about meteorological phenomena since as early as 1861, till the 1960s and 1970s were people aware that economic development accompanied with destruction of environment is not sustainable; excessive taking from the nature by humans would finally punish humans itself and greenhouse effect is an apparent example. In 2007, the UN pointed out in IPCC Fourth Assessment Report that the possibility of attributing climate warming to the greenhouse gases discharged due to human activities has increased from 66 % in the 2001 assessment to over 90 %; influence of climate change covers all aspects of natural ecology and social economy, from water resource to food safety and human health, and to the root of global operation – energy. Former Chief Economist of World Bank Lord Stern indicated in his Stern Review: The Economics of Climate Change that climate change has caused an economic loss that might reach 5–20 % of annual global GDP and may particularly impact the developing countries including China. In a word, climate change as an issue has completed a hop skip and jump from "scientific issue" to "political issue" and to "economic issue", and finally to the all-inclusive strategic height of "development issue".

Global warming is a complicated issue and people's understanding of the issue far from adequate; besides, as the causes and influences of global warming are worldwide, any effective policy or solution must rely on international covenant. The world community has made great efforts in this issue. The United Nations

[4] UNEP. United Nations Environment Program Yearbook 2009 [R]. UK: SMI (Distribution Services) Ltd., 2009: 1.

Framework Convention on Climate Change, Kyoto Protocol and Copenhagen Agreement are all important climate resilient legal documents, and the international system guarantee for the universe to jointly solve the historically most challengeable environmental externality problem. These all reflect the complexity and persistence of climate change; and tomorrow, the international community will have to put more efforts to solve this world issue.

Although the global negotiation process against climate change is not smooth, international conducts never stopped and the international system framework for the issue of climate change is foreseeable, which will eventually become a global agreement covering political, economic, social and cultural fields and, through international political and diplomatic channel, be transformed into legal obligations and policy of all countries with the efficacy like such international codes as the United Nations Charter and GATT. That means increasing global environmental competitiveness, energy-saving and emission reduction, increasing carbon sink, controlling emission of greenhouse gases, improving global climate, which will become compulsory obligations within legal system.

2.2.3 Enhancing GEC Is the Key Part of Enhancing the Comprehensive Competitiveness

Green economy is the future direction of world economy. No matter at macro-level, meso-level or at micro-level, environment always influences almost all aspects of economy of a nation; in other words, global environmental competitiveness will be the key part of a nation's comprehensive economic competitiveness.

First, from the macro-level, the instrument to measure the overall economic level of all countries is still Gross National Product (GNP); but in fact, under the current sustainable development strategy, GNP is inappropriate, because it does not consider such problems as environmental pollution, resource depletion and social security caused by economic growth: in the first place, GNP does not calculate the loss caused by environmental damage; and in the second, the expenditures use to handle environmental pollution and resource destruction are included in GNP. Therefore, specialists and scholars are all studying new economic accounting system that includes both natural resource and environment. Thus it can be seen that the level of environmental competitiveness will directly influence the general economic level of a nation.

Secondly, from the meso-level, green economy has already become the direction of future economic development. The Copenhagen Climate Change Conference held in 2009 has set the requirement that by 2020 emission shall reduce 30 % from the base of 1990. According to the analysis of International Energy Agency, if by 2050 greenhouse gases emission were reduced to the level of 2005, the marginal emission cost per ton of CO_2 would reach $50; if by 2050 emission were reduced to 50 % of 2005 level, the marginal emission cost would reach $200–$500 per ton of CO_2, which is equivalent to ¥620–¥2,480 or even ¥6,200 of cost for each ton of coal. "Low-carbon economy" thus appears. It aims at reduction of greenhouse gas emission and establishment of economic development system based on low energy consumption and low

pollution. This includes low-carbon energy system, low-carbon technology and low-carbon industrial system. Through levying carbon taxes on high-emission and high-carbon economies (such as coal, steel, non-ferrous metal, etc.) and transaction of Certified Emission Reduction (CER), subsidies for low-carbon or zero carbon emissions economies (primarily clean energy) and thus the objective of reducing CO_2 emission and solving climate problem can be reached, forming a low-carbon economic system.[5] So to speak, green economy like environment-related low-carbon economy is the direction of future economic development.

Finally, from the micro-level, green competitiveness has already become the core competitiveness of enterprises. Core competitiveness is the source an enterprise to obtain and maintain competitive advantage; its characteristics are reflected in at least three aspects: particularly good for realizing customer-emphasized value; hard to be copied by competitor and hard to be replaced; persistence. Enterprise having green competitiveness would have advantage in realizing user's value compared with other enterprises, because, with people's requirement on the material standard of living getting higher, consumers show increasing preference to environment-friendly products and hence green products can bring more value to users. Moreover, the technology and knowledge implied by such value activities as green production, green design and green material supply makes green competitiveness something difficult to be copied by ordinary enterprises and thus help the enterprise maintaining persistent competitive edge. Today, when green consumption becomes a vogue, green itself becomes a commonly understood concept, green products are well accepted by the public and when green market extends wide, green competitiveness has become an important part of the core competitiveness of an enterprise, or even become one of the fundamental ability to survive and grow.[6]

2.2.4 Enhancing GEC Is a Practical Choice to Realize Sustainable Development

Since the advent of humankind, she has established an inalienable close tie with environment. In retrospection of the historical process of human development, we can find that the entire human history is the course during which humankind continues fighting with environment and get adapted to environment. Only by harmonious coexisting with environment, can human beings survive and all countries can thrive; otherwise, death and declining wait. In the two or three million years of Paleolithic Age, primitive humans lived on hunting and fishing and collection simply relying on environment; till the Neolithic Age about 10,000 years ago, ancient humans began invention of simple tools to utilize environment and started agriculture and animal

[5] Shihua Financial Information. Low-Carbon Economy is the Direction of Future Economic Development [EB/OL]. http://content.caixun.com/NE/01/ct/NE01ctka.shtm, 2009-05-1/2010-03-20.

[6] MBALib. Green Competitiveness of Enterprise [EB/OL]. http://wiki.mbalib.com/wiki/%E4%BC%81%E4%B8%9A%E7%BB%BF%E8%89%B2%E7%AB%9E%E4%BA%89%E5%8A%9B, 2010-06-6/2010-03-20.

husbandry as well as handicraft activities like jade carving. Since then, especially about 5,000 years ago, with the start of human civilization, driven by increase of population and continued progress of production technology, the area coverage by human colonization has been continually widened, followed by environmental problems. Particularly after humans entered industrial society, the pace of development has exceeded any time in history. When people enjoyed the benefit of economic growth, they have to face the increasingly severe environmental problems.

In the 1950s and 1960s, environmental problem began one of the biggest concerns of the public. Frequent environmental problems in developed countries have made related researches shift gradually from microscopic areas like resource depletion, pollution control and environmental protection to macro issues like resource environment system, and environment was tightly attached with economic development. The researches on environment problems also broke the geographic limitation within a country or region; it has become a problem to be faced and solved by the entire world.

Today, the influence of the international financial crisis is not yet cleared, and world economy is just at the turn of a new round of structural adjustment and the critical period for innovation development; global resource and environment issues will be a big challenge for the international community for a long period, such as climate change, energy security and biodiversity protection; and green development, circular economy and low-carbon economy are increasingly becoming the trend of development. Particularly after March 11, 2011, when the Fukushima nuclear disaster triggered by the earthquake and tsunami in Japan again stroke the bell for nuclear pollution, countries like USA, Europe, China and Korea successively detected artificial radioactivity substance in both air and ocean several days later. The hazard and consequence on environment and humankind due to this nuclear crisis are to be further assessed, but environmental issues like nuclear pollution and nuclear security undoubtedly become the focal issue of public concern again. Therefore, whether to confront the shock from world's new economic development, or the supportiveness of resource and environment, we must enhance environmental competitiveness and take it as the breaking point to optimize economic structure, accelerate the transformation of development pattern and to realize the transition from industrial economy to ecological economy; only so can a country take dominance in the new round of international competition.

2.2.5 Enhancing GEC Is an Innovation to Overcome the Limitation of Environment Related Theories in Practice

Environment related theories are actually all from objective practice, which offer guidance and reference for assessment of and solution to environmental problems. But, as the historical context of researchers, the subject for study and the focus of research are different, some theories show apparent limitations. (1) Environmentology. It can tell us the constructive principle of environment, principle of various pollutions (water pollution, atmospheric pollution, soil pollution, noise pollution and ecological effect of environment pollution), the indicators and standards for judgment of the

status of environmental pollution as well as environmental pollution control technologies. But, it is more research on the various principles and control technologies of environmental problems from the perspective of natural science; it can only tell us the current status of environmental pollution and under such circumstance what technologies to be adopted for governance. Here are two problems: first, environmental pollution is not solely caused due to technical reasons; actually, environmental economics already demonstrated that the root cause is the externality of environmental resource, but people do not thoroughly understand this. Just because of the dual effects of both market failure caused by externality and policy failure caused by inadequate understanding, environmental problems appeared. Therefore, environmental pollution governance should essentially be to correct the market failure and policy failure. Secondly, assessment and measurement of environment must include status, pressure and response, because environmental change is such a dynamic consecutive process, during which, when human activities impose certain pressure on environment, environmental status would change and the society should respond to such change to restore environmental mass or prevent environment from degradation. If the measurement and assessment only covers current status of environment, the dynamic change of environment can't be obtained. (2) Natural resource and environmental economics. It discussed the root cause of environmental problems from the socio-economic perspective, put forward various policies and economic means to control environmental problems, explored the value connotation of environment and proposed different types of methodologies for environmental assessment. But, these analyses must be established on the data of environmental status. So, natural resource and environmental economics need the theoretical support of natural sciences such as environmentology. In addition, although natural resource and environmental economics attempted including environment (resource) into the system of national accounts so as to establish appropriate sustainable development ability evaluation system, there is still no single final conclusion from the existing environment and economic comprehensive accounting; from related research results we observed that there are at least two weaknesses: (1) Simple natural resource accounting or roughly putting natural resource depletion value and ecological environmental degradation value into national accounts. This fails to differentiate economic value and ecological value according to its correlation to economic strength and its essential characteristic; thus confusion of the relationship between economy and environment might occur, which is kind of barrier to the provision of objective, systematic and orderly baseline data for the establishment of policies regarding economy, natural resource, environment and other related price policies. (2) Roughly copying SEEA related concept of natural assets, which might lead to magnified comprehension of natural resource and misunderstanding of it, confused with concepts that are commonly used in economic sphere, such as economic assets and financial assets. Finally, environment and economic comprehensive accounting theory are already mature, but it can only be used to evaluate static regional sustainability, not the dynamic development trends of regional sustainability.

Chapter 3
Main GEC Research Contents

3.1 Understanding of Relation Between Environment and Economy

Environment and economy are two factors of a system. Between the two there is a kind of both opposition and unity dialectical relations. On the one hand, the environment and the economy are interdependent and closely linked entity. Environment is the basis and conditions for economic development, for any economic activity is under certain environment and resource conditions, environmental pros and cons will play a direct or indirect role in promoting or inhibiting economic development. And economic development, in turn, can provide guarantee funds and technical support for environmental protection and improvement to promote the virtuous cycle of economy and environment. On the other hand, the environment and the economy the environment and the economy are opposite and mutually exclusive to each other. Human has to continue to develop and utilize natural resources in the process of production and living which is bound to have an impact on the environment. Especially after the industrial revolution, with the rapid development of global industrial production and a surge in resource utilization, environment pollution is worsening, which has brought a huge threat to human survival and development, but also limits the further development of the economy. With the development of economy and the progress of human society, awareness of environmental and economic relations mainly experienced the following three stages:

3.1.1 Understanding of the Relation Between Environment and Economy Before the Industrial Revolution

Early development economists in discussing development issues, mainly focus on issues such as the economic growth, income distribution, employment and other ones, and often neglect environmental concerns, or just simply mentioned.

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Therefore, during this period the environment is simply seen as "library materials" providing resources for the economic development and "natural container" accommodating unlimited waste, and the emission is also lower than the capacity of natural environment. Environmental issues are not particularly prominent during this period, the harmfulness of environmental problems also lack enough understanding. In understanding the relationship between environment and economy, it is widely believed that environmental pollution is the price to pay for economic development, thus making the policy choice is to pursue rapid economic growth, consume large amounts of resources, at the expense of environment, damage ecology, which is simply "economic development determinism." Especially for developing countries, economic growth becomes a priority target.

3.1.2 Understanding of the Relation Between Environment and Economy After the Industrial Revolution

Human production technical level and material civilization level has been greatly improved after industrial revolution in the middle of the eighteenth century. However, large-scale industrial production and a substantial increase in the population makes the use of resources growing rapidly, resulting in economic development, at the same time, resulting in increasingly serious environmental damage, and natural resources are exhausted, natural ecological environment system is unable to recover in a short time, thus restricting the progress of human society and economic development.

In recognition of this reality, people began to attach importance to environmental protection, through a variety of systems, policies and techniques to bring economic development to reduce pollutant emissions. However, investment in environmental protection has to spend a high price, but also restrict economic development; so many people think that environmental protection and economic development are mutually contradictory and incompatible. Under the influence of this idea, people making policy choices are biased. One view is blindly emphasizes environmental protection, at the expense of economic development, namely "anti-growth theory" or "zero growth" theory, "Limits to Growth" published by Meadows and other scholars is the typical view. "Zero growth theory" is unrealistic for developing countries which in the urgent need to achieve industrialization and modernization, and promote economic growth. But to some extent, it poses a challenge to traditional concept of development centering on growth, and has positive significance in promoting coordinated development of environment and economy. There's viewpoint putting forward the development path of "treatment after pollution", that is taking steps to control the environment after economy developing to a certain stage. In essence analysis, these views and the aforementioned "Economic

Development Determinism" regarded environmental protection opposites to economic development, while ignoring the mutually reinforcing and connecting linkages between them.

3.1.3 Understanding of the Relation Between Environment and Economy Since the 1960s

In 1950s and 1960s and 1980s, with two serious outbreak of environmental crisis in human society, contradictions between environment and economic development are increasingly acute. Environmental problems quickly develop from local, regional problems into global issues around the world. Humans also gradually realized the relations between the environment and economy which are mutual promotion and mutual restraint. Therefore, in order to avoid environmental problems, economic activity must be in the range of environmental carrying capacity, so as to achieve coordinated development of economic and ecological environment, namely to achieve a virtuous circle between the two. Since the 1960s, in order to strengthen environmental protection, the world has held a series of Environment Conference, adopted a series of environmental declarations, environmental conventions, and proposed the concept of sustainable development. Under the guidance of this idea, economic development and environmental protection are not contradictory, but can achieve harmony and promote each other. Environmental issues are generated in the process of economic development, but also needs to be properly addressed in the process of economic development. It is possible to promote the economic development while improving the quality of environment through effective policies. In the process of global environmental protection, the world has reached such a consensus that economic development must coordinate with environmental protection and ecological balance. Only insist global sustainable development can we achieve the improvement of living standards and quality of all mankind and promotion of the common prosperity of human society.

3.2 Environment and Competitiveness Relevance Analysis

Researches on the relation between environment and competitiveness began with people's recognition of the importance of environmental protection due to environmental deterioration, ecological damage and resource depletion. Further attention on the subject could be traced back to both the impact of environmental protection on production cost and then on international trade and the increased economic loss caused by environmental pollution. Environment and competitiveness is not only an

economic issue; it has been more a comprehensive issue involving social development, political and diplomatic areas. The issue now has become a focus for governments and the entire humankind. Following are the main views about the relevance between environment and competitiveness.

3.2.1 Equivalence Theory: Environment Is Competitiveness

Since the start of ecological civilization, the harmonious cohabitation of both humans and nature has become the objective of development. In 1992, the United Nations Conference on Environment and Development proposed and approved the Agenda 21; China's State of Council approved White Paper on China's Population, Environment and Development in the twenty-first Century in 1994; USA released a plan for sustainable America towards twenty-first century in 1996; EU established the green Europe development strategy in 1998; and Japan proposed the new national policy of building up the nation from environment in 1999.[1] All countries of the world are putting the maintenance of environmental balance and the survival and sustainable development tightly tied together. The viewpoint of equaling environment to competitiveness emphasizes the decisive effect of environment in enhancing the competitiveness of a nation or region and believes that environmental strength level will directly decide the strength of regional competitiveness and that regional competitiveness will gain new driving force and source through environmental competitiveness. This theory is mainly adopted and applied by cities or regions with superior natural environment, comfortable living environment and outstanding investment environment. Of course, this point of view regards environment as equal to competitiveness, which neglects the effects and influences of other factors and mixes up the connotation and significance of environment and competitiveness.

3.2.2 Element Theory: Environment Is a Component Element of Competitiveness

Element theory regards environment as one of the component elements to weigh the strength of competitiveness, but it is not the only element; instead, environment, as well as the economic, social and political elements, together constitutes competitiveness. Douglas Webster and Larissa Muller (2000) is the first to introduce natural

[1] ZHU Da-jian and LI Jing-sheng. Strategic Steps to Enhance the Green Competitiveness of Shanghai Metropolis: A Research on Building Chongming into an International Comprehensive Ecological Demonstration Site. Journal of Tongji University (Social Science Section). 2001, vol. (12), No.5: 21–27, 54.

environment into the framework for city competitiveness research and elaborates from the impact of natural environment on the non-transferable regional endowment to the process of city competitiveness.[2] In Blue Book on China's Provincial Competitiveness, sustainable development competitiveness and development environment competitiveness are included in the evaluation system, which reflects the importance of environment. IMD Business School also puts health and environment as one of the 20 sub-index of the national competitiveness indicator system. The formation of this point of view indicates growing emphasis on the position of environment in assessment of competitiveness and the effect as an element to measure the strength of competitiveness at national and municipal level; but, the theory failed to stress the relative importance of environment and neglected the assessment of the potential and ability of environment to influence competitiveness.

3.2.3 Influence Theory: Environmental Protection Influence Competitiveness

Influence theory mainly aims at the relationship between environment and international trade; it argues that environment influences international competitiveness from aspects like comparative advantage, industrial transfer and trade barrier.[3] At present, the international academic circle has put forward three related theoretical hypotheses: the race to the bottom (RTB) hypothesis based on prisoner's dilemma, assuming that all countries will select to adopt tolerant antipollution measures in order to obtain competitive advantage and increase international competitiveness, which will intensify global environmental deterioration; the pollution haven hypothesis based on industrial transfer, assuming that adoption of tolerant antipollution measures is favorable to cost reduction, investment increase or production advantage, thus would pull industrial transfer towards it; Porter hypothesis based on long-term change, assuming that from the long term, adoption of strict antipollution measures will produce positive effect greater than the negative effect caused by cost up.[4] Hence we see two totally opposite point of views. On the one hand, they say strict environment regulation will increase production cost and management expenditure and thus will decrease output and profit, increase management difficulty, hamper technological innovation and finally influence competitiveness; on the other hand, people think that strict environmental regulation will promote enterprise innovation, increase resource utilization efficiency and finally promote

[2] YANG Tong and WANG Neng-min. Literature Review and Some Issues on the Relationship between Environment Protection and Urban Competitiveness. Journal of Qingdao University of Science and Technology (Social Sciences). 2008, vol.24 (2): 22–26.

[3] ZENG Fan-yin and FENG Zong-xian. Environment-Based International Competitiveness of China. Economist, 2001.5: 28–33.

[4] ZHAO Xi-kang. Environment Protection and International Competitiveness. China Population Resources and Environment. 2001.11(4): 12–16.

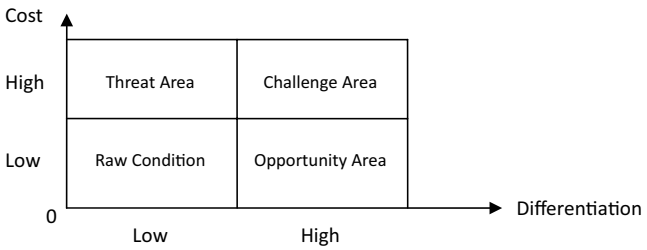

Fig. 3.1 Environment-competitiveness model

structural upgrading of industry and enhancement of competitiveness.[5] The relationship between environmental protection and competitiveness is influenced by cost and differentiation these two factors, which can be described in the Environment-Competiveness Model (ECM).[6] As the social cost effect induced by environmental deterioration, the economic growth effect of endogenous environmental cost, and the endogenous growth effect of environment as a production factor, all influenced environmental cost, different competitiveness models based on different "cost-profit" ratio appeared. Besides, since the strictness of environmental regulation distinctly differentiate competitors, the impact of environment on competitiveness shows dynamic changes alternating between positive and negative. Environmental protection influences competitiveness, but in varied direction and degrees. This point of view emphasizes the impact of environmental regulation strictness on international competitiveness and confines the issue within the scope of international competitiveness; it neglects both the endogenous influence of environmental quality on competitiveness and the influence of environmental management steps outside environmental regulation.

3.2.4 Summary: Environmental Competitiveness Is an Integrated Concept

Environment is competitiveness, environment is a component element of competitiveness, and environmental protection influences competitiveness, the forming of which indicates increasing attention to environmental issues on the one hand, and on the other shows the intensity of international competition under globalization. However, the current discussions mainly focus on the levels of natural environment, environmental protection, product competitiveness and enterprise competitiveness,

[5] QU Ru-xiao and WANG Yue-shui. Environmental Protection: An Important Instrument to Enhance International Competitiveness. Commercial Research. 2002.10: 84–85.

[6] FU Jing-yan. Environmental Regulation and International Competitiveness of Industry [M]. Economic Science Press, 2006: 69–77.

regarding environment as a sub factor or subsystem of enterprise/industrial/regional/national competitiveness, and environmental competitiveness is not put on the same layer as enterprise/industrial/regional/national competitiveness, thus purposely narrowed and restricted the connotation and denotation of environmental competitiveness. The researches neither consider the long-term potential impact of environment, especially natural environment, or the follow-up influence on competitiveness by environment improvement after adoption of environmental protection; instead, the researches emphasize the economic effects of environment and neglect its social and cultural impacts. In fact, either discussion of competitiveness apart from environment or vice versa would be segmented discussions. Environmental competitiveness itself is just an integrated and unified concept that can be discussed at the same layer as enterprise/industrial/regional/national competitiveness is discussed.

3.3 Economic Transition and Environmental Competitiveness Promotion Coupling Analysis

In the face of today's environment and development issues, we need to observe and analyze in a global perspective, to grasp and process with a development vision, to plan and solve from the strategic level, so as to actively explore an effective environmental protection path. Economic development and environmental protection are two aspects of one contradictory; they are mutually conditional, interdependent and inseparable. Environmental issues in its essence, is the economic structure, mode of production and development path problem. Talk about environmental protection without economic development is "climb trees to look for fish" and talk about economic development without environmental protection is "drain the pond to catch all the fish". Environmental problem is increasingly becoming the main constraints on economic development scale and development space. Conducting "anti-driving mechanism" of environmental protection to the structure adjustment and economic transition will be better able to promote the whole society onto the civilization development path of production development, affluent life and sound ecological development.

3.3.1 Green Economic Transition Is the Common Choice of the World

Economic transition refers to transformation of the allocation of resources and economic development pattern, including changes of development model, development factors and development path. Both developed countries and newly industrialized countries, none is not to achieve sustained and rapid development in the economic transformation and upgrading. The outbreak of the international financial crisis in 2008 indicates that the original economic development model has become obsolete

and must be changed. In post-crisis era, the global production and trade patterns change significantly, challenges like slow economic recovery, relative shortage of resources and growing environmental pressures are universally faced. Traditional economic development mode which relies on high input, high consumption, high pollution and extensive growth has been difficult to sustain. To achieve strong economic growth, improve the quality and efficiency of economic development and crack resource and environmental constraints become the world's main task. In this case, the global economic recovery requires a new development concept as a guide, and it has become the trend of the times to speed up economic structural adjustment, transform the pattern of economic development, and accelerate the economic transformation and innovation. We must promote the transformation in development, development in the transformation.

At the end of 2008, the United Nations Environment Programme (UNEP) put forward "Green Economy" and "Green New Deal" initiative, green economy has become the new trends and fashions of world's environment and development field. Green economy also points the way for the reshuffle of the world economic pattern and become the direction of the world economy. At present, many countries in the world has put green economy as the key driver to promote economic recovery, also sounded the horn of developing green economy, rushed to introduce all kinds of green economic development plans and policy measures, to develop all kinds of green technology innovation. A global "Green Economy Revolution" involved in production mode, lifestyle, values is quietly opened.

Green economic transition is the requirement of changing the traditional pattern of economic growth which relies on large resource consumption, environmental pollution to the new pattern relying on scientific and technological progress, improvement of the quality of workers, management innovation and green production. Only if we vigorously develop the supporting key technologies of green economic development, improve the level of environmental technology innovation, promote the adjustment of economic structure, expand development space, improve the consumption pattern, improve the use efficiency of resources and environment, can the economy development based on energy and resources saving and environment protection, so as to optimize the economic development through energy conservation and environmental protection, and to improve the sustainable development ability and level. From the connotation and objectives of the green economy perspective, strengthening energy conservation and environmental protection is not only an important starting point and end-result of economic development, but also a booster and important breakthrough in the transition of the green economy. Energy conservation and environmental protection is beneficial to form a new growth area, a variety of means and tools of it will be promising in the development of green economy. For example, strictly implement the assessment system of environmental impact is helpful to adjust industrial structure and spatial layout at source; improve environmental standards can promote the adjustment of industrial structure in the end of the upstream; strengthen environmental law enforcement can reduce economic output pressure on the environment; promote environmental product certification can lead green consumption; formulate environmental economic policies can

promote the development of environmental protection industry; improve the level of environmental information disclosure can encourage the public to actively participate in the green economic development; strengthen environmental technology applications can provide technical support for green development. In addition, strengthening energy conservation and environmental protection has reversed transmission function for improving the quality of economic development. That is conduct the "anti-driving mechanism" of energy conservation and environmental protection to the economic transition, would be able to promote industrial structure adjustment and technology upgrade, eliminate backward production technology, techniques and project. The precious environmental capacity will be reserved for those projects with less resource consumption, high technological content and good environmental benefit. Besides, create more space for economic sustainable development, promote the transformation of development pattern, and to obtain environmental benefits from better way of development, promote the whole society to embark on the civilization development of production development, affluent life and good environment, which is both an important content of economic transformation, but also an important symbol of economic transformation effect.

3.3.2 Greatly Enhance the Competitiveness of the Environment Is an Important Breakthrough in Economic Transformation

Since the twentieth century, in the process of industrialization, human beings has experienced high speed of production and economic prosperity, but the environment is rapidly deteriorating, environmental crisis is pressing harder and harder, environmental issue has not only become a global problem and the primary issue affecting the future world, but also a hard constraint of economic and social development in the future. Compared with the past, the main body, nature, methods, scope and extent of contemporary international competition have changed a lot with the new features. Environmental issues as a multi-dimensional complex involving economic, political, social, cultural, science and technology of multi-level, it has a special important role in the international competition. Under the constraints of the environment, competition between different countries is not only in comprehensive national strength taking economic strength as the main, environment which is long-neglected is also brought to the foreground of international competition. It is not only an integral element of national economic competition, but also becoming a more critical competitive factor. Fierce competition and game have been launched around the environment among developed countries, between developed countries and developing countries. Many countries put environmental governance and tackling climate change as a major chip in diplomacy and international competition is a proof. In this context, environmental competitiveness has become an important evaluation index of national competitiveness. Environmental protection industry and technology becomes a new field of the international competition of economy,

science and technology, and environmental protection has become the main land of environmental protection and cooperation in international competition. Meanwhile, with the increasingly intense competition in trade between countries, some countries began to frequently use environmental barriers to protect domestic industry and market, so as to maintain and enhance its competitiveness, as a result, energy-saving and environmental protection has become an important means to enhance the international competitiveness.

Environmental competitiveness is a new way to measure competitiveness, a comprehensive system, including both the natural environment and ecological environment, including environmental quality and environmental safety, but also the environment management and coordination of government and society, involving political, economic, social, cultural and other aspects of systems engineering. In its essence, environmental competitiveness is also a development mode, economic structure and consumption patterns, etc. Environmental competitiveness represents the country's economic and social development potential and sustainability, and is the foundation of competitiveness in other areas, relation with national economic and social long-term development. At present, countries around the world are in a critical period of economic transition, and development goals and tasks of environment are extremely arduous. Efforts to promote the competitiveness of the environment is the inevitable requirement to strengthen energy conservation, environmental protection, also is the inevitable choice and a new platform of all countries in the current world to solve environmental problems, open up new avenues of growth, breakthrough development bottleneck, grab competitive high ground. Whose environmental competitiveness is high, who will be able to take the initiative in international competition.

Enhance the competitiveness of the environment is the inevitable choice of all countries in the current world to solve environmental problems, breakthrough development bottleneck, grab competitive high ground. In recent years, there is a fierce debate and game around the environment among the developed countries, between developed countries and developing countries. In view of this, promote the competitiveness of the environment is the inevitable requirement and the realistic choice of global economic transformation, is to realize the sustainable development of the world, to solve problems like the human resource, ecological environment, natural disasters, population health, at the same time also is a new platform for countries to seize the high ground of the future development, so it has very important practical significance.

3.3.3 Enhance Environmental Competitiveness Coupled and Consistent with Economic Transformation

Coupling is a physics concept, refers to the phenomenon that two or more than two systems or motion forms influence each other through a variety of interaction. From synergy point of view, the key of system evolving from disorder to

order is the synergy between the internal parameters, which determines the characteristics and the law of phase transition. Coupling is a measure of this synergy effect.

Environmental subsystem and economic subsystem constitute the environmental economic system, and the interactive coupling relationship exists between the two sub-systems. On the one hand, economic subsystem has strong interference to the environmental subsystem (resource utilization, environmental pollution, waste discharge, etc.), and with the development of economy, the growing role; Environment subsystem, on the other hand, provides social and economic activities with resources for production and processing, as well as the space for emissions of pollutants and waste, and the environmental subsystem has a certain ability to repair and regeneration, that is under the influence of economic subsystem, not only try to keep the structure, function and stability of their systems, but also produce a certain degree of counter and constraints to the economic subsystem. Good environmental subsystem can efficiently support the development of economic subsystem; provide power and condition for enhancement of economic subsystem, good economic subsystem. At the same time, good economic subsystem can minimize the negative effect on the environmental subsystem, promote the improvement of the environmental subsystem, interact with each other, and jointly promote the environmental economic system's co-evolution development.

Enhancement of environmental competitiveness and economic transformation belong to one aspect of environmental subsystem and economic subsystem respectively, which influence each other and interact with each other. In the context that current world are faced with pressure of economic transformation, promoting environmental competitiveness and economic transformation is a dialectical unity. Promoting the competitiveness of the environment is the real needs of the economic transformation, is an important reflection and logo of shift of economic development mode; enhancing the competitiveness of the environment must have reversed transmission on economic transformation, promoting the development of economy.

To enhance the environmental competitiveness requires the implementation of concrete practice, not only including the ascension of hard power, for example, resources environment, ecological environment and environmental carrying, also containing the ascension of soft power, such as the ability of the environmental governance, environmental coordination, etc. This necessarily requires countries to accelerate economic transformation, continue to strengthen environmental protection work, and make sure to pay attention to environmental protection in economic development, focus on economic development in environmental protection, to combine the two. Take environmental protection as an important starting point of transformation of the mode of economic growth, to promote the development into the orbit of transformation. View the resource and environment carrying as basic premise of development, take environmental governance as an important means of development, consider environmental and economic coordination development as the goal, give full play to the optimization of environmental protection on the role of safeguard effect on economic growth and the reversed transmission effect on

economic transformation. Conduct these effectively in all aspects of the economic and social development, to promote the establishment of resource-saving and environment-friendly economic and social system. Meanwhile, promote the reform and innovation throughout all areas and all aspects of environmental protection, and actively explore small cost, good efficiency, low emission, sustainable new roads of environmental protection, to promote the improvement of environmental protection and environmental quality and effectively enhance the overall environmental competitiveness around the world. Improvement in environmental quality, resource conservation and environmental competitiveness will bring a lot of new demand, promote technological progress and product innovation, create new industries, and give new impetus to economic development. Transform the mode of development and realize win-win effects of economic benefit, social benefit, and resource environmental benefits, to promote the long-term stable and rapid economic development and build a harmonious and progressive society.

Of course, to achieve the coupling between enhancement of environmental competitiveness and economic restructuring is a long-term and complex process, since enhancement of environmental competitiveness is the common choice of countries around the world, all countries in the process of solving environmental problems and enhancing environmental competitiveness must adopt the method of global cooperation. However, it is very difficult and complicated to contributing to global cooperation. Because global cooperation is mixed with the common interests and own interests of all countries and regions, at the same time, also need to pay a high economic cost and social cost. So how to coordinate the interests of all parties and reduce the cost is the key to deal with environmental problems, which must be a gradual and slow, full of twists and turns process.

3.3.4 Empirical Analysis on Consistency of Environmental Competitiveness Enhancement and Economic Transformation

In order to further illustrate the consistency of coupling of the environmental competitiveness enhancement and the economic transformation, the following will be the empirical analysis on coupling degree of environmental competitiveness system and economic system. Coupling is to describe the strength degree of synergy of order parameter in the process of system development, according to the principle of synergy theory (Wu Dajin et al. 1990), and the key of a system to order lies in synergy effect between each subsystem in the internal system, the degree of coupling is a measure of this synergy (Jia Shi-jing et al. 2008). Here, the respective elements of the two systems of environment and economic competitiveness interact and influence each other is defined as the degree of coupling. The coupling model is established to illustrate the consistency of environmental competitiveness enhancement and economic transformation.

Firstly, create a power function. Set variable X_i (i = 1,2, ..., m) as an order parameter for the system, x_{ij} is the j-th index of the i-th order parameter, and its value is x'_{ij} (j = 1,2, ..., n)., Respectively, α_{ij}, β_{ij} is the max and min value of order parameter on the stable critical point, then the efficiency coefficient of x_{ij} is expressed as:

$$x_{ij} = \begin{cases} \left(x'_{ij} - \beta_{ij}\right) / (\alpha_{ij} - \beta_{ij}), \text{ possitive effect} \\ \left(\alpha_{ij} - x'_{ij}\right) / (\alpha_{ij} - \beta_{ij}), \text{ negative effect} \end{cases} \tag{3.1}$$

In formula (3.1), x_{ij} represents the contribution of the variable x'_{ij} to the efficiency of the system, and its range is between 0 and 1. "Total contribution" of order parameters within the system is:

$$x_i = \sum_{j=1}^{n} \lambda_{ij} x_{ij} \tag{3.2}$$

In Formula (3.2), x_i is the efficiency contribution of subsystem i to the overall system, λ_{ij} stands for the weight of i-th order parameter, and $\sum_{j=1}^{n} \lambda_{ij} = 1$.

Secondly, establish the coupling model. Learn concepts of capacitive coupling and capacitive coupling coefficient model in physics (Valerie Illingworth 1996), to obtain the coupling model of the two systems as follows:

$$C = 2 \bullet \left\{ \left(x_1 \bullet x_2\right) / \left[\left(x_1 \bullet x_2\right) \bullet \left(x_1 \bullet x_2\right) \right] \right\}^{1/2} \tag{3.3}$$

In formula (3.3), C is the coupling degree, and the value between 0 and 1.

To calculate the system coupling, it is necessary to establish index system of environmental competitiveness and economic subsystem. Environmental competitiveness index system will have a special introduction in the fourth chapter, with 1 primary index, 5 secondary indexes, 16 three-level indexes, 60 four-level indexes. In line with principles of representative, comparability, dynamic and data availability, we establish an index system of economic system, containing 1 primary index (economic subsystem), 6 secondary indexes (GDP, per capita GDP, GDP growth rate, industrial added value, industrial added value, net exports of goods) the weight of each index was determined through expert survey method, respectively 0.2, 0.2, 0.2, 0.15, 0.15, 0.1. All indicators data derived from the statistics released by World Bank, the United Nations and other international authoritative organization.

The order parameter and coupling degree of 133 national environmental competitiveness subsystem and economic subsystem can be calculated by coupling model, as shown in Table 3.1.

The table shows that there is a high degree of coupling between world's environmental competitiveness subsystem and economic subsystem, with a minimum of

Table 3.1 Order parameter and coupling degree of environmental competitiveness system and economic subsystem

Country	Item			Country	Item		
	Environmental competitiveness order parameter X	Economic order parameter Y	Coupling degree C		Environmental competitiveness order parameter X	Economic order parameter Y	Coupling degree C
Albania	0.5312	0.1483	0.8260	Libya	0.4034	0.0996	0.7969
Algeria	0.4650	0.2409	0.9482	Lithuania	0.5130	0.2089	0.9070
Angola	0.4803	0.2805	0.9649	Luxembourg	0.5166	0.3497	0.9813
Argentina	0.4988	0.2245	0.9253	Macedonia, FYR	0.4758	0.1703	0.8812
Armenia	0.4916	0.1594	0.8600	Madagascar	0.4406	0.1574	0.8808
Australia	0.5484	0.3406	0.9723	Malaysia	0.5153	0.2452	0.9348
Austria	0.5665	0.2720	0.9363	Mali	0.3893	0.1586	0.9070
Azerbaijan	0.4622	0.2605	0.9603	Mauritania	0.3927	0.1920	0.9392
Bangladesh	0.4698	0.1675	0.8803	Mauritius	0.5181	0.1858	0.8816
Belarus	0.4844	0.1767	0.8851	Mexico	0.5052	0.2483	0.9401
Belgium	0.5399	0.2644	0.9395	Moldova	0.4487	0.1753	0.8989
Benin	0.5028	0.1461	0.8354	Mongolia	0.4769	0.2482	0.9489
Bolivia	0.5522	0.2056	0.8893	Morocco	0.4745	0.1728	0.8848
Bosnia and Herzegovina	0.4651	0.1636	0.8775	Mozambique	0.4637	0.2195	0.9339
Botswana	0.5238	0.2233	0.9156	Myanmar	0.5247	0.2079	0.9017
Brazil	0.5746	0.2624	0.9278	Namibia	0.4928	0.1897	0.8959
Bulgaria	0.4824	0.1840	0.8942	Nepal	0.5107	0.1561	0.8468
Cambodia	0.5201	0.1656	0.8560	Netherlands	0.5278	0.2906	0.9571
Cameroon	0.4922	0.1788	0.8842	New Zealand	0.5767	0.2332	0.9056
Canada	0.5497	0.3216	0.9651	Nicaragua	0.5472	0.1617	0.8392
Chile	0.5425	0.2238	0.9094	Niger	0.3227	0.1524	0.9336
China	0.4803	0.5826	0.9954	Nigeria	0.4854	0.1988	0.9080
Colombia	0.5489	0.2127	0.8973	Norway	0.5820	0.3933	0.9811
Congo, Rep.	0.5092	0.2674	0.9503	Oman	0.4602	0.3192	0.9835
Costa Rica	0.5720	0.1831	0.8572	Pakistan	0.4521	0.1919	0.9147

Cote d'Ivoire	0.4651	0.1539	0.8644	Panama	0.5452	0.1400	0.8065
Croatia	0.5138	0.1748	0.8704	Paraguay	0.4920	0.1981	0.9048
Cuba	0.5157	0.1527	0.8397	Peru	0.5294	0.2011	0.8933
Cyprus	0.4938	0.1736	0.8774	Philippines	0.5316	0.1913	0.8823
Czech Republic	0.5168	0.2225	0.9174	Poland	0.5278	0.2109	0.9033
Denmark	0.5314	0.2655	0.9427	Portugal	0.5214	0.1894	0.8842
Dominican Republic	0.5059	0.1790	0.8787	Qatar	0.4430	0.4783	0.9993
Ecuador	0.5589	0.1941	0.8748	Romania	0.4950	0.2013	0.9067
Egypt, Arab Rep.	0.4611	0.1867	0.9059	Russian Federation	0.4846	0.3009	0.9722
El Salvador	0.5064	0.1658	0.8622	Saudi Arabia	0.5133	0.3627	0.9851
Eritrea	0.4351	0.1670	0.8954	Senegal	0.5050	0.1603	0.8554
Estonia	0.4946	0.2087	0.9136	Serbia	0.4607	0.1894	0.9088
Ethiopia	0.4570	0.1450	0.8552	Singapore	0.4813	0.2816	0.9651
Finland	0.5324	0.2584	0.9380	Slovak Republic	0.5573	0.2175	0.8987
France	0.5628	0.3042	0.9545	Slovenia	0.5382	0.2011	0.8900
Gabon	0.5495	0.3435	0.9730	South Africa	0.4721	0.2027	0.9168
Georgia	0.5084	0.1860	0.8856	Spain	0.4972	0.2552	0.9469
Germany	0.5845	0.4169	0.9859	Sri Lanka	0.5258	0.1917	0.8850
Ghana	0.4922	0.1819	0.8877	Sudan	0.4760	0.1412	0.8401
Greece	0.5303	0.1793	0.8690	Sweden	0.5526	0.2974	0.9539
Guatemala	0.5516	0.1835	0.8656	Switzerland	0.5868	0.3568	0.9698
Guinea	0.4682	0.1736	0.8884	Syrian Arab Republic	0.4501	0.1808	0.9043
Haiti	0.4700	0.1462	0.8509	Tajikistan	0.4473	0.1648	0.8872
Honduras	0.5521	0.1739	0.8536	Tanzania	0.5140	0.1403	0.8209
Hungary	0.4997	0.1984	0.9020	Thailand	0.4873	0.2238	0.9288
India	0.4432	0.2207	0.9422	Togo	0.4844	0.1580	0.8613

(continued)

Table 3.1 (continued)

Country	Item			Country	Item		
	Environmental competitiveness order parameter X	Economic order parameter Y	Coupling degree C		Environmental competitiveness order parameter X	Economic order parameter Y	Coupling degree C
Indonesia	0.5171	0.2559	0.9412	Tunisia	0.4846	0.1694	0.8761
Iran, Islamic Rep.	0.4589	0.2505	0.9559	Turkey	0.4800	0.1985	0.9099
Iraq	0.3802	0.3214	0.9965	Turkmenistan	0.4326	0.2308	0.9526
Ireland	0.5143	0.2637	0.9467	Ukraine	0.4741	0.2066	0.9196
Israel	0.4949	0.2196	0.9228	United Arab Emirates	0.4500	0.3386	0.9900
Italy	0.5304	0.2902	0.9562	United Kingdom	0.5658	0.3032	0.9532
Jamaica	0.5286	0.1536	0.8354	United States	0.5383	0.6458	0.9959
Japan	0.5721	0.4204	0.9882	Uruguay	0.4948	0.1932	0.8988
Jordan	0.4394	0.1750	0.9027	Uzbekistan	0.4030	0.1852	0.9289
Kazakhstan	0.3984	0.2472	0.9722	Venezuela, RB	0.5582	0.1648	0.8390
Kenya	0.4776	0.1367	0.8319	Vietnam	0.4678	0.2100	0.9248
Korea, Rep.	0.5026	0.2808	0.9591	Yemen, Rep.	0.4160	0.1801	0.9184
Kuwait	0.4237	0.4274	1.0000	Zambia	0.5251	0.1749	0.8658
Kyrgyz Republic	0.4252	0.1925	0.9263	Zimbabwe	0.4899	0.2197	0.9247
Latvia	0.5282	0.1981	0.8907	Maximum	0.5868	0.6458	0.9999
Lebanon	0.4747	0.1473	0.8503	Minimum	0.3227	0.0996	0.7970
Lesotho	0.3572	0.1795	0.9436				

0.7970 and a maximum of 0.9999, the coupling degree of 121 countries is more than 0.85, and the coupling degree of 76 countries is over 0.9, which shows that there is intrinsic consistency of coupling between the environmental competitiveness subsystem and economic subsystem. Two sub-systems are interdependent and influent each other with good synergies in the same direction, and jointly promote the co-evolution development of large system of environment and economy. Good economic development is the guarantee of promoting environmental competitiveness; unreasonable economic development model will aggravate destruction and pollution to the natural resources and environment. And enhancement of environmental competitiveness, in turn, promote the rational development of economy, it will set up a good resources environment structure, keep the benign substance cycle and energy conversion, control the interference and impact of human production and living on natural resources and environment within its bearing range. Therefore, countries in accelerating the development of economy need to pay attention to promote the competitiveness of the environment at the same time, both are integral and mutually reinforcing. If we only attaches great importance to the economic development and ignore the environmental protection and enhancement of environmental competitiveness, then the whole system of environment and economy will have the risk of imbalance, which will eventually corrode fruits of economic development.

3.4 Connotations of GEC

3.4.1 Concept of GEC

Since the 1990s, environmental competitiveness as a concept was frequently used and gradually valued by people; but as the discussions about the concept was done in different angles, there has been no unified definition for the term. In a broad sense, environmental competitiveness has rich contents: it can be classified into natural environmental competitiveness and social environmental competitiveness by nature; or into national environmental competitiveness, regional environmental competitiveness, city environmental competitiveness, development area environmental competitiveness, industrial environmental competitiveness and enterprise environmental competitiveness by spatial dimension; or into tourism environmental competitiveness, ecological environmental competitiveness, investment environmental competitiveness, humanistic environmental competitiveness, living environmental competitiveness and talent environmental competitiveness by focal point.

GEC is a whole new way of weighing under the context of increasing contradiction between economic development and environmental protection. It takes competitiveness as the core supported by natural environment; technology innovation as the main instrument; market mechanism and government regulation as the means; bearing capacity-coordinating capacity-executive capacity-influencing capacity-contributing capacity as assessment basis; capacity-response-feedback-adjustment-optimization

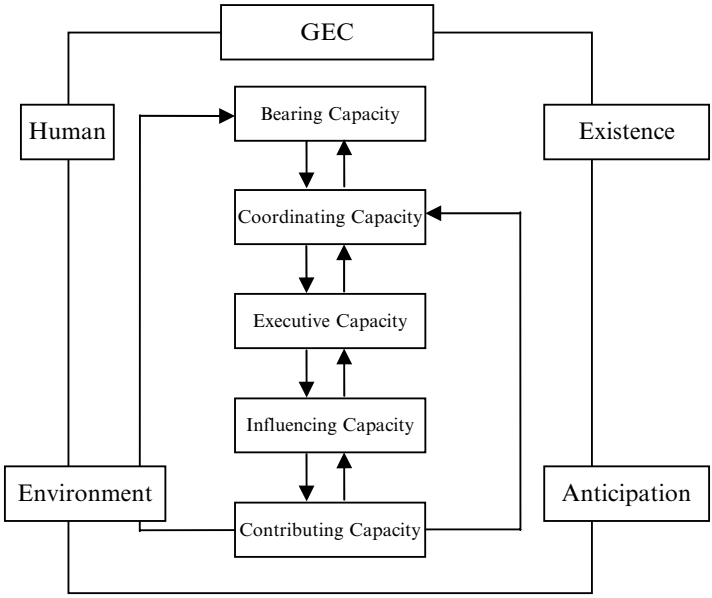

Fig. 3.2 Connotation of GEC

as main line; intensifying environmental development and utilization, reducing environmental damage, maintaining global ecological equilibrium and realizing global sustainable development as objectives; and ecological environment, resource environment, environmental bearing, environmental management and environmental coordination as contents. It reflects the environmental competitive capacity of different countries of the world in a comprehensive and systematic way.

The concept of Global Environmental Competitiveness proposed in this study is different from terms like green competitiveness, ecological competitiveness, energy competitiveness or low carbon competitiveness; it is neither attached to enterprise competitiveness, industrial competitiveness, regional competitiveness or national competitiveness. GEC is independent of and somewhat related to these concepts. Compared with the traditional competitiveness concepts, GEC emphasizes environment more as the basic element of human production and living; it places stress on the coordinated development of both human and environment and focuses on the existing and potential impact of environment.

3.4.2 Connotations of GEC

As given above, GEC is a huge comprehensive system involving economy, society and environment; it can be divided into five aspects, as shown in Fig. 3.2:

1. Bearing Capacity. It reflects a nation or region's capacity of ecological and resource environment to bear the regional sustainable development. The area and space of the nation or region is limited, its environmental basis available for development and utilization is limited, and its capacity to bear pollutant is also limited. Environment with different size, structure and function will show different bearing capacity. But environmental bearing capacity is never unalterable. Through environmental protection and technological advancement, the capacity to bear the intensity and scale of development and utilization may be enhanced. At the same time, once environmental damage exceeds the highest threshold, it would influence environmental function and damage ecological balance, while recovery of the damage would require payment of high cost.
2. Coordinating Capacity. It reflects a nation or region's capacity of ecological and resource environment to coordinate with the regional production and living activities. Environment provides the fundamental physical and spiritual conditions for normal production and living activities for humans, and digests and absorbs various pollutants generated by human activity; and human activity, particularly large-scale organized production activity, will also influence environment in aspects like earth surface formation, material cycle, heat budget and ecological balance. Coordinating capacity is an important component of environmental competitiveness; it may be adjusted and optimized by means of lifestyle transformation, readjustment of industrial structure and emission control. The stronger coordinating capacity is, the more harmonious the symbiotic relation between environment and human will be and the stronger environmental competitiveness will be.
3. Executive Capacity. It reflects a nation or region's executive capacity of all levels of government to manage ecological and resource environment and so as to realize environmental optimization. Relying on the administrative, economic, legal, educational and technological management functions of all levels of government, with public participation and social supervision as supplement and by means of environmental monitoring, environmental inspection and environmental assessment, environmental pollution can be prevented and controlled, ecological environment can be protected and repaired, environment can be comprehensively optimized and environmental competitiveness can be enhanced. Executive capacity is shown in almost all links of production and life and the entire course of production-distribution-trade; focusing on innovation in technology, system and mechanism and combining both price and non-price instruments, it will gradually strengthen environmental competitiveness.
4. Influencing Capacity. It reflects a nation or region's capacity of ecological and resource environment to influence neighboring regions and the capacity of human activity, especially major construction projects, to influence the regional internal environment. Influencing capacity comprehensively reflects the influencing capacity of regional natural environment and social environment through assessment of environmental quality status and impact; it is an important part to weigh

environmental competitiveness. Such capacity varies with the improvement in environmental management and management pattern, and also varies with the influencing capacity of surrounding areas.

5. Contributing Capacity. It reflects a nation or region's capacity of existing, improved ad damaged environment to make contributions to regional sustainable development. The quality of environment, efficiency of environmental management and implementation of major projects will directly influence the contributing capacity of environment. Vice versa, contributing capacity influences the bearing capacity of regional ecological and resource environment and the coordinating capacity between human and environment. Contributing capacity is the manifestation of the externality of GEC and core of GEC.

In summary, the concept of GEC used in this study has the following characteristics: (1) It considers both existing environmental competitiveness and the potential impact of environmental change; (2) It mainly investigates natural environment and its contents have overlapping areas with ecological environment and hard environment; (3) It also investigates the impact on all nations inside and outside the region by environmental quality improvement under the concept of environmental protection; (4) It considers the multi-layer superimposed effects of implementation of environmental protection under the current global environmental status.

3.5 Compositions of GEC

3.5.1 Component Elements of GEC and Their Functions

Based on the research results on GEC, the component elements of GEC in this study include five parts, i.e. ecological environmental competitiveness (EEC), resource environmental competitiveness (REC), environment carrying competitiveness (ECC), environmental management competitiveness (EMC), and environment harmony competitiveness (EHC).

3.5.1.1 Ecological Environmental Competitiveness (EEC)

Ecological environmental competitiveness (EEC) is the basic element of GEC. Ecological environment is the main component that attracts inhabitants and capital input and also an important factor that influences environmental competitiveness in long term. The cost to obtain ecological environment is very low; but once damaged, the cost for recovery is huge. Ecological environment includes natural ecology, rural ecology, biodiversity and biosafety. On the one hand, EEC looks at the utilization efficiency of ecological environment during the course of

production and living, mainly shown as indicators like emission quantity and industrial added value ratio, pesticide and fertilizer consumption and available irrigation area; on the other hand, it also looks at the intensity of ecological environmental protection, mainly shown as indicators like amount and area of public park, green surface and natural reserve used. ECC should reflect not only the contributing capacity of ecological environment for human activity, but also the utilization intensity and level of ecological environment by humans; it also reflects the degree of emphasis put by humans on ecological environment; it is the assessment basis of GEC.

3.5.1.2 Resource Environmental Competitiveness (REC)

Ecological environmental competitiveness (EEC) is the fundamental condition of GEC. Resource environment includes water environment, land environment, atmosphere environment, forest environment, mineral product environment and energy environment; it is the existing element of GEC and provides necessary support for human production and living. Water environmental competitiveness looks at the amount of existing water resource, its utilization efficiency and pollution status; land environmental competitiveness looks at the quantity intensity of using farming land, garden plot and construction land; atmosphere environmental competitiveness looks at the pollutant discharged by industrial activity into atmosphere; forest environmental competitiveness looks at the situation of forest utilization and plantation; mineral product environmental competitiveness looks at the reserve status of mineral resources; energy environmental competitiveness looks at the status of energy production, consumption and utilization. REC is an internal element of GEC and the necessary guarantee to form GEC; it comprehensively reflects environmental capacity to bear human production.

3.5.1.3 Environment Carrying Competitiveness (ECC)

Environment carrying competitiveness (ECC) is an important aspect to weigh the strength of GEC. Environment carrying involves industrial production, agricultural production, energy consumption and climate change; it reflects a nation or region's capacity of ecological and resource environment to bear regional sustainable development and also human activity's influence on natural environment, or, the response and restorability of environment against human activity; it is an important indicator to weigh the strength of environmental competitiveness. Again, ECC is never unalterable. Through environmental protection and technological advancement, the capacity to bear the intensity and scale of development and utilization may be enhanced. At the same time, once environmental damage exceeds the highest threshold, it would influence environmental function and damage ecological balance, while recovery of the damage would require payment of high cost.

3.5.1.4 Environmental Management Competitiveness (EMC)

Environmental management competitiveness (EMC) is a powerful support to GEC. Government and the public are the key players of environmental management; it coordinates the supervision relationship between socioeconomic development and environmental protection by various administrative instruments and economic and legal means. EMC includes two aspects, resource utilization and environmental safety, used to show utilization efficiency and environmental pollution governance results respectively. On the one hand, EMC needs economic and non-economic input to guarantee the smooth execution of environmental management and execution intensity of such; on the other hand, environmental management efficiency can only be observed after long-term observation. EMC comprehensively reflects the executive capacity for environmental governance; it is an important step to enhance GEC.

3.5.1.5 Environment Harmony Competitiveness (EHC)

Environment harmony competitiveness (EHC) is an important assessment reference for GEC. Population, economy, society and environmental coordinated development are the important criteria to judge the superiority or inferiority of environmental competitiveness and also an important way to realize the objective of sustainable development. EHC is present via the harmonious degree of population and environment and the harmonious degree of economy and environment. EHC can be optimized with improvement in production technology, readjustment of production structure and transformation of lifestyle. It is the external factor that influences GEC and also an important guarantee for formation of GEC; it even influences the changes in GEC.

3.5.2 Internal Relations of GEC Elements

The formation of GEC is a dynamic complex process. EEC, REC, ECC, EMC and EHC are the foundation stones of GEC and at the same time an important link to influence GEC. The objectives of these five elements are to increase the efficiency of environmental development and utilization, reduce environmental damage, maintain global ecological balance and realize socioeconomic sustainable development; through economic and administrative means, it can comprehensively reflect and influence environmental competitiveness.

EEC and REC reflects environmental bearing and contributing capacity by the way of capacity-response; they are the foundation and guarantee of EMC, ECC and EHC. Without ecological and resource environment, human production and living would have no support, not to mention utilization and protection of environment. And, for ecological and resource environmental protection and governance by means

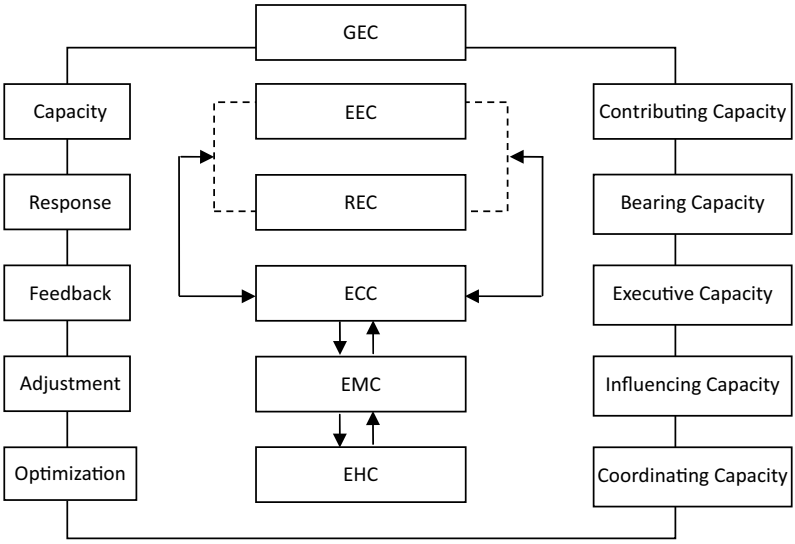

Fig. 3.3 GEC elements and their internal relations

of various administrative and economic policies, system and mechanism, the process and effect receive feedback through environmental management and bearing competitiveness and they are kept under readjustment and improvement based on the representation. The ultimate objective of improving environmental quality is to promote the harmonious unification of humankind and environment, and to realize the sustainable development of both; this is the essential contents to be reflected by EHC and the key part where environmental optimization lies (See Fig. 3.3). Therefore, EEC, REC, ECC, EMC and EHC are never mutually independent units; instead, they are an interactive unity focusing on the main line of capacity-response-feedback-adjustment-optimization. Appropriate degree of enhancement and collaboration of the five elements can push the overall enhancement of GEC.

Chapter 4
GEC Indicator System/Mathematical Model Design & Evaluation Methodology

In order to objectively evaluate the level of GEC and understand all the aspects and internal mechanism of GEC, it is necessary to conduct a comprehensive evaluation, which requires establishment of an indicator system that can objectively and precisely reflect the various aspects of GEC while at the same time referring to the internal structural characteristics of it and can evaluate and analyze it using scientific and logical mathematical evaluation model. Owing to the extensive contents of GEC, such as ecological environment, resource environment, environmental management, environmental influence and environmental coordination, and the unique internal structural characteristics, it is a rather complex task to establish an indicator system and mathematical model for evaluation, analysis and research of the GEC. This study has explored to design a scientific and proactive evaluation indicator system and model with reasonable logics and wide visual field and at the same time fitting into the reality of global environment based on the environmental status and facts of 133 countries of the world and their environmental development objectives.

4.1 Features and Principles of Design

From the perspective of economics, environment is the synthesis of all external conditions supporting economic entities; and GEC is a comprehensive evaluation of the relative competitive advantage of such external conditions. We may use the traditional qualitative description and qualitative evaluation approach to complete the evaluation, but such approach is rather subjective, and, very often, driven by different types of performance examination and benefits; besides, such evaluation results are quite ambiguous, fail to give appropriate and precise evaluation and placement for the environmental competitiveness level of different regions, and of course, no specific and precise policy suggestions with guidance and operability can be proposed based on such evaluation. If adopting quantitative analysis otherwise, we need to use scientific standards, select and determine typical indicators to form an

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evaluation system and use a logical mathematical model to measure and assess the GEC level of the countries; thus GEC can be converted into a concrete standard that can be easily judged and dissected and is operable, from a conceptual and abstract matter into a concrete and representational matter. From the evaluation results obtained, we can timely discover the primary indicators, weak links and other causes that restrict and influence the level of GEC of a nation and hence propose relevant countermeasures for the nation to enhance environmental competitiveness, as decision-making reference.

For quantitative analysis, the most important thing is to design an evaluation indicator system that can objectively and precisely reflect the GEC level of all countries of the world as well as a scientific and logical mathematical model; this is the foundation and key to the comprehensive evaluation, analysis and research of GEC. A scientific GEC indicator system and mathematical model must be designed thorough understanding of the internal mechanism and characteristics of GEC and following certain principles.

4.1.1 Composition and Characteristics of GEC

Environment can be subdivided into natural environment, social environment, economic environment; the environment used in this study refers to natural environment and therefore Global Environmental Competitiveness primarily refers to natural environmental competitiveness. In environmental laws, natural environment refers to the totality of naturally formed substance and energy that have direct or indirect influence over human existence and development, such as atmosphere, water, plant, animal, soil, rock and mineral, etc. These are the material basis for human survival and are normally divided into five natural spheres, the atmosphere, the hydrosphere, the biosphere, the pedosphere and the lithosphere. Natural environment includes ecological environment, biotic environment and resource environment. Biotic environment further includes animal environment and plant environment. As collection of bioenvironmental indicator data is very difficult and very often impossible, the biotic environment part is temporarily taken out from this study and when the data become available, evaluation of this part will be added.

From the definition of environment we can see the wide coverage of the concept; hence, GEC is also a concept with rich contents and broad extension. And therefore, a thorough understanding of the internal mechanism and characteristic of GEC becomes a necessary for construction of a scientific and logical evaluation indicator system; these should be adequately integrated in the indicator system and mathematical model.

1. **GEC has rich contents and covers wide range of aspects.** Comparing to natural environment, GEC covers the entire contents of natural environment, including ecological environment, biotic environment and resource environment and involving various aspects such as air, water, soil, forest, mineral product, energy source, plant, animal, etc.; it is the synthetic manifestation of the competitiveness of all natural environmental factors. Therefore, while constructing the indicator system,

these aspects must be adequately considered and the indicators of various factors should be rationally determined and distributed, so as to form a structurally complete, logically strict and rationally distributed indicator system; in this way, the evaluation system can comprehensively and precisely reflect the real status of global environmental competitiveness.

2. **The GEC factors are mutually influential and interactive.** The ecological, biotic and resource environment under the context of global environmental competitiveness are always mutually influential and interactive in between. Changes in ecological environment will influence biotic and resource environment, while changes in the latter will also influence the former. For example, expansion of natural reserve area (corresponding to ecological environment) will increase the variety of biologic species and improve the status of atmosphere and water resources in the reserve. And deterioration of the atmosphere, water and soil and decrease of biotic life will cause such ecological deterioration problems as desertification of land as well as water loss and soil erosion. The relationship between ecological, biotic and resource environment has decided that the relationship between ecological environmental competitiveness, biotic environmental competitiveness and resource environmental competitiveness are also mutually influential and interactive. Therefore, the relationship between the three should be carefully designed during construction of the indicator system to fully reflect the interactions in between. Of course, the availability of data should also be considered. Take biotic environmental competitiveness for example, there is almost no data and therefore the factors are not included in the indicator system.
3. **GEC is not only determined by environmental system, but also influenced by the economic system and social system.** GEC itself is an indicator reflecting the status of environmental status and hence it is undoubtedly dependent upon environmental system. But environmental problem is never only a matter of environmental issue; it is at the same time a matter of economic issue and social issue. In the entire environment-economy-society system, environmental system is influenced by economic system and social system, and economic system and social system are likewise influenced by environmental system. To be specific, economic system influences environmental system through production activities and environmental system satisfies the resource demand of economic system; social system influences environmental system through human daily life and environmental system satisfies the ecological demand of social system; economic system satisfies the economic demand of social system and social system satisfies the consumption demand of economic system. The relationship between the three is shown in Fig. 4.1.

In this system, of course, everything goes on surrounding humans; it is humans that impose the influences on environment through various economic and social instruments. Therefore, the influence of economic system and social system on environmental system must be adequately considered and reflected in the indicator system. For instance, adding two sub-index, EMC (including two pillars, resource utilization and environmental safety) and ECC (including two pillars, coordination

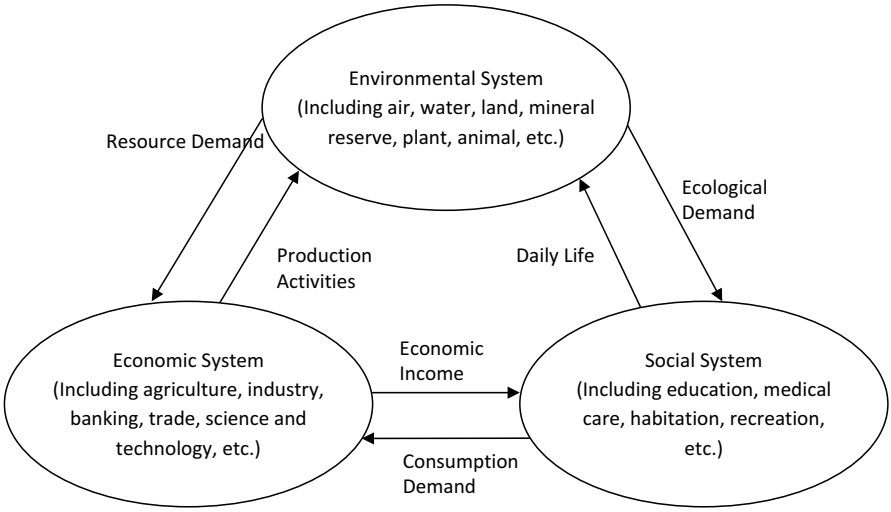

Fig. 4.1 Environment-economy-society system

between population and environment, and coordination between economy and environment), is to adequately reflect the influence of human economic activities and social activities on environment.

4.1.2 Principles of Constructing GEC Indicator System and Mathematical Model

Environment is a complex system with multiple intricately related factors that decide and influence GEC; a comprehensive and systematic analysis of these factors is never simple and should be done within an equally complex evaluation system. A relatively complete framework system requires as many as possible indicators to be screened according to the correlation between the factors and the representative indicators can be obtained after removal of irrelevant ones. This process is based on certain principles. The indicators selected must be typical and representative, as part of a unified entirety and must be mutually related; they should not be a simple combination of non-related indicators. The particularity, complexity and scientific requirements of evaluation of GEC should also be considered in the mathematical model. In summary, below are the principles to be followed while designing the indicator system and mathematical model:

1. **Principle of combining system and layering**
   Environmental system, as a system with the ecological environment, biotic environment and resource environment as dominant factors, has complex inter relationship; the subsystems are mutually influential and interactive. Therefore,

the GEC indicator system and mathematical model must be an organic entirety that can comprehensively and precisely describe and reflect the level and characteristic of the entire environmental system and should follow the principle of being systematic. From the perspective of system theory, environmental system as a macro system may be further divided into many subsystems in multiple layers, which together determines the level of environmental competitiveness and connects the evaluation target with the indicators as organic entirety. From the perspective of methodology, human observation and cognition of complex problem can hardly be thorough once and for all; very often, we need to systematically decompose the problem into multiple layers and subsystems, step by step from global to local, from abstract to concrete, and from appearance to essence; this is a process of using layered cascade method in analysis, following the principle of layering. It is the continuation of the principle of system, requiring the indicator system to divide the indicators into distinct layers according to the structure of the macro system; and, the indicators of the lower layer should represent the meaning of the upper layer as much as possible, in order to avoid overlapping among the various indicators. In the hierarchical structure, each evaluation indicator shows its affiliation to different layers of indicators and the interactions in between. The higher the layer, the more comprehensive the indicator will be; and the lower the layer, the more concrete the indicator will be. Upper-layer indicators are the summarization of the lower-layer indicators and guide the establishment of the lower indicators; lower-layer indicators are the breakdown of the upper-layer indicators; hence an orderly systematic hierarchical structure is formed for convenient operation and utilization. In summary, an indicator system reflecting the environmental competitiveness of the environmental system must be systematic and hierarchical.

2. **Principle of combining completeness and independence**
   The constructed GEC indicator system and mathematical model as an organic whole should reflect not only the entire characteristics and comprehensive status of the environmental system in all countries from different angles and in an all-round way, but also the key information of the system; the indicators should be concise and relatively independent and indicators in the same layer should be able to represent one of the aspects of the layered system, trying to avoid overlapping or inclusive causal relations; the entirety should be expressed in as less indicators as possible.
3. **Principle of combining universality and comparability**
   The indicators of GEC evaluation system should be able to understood and accepted by most people and universally applicable; they should consider the differences of the countries or regions around the globe and straightforwardly manifest the environmental competitiveness status of the countries or regions of the world. While considering the universality of the indicators, comparability should not be neglected. Which is to say, the selected indicators must be comparable indicators showing universality and at the same time with definite meaning as well as scope of statistics and scope in each country, as a way to guarantee the comparability in time and space. They can be compared with respective past and

future and also with the corresponding indicators of other countries, so as to make sure that GEC can be evaluated in comprehensive and proper way; consequently, the evaluation results can be better used to compare and analyzed GEC in time and space and finally to find out the factors that actually influence global environmental competitiveness.

4. **Principle of being scientific and operable**
   The screened out indicators and designed mathematical model should be established based on adequate understanding and research on the environmental system. It should be able to objectively reflect the connotations, requirements, intrinsic characteristics and actual status of environmental competitiveness, with logical preciseness and able to survive any questioning or scrutiny by different point of views and argumentation as well as the inspection of facts and history. Moreover, the evaluation of GEC can reveal the essential characteristics and inherent laws of GEC and thus could be guidance for enhancement of GEC.

   In addition to being scientific, the indicator system and mathematical model should also be operable. The selected indicators should be distinct in definition and expressed in terms internationally used to avoid any reciprocal overlapping or repetition of contents. Data should be easily collectable from authoritative and reliable source. For example, the data of biotic environmental competitiveness are basically unavailable and therefore this part is excluded from the indicator system. Besides, the statistics, calculation, comparison and analysis of the indicators and model should be convenient and understandable, in order to guarantee smooth progressing of the evaluation work and sufficient reliability.
5. **Principle of integrating dynamic and static aspects**
   Environmental system is a historical, dynamic, continued and developing system and at the same time static and stable at certain point of time period; it is the unification of being both dynamic and static. On the one hand, GEC evaluation must reflect the dynamic characteristics of environmental system and can adjust and improve the indicator system and model with the development of and changes in the environmental system; in this way, it can continuously and dynamically reflect the changing status of GEC. On the other hand, once established, the indicator system and mathematical model should not be frequently changed and should remain relatively stable within given period of time, to guarantee the effective comparison and analysis of the development process of the system.
6. **Principle of being forward looking and guiding**
   Environmental system is dynamic and so is GEC. One time of evaluation of GEC only represents the status at one point of time in the past of its developing process. To know the latest status, we have to do new evaluation, but as environmental reflection of human activities is always hysteretic even the newest evaluation results might also be hysteretic, which makes it difficult to obtain evaluation results that truly reflect the current status, not to mention the results that can reflect the future status. Therefore, in order to better reflect the actual status of GEC, the design of the indicator system and model should fully consider the development trends and future situation by selecting certain advanced and for-

ward looking indicators that can not only reflect the past and present but also the future status of GEC.

Selection of the forward-looking indicators should follow the principle of being guiding. The selected indicators should be supportive and instructive to decision makers, general public and various entities in the society; they should be able to guide people to act towards the required direction of the forward-looking indicators in areas like resource saving and environment-friendly activities.

4.1.3 Overall Coordination of Relationship Between the Principles

The above six principles are relatively independent and at the same time constitute an interrelated and interactional whole. They should not be dissevered; instead, the relationship between each other should be coordinated in overall perspective and be applied throughout the entire process of evaluation. Only in this way, they can truly offer guidance during construction of the indicator system and model and can be the guarantee for correct and effectively evaluation, analysis and research of GEC.

4.2 Construction of GEC Indicator System

With adequate understanding of the intrinsic composition and characteristics of GEC as well as the principles to be followed, we may start the work of constructing the GEC Evaluation Indicator System.

4.2.1 Methodology

Based on the connotations, intrinsic composition and characteristics of GEC and according to the requirements of global sustainable development, this study has constructed a multi-layer and multi-system GEC Indicator System with classified categories, and divided the indicators into four layers of system layer, module layer, factor layer and foundation layer (corresponding to primary, secondary, tertiary and individual indicators) following the six principles and the rationale behind such top-down hierarchical division is system theory and control theory. The specific flow of thinking is shown in Fig. 4.2.

First the theories about environmental sciences, ecology, environmental economics and sustainable development, the objective, significance and system layering of GEC is made clear according to its connotation, internal mechanism and characteristics and then the representative, pertinent and operable evaluation indicators are selected after careful analysis and comparison as well as consideration of

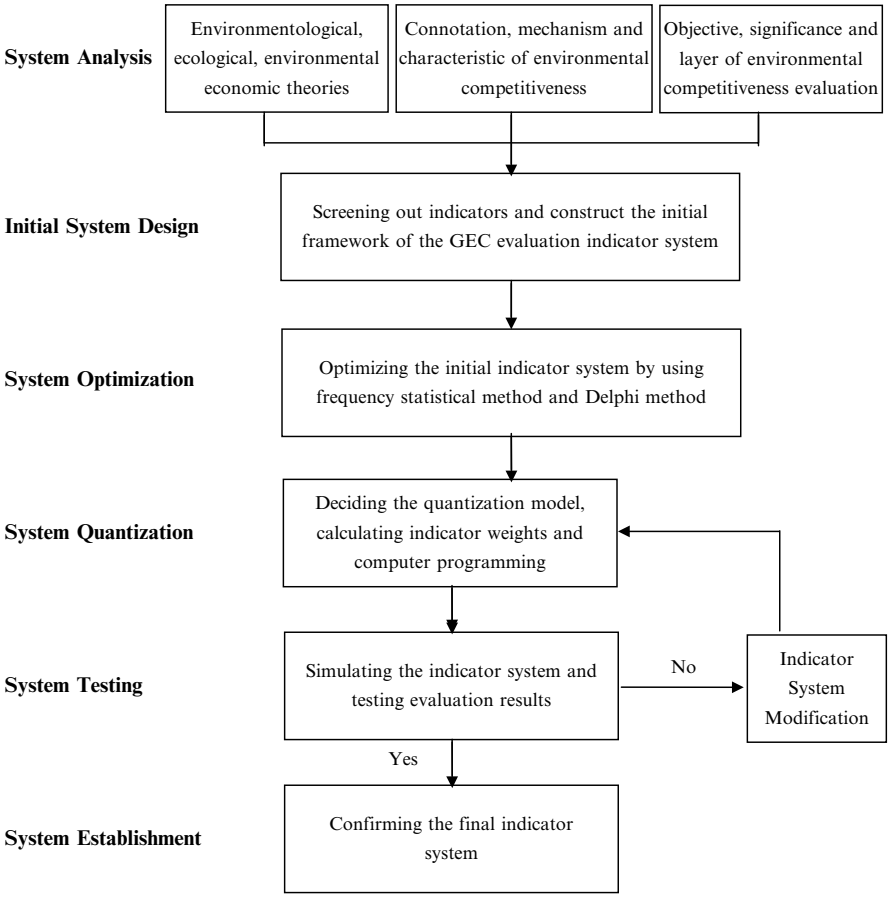

Fig. 4.2 GEC evaluation indicator system construction flow

the availability of data; thus the analytical framework and layered indicators for GEC evaluation are constructed and the meaning as well as measuring method for each indicator are also defined.

Second, by using frequency statistical method and Delphi method, the evaluation indicator system is further optimized to ensure the scientific and authoritative property of the indicators. To be specific, a statistical frequency counting is first done regarding the research reports and papers about sustainable development evaluation, ecological environmental quality evaluation and environmental competitiveness evaluation and then selects the indicators with high frequency of usage, such as Proportion of land area covered by forest, water resources per capita, Arable land per capita, etc. These indicators can reflect regional environment-friendliness and mostly data are available; thus these are good for indicators to measure the environment friendliness in evaluation. On top of this, Research team invited over 50 experts from environmental protection authority, social sciences academy,

governmental development research center and the university domestic and overseas, meanwhile, we asked the environmental experts in the field of economy for advice who participated in "International workshop on Green Economic Transformation and Environmental Competitiveness Indicators" which held by UNEP, Chinese Academy for Environmental Planning, Division of Environmental Strategy, PRCEE, Fujian normal university to form an expert panel and the panel use Delphi method to do additions and deletions and improvement on the indicator system after discussions in meetings; an indicator weight survey form is also designed for all layers as showed in Table 4.1.

Third, a quantized mathematical model is decided according to the indicator system established in the previous step and the specific weight of each indicator is calculated; at the same time, quantization method and quantity calculation method for specific indicator as well as the detailed procedures are also defined; then a computer program is compiled.

Finally, input the regional indicator data to simulate the system and test the results. If the test results are justifiable, then the final GEC evaluation indicator system will be confirmed; if unjustifiable, the research team will further modify the indicator system and do system simulation again after modification.

4.2.2 Selection of Indicators in System Layer and Module Layer

There is only one indicator in the system layer of GEC evaluation indicator system (index), i.e., Global Environmental Competitiveness (GEC, A1). This is a comprehensive and systematic index to evaluate global environmental competitiveness, covering the various aspects of an environmental system as general outline and reflects the overall level of environmental competitiveness of a country; it is also the general objective of evaluation for the indicator system.

Below the system layer is module layer, in which indicators are actually the sub modules of an environmental system reflecting respective support to the environmental system. As per the composition, mechanism and characteristics of GEC, the module indicators are designed from the five key component parts of GEC, namely REC, EEC, ECC, EMC and EHC, as five sub-index which constitute the major aspects and framework of GEC, as shown in Fig. 4.3.

1. **Resource Environmental Competitiveness (REC, B1).** Resource is the most fundamental condition for human existence and development and also the basic element for socioeconomic activities. Utilization of resources will not only influence the balance of resource supply, but also affect the balance of environmental system and might further cause deterioration of the foundation for human existence and development due to environmental damage and pollution out of overuse and disuse of resources. REC reflects a region's strength in resource material basis; it is the basal indicator to measure the strength of GEC.

Table 4.1 List of experts to attend "International workshop on "Green Economic Transformation and Environmental Competitiveness Indicators""

NO:	Name	Institution	Nationality
1	André Schneider	Former COO, World Economic Forum	Swiss
2	Andrea Bassi	CEO of KnowlEdge Srl and an Extraordinary Professor at Stellenbosch University	Italian
3	Caroline Eugene	Ministry of Sustainable Development, Energy, Science and Technology	Saint Lucian
4	Dowarkasing Mokshanand	Project Director, 'Sustainable Mauritius'	Citizen of Mauritius
5	German Dario Benitez Forte	Fiscal advisor at the Ministry of Economics and Finance, Uruguay	Uruguay
6	Hoseok Kim	Global Green Growth Institute	Korea
7	Laszlo Pinter	International Institute for Sustainable Development and Central European University	Canadian & Hungarian
8	Lino Briguglio	Professor of Economics, University of Malta	Maltese
9	Novrizal Tahar	Environmental Economic Planning Division, Ministry of Environment of Indonesia	Indonesia
10	Oliver Greenfield	Convener, Green Economy Coalition	British
11	Richard Scotney	Consultant, UNEP	British
12	Roberto Crotti	World Economic Forum	Italian
13	Seong yoon CHOI	Global Green Growth Institute	Korea
14	Sheng Fulai	Head of Research Unit, UNEP	Chinese
15	Zhou Xin	Institute for Global Environmental Strategies (IGES), Japan	Japanese
16	Chen BoPing	World Wide Fund for Nature (WWF)	Chinese
17	Chen Shaofeng	Institute of Policy and Management, Chinese Academy of Sciences (CAS)	Chinese
18	Cheng Qian	International Labour Organisation (ILO)	Chinese
19	Dong Zhanfeng	Chinese Academy for Environmental Planning	Chinese
20	Ji Zhu	President, Beijing Academy of Smart Economy	Chinese
21	Jiang Hongqiang	Chinese Academy for Environmental Planning	Chinese
22	Jiang Nanqing	UNEP China Office	Chinese
23	Jin Zhouying	Senior Researcher, Institute of Quanti-Economics and Techno-Economics, Chinese Academy of Social Sciences (CASS)	Chinese
24	Li Xiaoxi	Director, Institute of Economics and Resources Management, Beijing Normal University	Chinese
25	Liu Yimeng	Institute of Economics and Resources Management, Beijing Normal University	Chinese
26	Wang Jingyi	Institute of Scientific & Technical Information of China	Chinese
27	Wang Jinnan	Director, Chinese Academy for Environmental Planning	Chinese
28	Wang Yi	Deputy Director-General, Institute of Policy and Management, Chinese Academy of Sciences	Chinese
29	Wu Qiong	Chinese Academy for Environmental Planning	Chinese
30	Wu Yitong	Volunteer	Chinese

(continued)

Table 4.1 (continued)

NO:	Name	Institution	Nationality
31	Yang Weishan	Chinese Academy for Environmental Planning	Chinese
32	Yu Hai	Director, Division of Environmental Strategy, PRCEE	Chinese
33	Zhang Huanbo	Research Associate, China Center for International Economic Exchanges (CCIEE)	Chinese
34	Zhang Wei	Chinese Academy for Environmental Planning	Chinese
35	Zhang Xuehua	Environmental Impact Assessment Specialist, UNEP	Chinese
36	Zhang Yongliang	Policy Research Center for Environment and Economy, Ministry of Environmental Protection, P.R. China	Chinese
37	Liao Fulin	Vice-chancellor of Fujian Normal University	Chinese

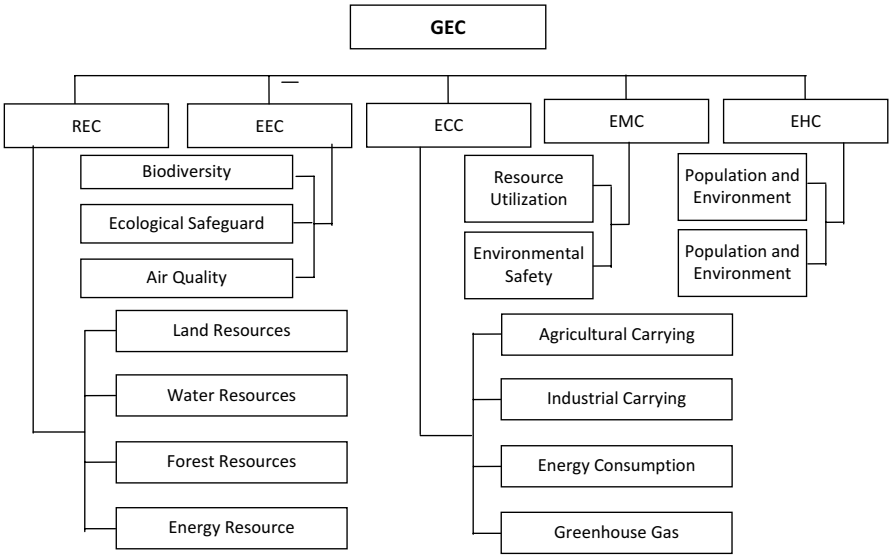

Fig. 4.3 Pillars of GEC evaluation indicator

2. **Ecological Environmental Competitiveness (EEC, B2)** Ecological environment refers to the entirety of various ecosystems that are composed of biotic communities and, mainly or completely, abiotic natural factors, and that indirectly and potentially impact human existence and development in the long run; it is the key part of natural environment. EEC mainly reflects the effect of both nature and humans themselves on ecological environment; it is an important label to indicate GEC strength.
3. **Environmental Carrying Competitiveness (ECC, B3).** Environmental Carrying refers to the effects of human activities (economic and social activities)

on environment and the changes in environment cause by such activities, such as environmental quality worsening due to natural environmental pollution and damage during human production and life process, including low-efficiency and uncontrolled exploitation of natural resources, discharge of waste water, waste gas and waste solids into the natural world without strict treatment, etc. EBC reflects the impact of human activities on natural environment in a region, or environment's ability to respond to and restore itself against human activity; it is an important indicator to show GEC strength.

4. **Environmental Management Competitiveness (EMC, B4).** Environmental management refers to a comprehensive action of human by using various means of planning, organizing, coordinating, control and supervision for the purpose of anticipated environmental objectives, mainly positive effects applied on natural environment, such as environmental pollution governance. Environmental management can timely discover and correct the problems in environmental system running, making environment operate normally and improving environmental status. EMC reflects a region's intensity in natural environment governance and supervision; it is a key indicator to measure GEC.
5. **Environmental Harmony Competitiveness (EHC, B5).** Environmental harmony refers to the degree of harmony between the existence and development of humans and the environment, mainly including two aspects, namely coordinated development of population and environment, and coordinated development of economy and environment. EHC reflects the degree of coordination between human activities and natural environment in a region and also an important indicator to measure GEC strength.

4.2.3 Selection of Indicators in Factor Layer

Indicators in factor layer are the major factors that influence the sub-index and therefore are decided by the contents and features of each submodule. As per the connotations, composition and characteristics of the five sub-index; the factors are further subdivided to 16 pillars. Establishment of indicators in the system layer, the module layer and the factor layer has formed the main framework of GEC, as shown in Fig. 4.3.

1. **Pillars under REC.** Resource environment mainly includes four factors, land, water, forest and energy; therefore Land Resources (C11), Water Resources (C12), Forest Resources (C13) and Energy Resources (C14) as the pillars of GEC. Land, water, forest and energy are the most fundamental resources for human existence and development and also the basic elements for consumption required by the social and economic activities of human; they are the carrier of the entire human production and life and the environment constituted by these factors are the place where human society exist and where human interference

and damage are most serious. Today, the resource environmental pollution and damage has become one of the key issues faced by the world. Land resources, water resources, forest resources and energy resources reflect the resource support to production and life from the angles of different type of resources in a region; they are the fundamental components of REC.

2. **Pillars Indicators under EEC.** EEC mainly reflects the competitiveness in biodiversity and ecological safeguard and air quality are selected as the factor indicators under EEC. Biodiversity refers to the steady ecological complex composed of various live organism (animal, plant and microorganism) incorporated in regular pattern. It reflects the abundance of biotic resources and also the intricate relations between biotic lives as well as between environments; it even reflects the degree of human influence on ecological system. Ecological Safeguard reflects the effects of ecological recovery and reconstruction in a region; it has big impact on ecological environmental competitiveness. Air Quality reflects the degree of air contamination; It is judged on the basis of pollutant concentration in the air, it is an important part of EEC.
3. **Pillars under ECC.** Environmental Carrying mainly reflects the scale and scope of human activities; such economic activity need to consume natural resources on the one hand and has certain influence on the ecological environment on the other. The capacity of environment to support and carry human activity decides the sustainability of good environment. Therefore, four pillars are selected under ECC, agricultural carrying, industrial carrying, energy consumption, greenhouse gas. Agricultural production is the key source of food and other consumer goods and such activities inevitably requires development and protection of land resources; it is one of the most direct factors that influence ecological environment. Industrial production is the most important part of economic activity and the major aspect that consumes resources and damages environment. The production level and industrial structure in all countries are different and therefore environmental bearing capacity also shows big difference; hence varied influence on EBC. Energy is the motive power of economic activity. At present, the industrial development pattern relying on consumption of fossil energy not only requires exploitation and consumption of large quantity of energy, but also emits greenhouse gases that have a strong impact on climate environment. The ecological disasters caused by climate change and the impact on human activity have attracted worldwide attention. Greenhouse gasses emission increase is the leading cause for climate change; emission control not only reflects the economic structure of a country, but also reflects a country's efforts in response to climate change.
4. **Pillars under EMC.** Environmental management mainly involves rational utilization of resources and protection of ecological environment, the factor indictors under this aspect are environmental governance, environmental protection and resource utilization. Modern economic operation can't do without exploitation, allocation and use of natural resources. Some resources are renewable, but many more resources are non-renewable. Excessive exploitation of renewable resources would cause non-renewability. Therefore, any country

need to ensure that resource utilization is rational and controlled and continue optimizing resource allocation to increase utilization efficiency. Human activity keeps discharge different kinds of waste into the external environment, including the byproducts and waste of industrial and agricultural production and also the disposables generated during people's daily life. Establishment of waste discharge regulation and supervision are the preconditions to guarantee no pollution or damage to the environment on which human existence and development lie and also an important aspect to measure a country's environmental management capacity.

5. **Pillars under EHC.** Environmental harmony mainly involves two aspects, the harmony between human and environment and the harmony between economy and environment, which become the two factor indicators under EHC. Harmony between population and environment refers to scientific planning of population development to promote moderate population growth and rational distribution as well as coordinated development of both population and environment, while taking environmental bearing capacity into consideration. Population and environment harmony competitiveness reflects the degree of harmony between population development and environmental protection in a region; it is an important indicator to evaluate EHC. Harmony between economy and environment refers to adequate consideration of environmental protection while guaranteeing necessary economic development, adopting low-pollution and environment-friendly way of production and life as much as possible, so that the influence of economic growth on environmental quality can be controlled within the range of bearing capacity and that economy and environment can reach balance. Economy and environment coordination competitiveness reflects the degree of harmony between economic development and environmental protection in a region; it is also an important part of EHC.

4.2.4 Selection of Indicators in Foundation Layer and Description

Foundation layer is composed of individual indicators with direct measuring capacity, directly showing the measurement of indicators in factor layer; it is the most basic layer and operation layer of GEC indicator system. The evaluation of the entire indicator system is actually carried out in this layer. As per the defined scope of pillars, there are 60 designed individual indicators, as shown in Table 4.2.

GEC Evaluation Indicator System is composed of four layers, system layer, module layer, factor layer and foundation layer, which corresponds to 1 index, 5 sub-index, 16 pillars and 60 individual indicators; among these, the index, sub-index and pillars are indirect synthetic indicators, while individual indicators are direct objective indicators that are measurable and therefore will use the data

Table 4.2 GEC individual indicators system

Sub-index (5)	Weight	Pillars (16)	Weight	Individual indicators (60)	Weight
Resource environment competitiveness	0.2	Land resources	0.2	Land area per capita	0.40
				Percentage of arable land to total land area	0.30
				Arable land per capita	0.30
		Water resources	0.3	Surface water	0.25
				Annual precipitation	0.25
				Groundwater	0.25
				Total internal renewable water resources	0.25
		Forest resources	0.2	Growing stock in forest and other wooded land	0.30
				Proportion of land area covered by forest	0.40
				Forest area per capita	0.30
		Energy resources	0.3	Fossil energy	0.30
				Energy production	0.35
				Proportion of combustible renewables and waste to total energy consumption	0.20
				Net energy imports of the energy consumption	0.15
Ecological environment competitiveness	0.2	Biodiversity	0.3	Threatened fish species	0.20
				Threatened mammal species	0.20
				Threatened plant species	0.20
				GEF benefits index for biodiversity	0.40
		Ecological safeguard	0.3	Terrestrial protected areas	0.60
				Marine protected areas	0.40
		Air quality	0.4	Inhalable particles (PM10)	0.20
				Particulate matter (PM2.5)	0.20
				Index of Indoor air pollution	0.30
				Nitrogen oxides emission	0.15
				Sulfur dioxide emission	0.15

(continued)

Table 4.2 (continued)

Sub-index (5)	Weight	Pillars (16)	Weight	Individual indicators (60)	Weight
Environment carrying competitiveness	0.2	Agricultural carrying	0.3	Cereal yield per unit of arable land	0.40
				Fertilizer consumption per unit of arable land	0.30
				Annual freshwater withdrawals for agriculture per unit of arable land	0.30
		Industrial carrying	0.3	Net exports of goods as a percentage of GDP	0.25
				Electric power consumption per unit of value added of industry	0.25
				SO_2 emissions per unit of value added of industry	0.25
				Annual freshwater withdrawals for industry per value added of industry	0.25
		Energy consumption	0.2	Energy consumption per unit of land area	0.25
				Ratio of clean energy consumption	0.25
				Elasticity of energy consumption	0.25
				Elasticity of electric power consumption	0.25
		Greenhouse gas	0.2	Growth rate of CO_2 emissions	0.40
				Growth rate of Methane emissions	0.20
				CO_2 emissions per unit of land area	0.20
				CO_2 emissions per unit of energy consumption	0.20
Environment management competitiveness	0.2	Environmental governance	0.3	Agricultural chemicals regulation	0.20
				Percentage of the rural population with access to an improved water source	0.20
				Percentage of the urban population with access to an improved water source	0.20
		Ecological protection	0.4	Area of plantation and afforestation	0.40
				Biome protect	0.30
				Overfishing of fishing resources	0.30
		Resource utilization	0.3	Utilization rate of water resources	0.20
				Percentage of total internal renewable water resources to total water resources	0.20
				Percentage of agricultural land to total land area	0.20
				Percentage of fossil fuel energy consumption to total energy consumption	0.20

Environment harmony competitiveness	0.2	Population and environment	0.5	Percentage of population with access to Improved sanitation facilities	0.20
				Motor vehicles per 1,000 people	0.20
				Renewable internal freshwater resources per capita	0.15
				SO_2 emissions per capita	0.15
				CO_2 emissions per capita	0.15
				Energy consumption per capita	0.15
		Economy and environment	0.5	Land resource utilization efficiency	0.25
				Sulfur dioxide emissions per unit of GDP	0.25
				Carbon dioxide emissions per unit of GDP	0.25
				Energy consumption per unit of GDP	0.25

released in current statistics system by such international organizations as UN and World Bank to guarantee the comparability of the collected data. As the statistical data about environment are limited and incomplete in current statistical system, which, to some degree, influences the availability of individual indicators data, certain relatively irrelevant individual indicators are already deleted while constructing the indicator system; but as for the few important and indispensible indicators, data will be collected using synthetic or substitute indicator. Such treatment might influence the precision and objectiveness of the evaluation result, but as the number of such indicator is extremely small and they are distributed in the bottom layer carrying small weights, there would be no obvious impact on the final overall evaluation result. The establishment of environmental competitiveness evaluation indicator system will provide a relatively reasonable and objective standard for the evaluation of GEC.

4.3 Construction of GEC Model Based on Modified AHP

After construction of GEC evaluation indicator system, the next step is to construct a GEC mathematical model, which is a step of vital importance during the evaluation process. Once the model is established, the evaluation process only requires input of collected data into the model and result will be obtained. Construction of the model can be done in three steps: first, apply dimensionless treatment to the evaluation indicators; next, determine the weights of indicators; and finally, establish the mathematical model. In the second step, indicator weights will be determined using Delphi – modified analytic hierarchy process.

4.3.1 Dimensionless Treatment to Indicators

As the unit of measurement and dimension of each indicator (individual indicators) are different and very often the numerical values show wide gap, calculation can't be done directly; instead, we must first apply dimensionless treatment to the indicators, changing them into non-dimensional numerical value or point value by indexation for integrated computation. There are multiple non-dimensional methods, and there are four commonly used ones: normalization by aggregation, normalization by standard deviation, normalization by max value and normalization by range. Here we adopt simple and practical efficiency coefficient method to apply this treatment to the indicators.

When an indicator is a positive indicator (having positive influence on the upper-layer indicators), the non-dimensional value of Indicator i will be Xi:

$$Xi = \frac{x_i - x_{\min}}{x_{\max} - x_{\min}} \times 100$$

When an indicator is a negative indicator (having negative influence on the upper-layer indicators), the non-dimensional value of Indicator i will be Xi:

$$Xi = \frac{x_{\max} - x_i}{x_{\max} - x_{\min}} \times 100$$

In which, Xi represents the obtained non-dimensional value of Indicator i, Non-dimensional Indicator i for short; xi is the original value of the indicator, x_{max} and x_{min} represent the maximum and minimum original values of similar indicators under comparison respectively.

After dimensionless treatment, the value of each indicator will be within the range of 1–100, with consistent polarity.

4.3.2 Assessment of Indicator Weight

Indicator weight represents its contribution to the evaluation objective in the indicator system; assessment of the weight of each indicator is a rather difficult procedure of the evaluation process and has vital importance for the results; therefore, the method used must be objective. Generally speaking, the most common way to assess indicator weight is using Delphi – analytic hierarchy process, i.e. first marking of the confirmed evaluation indicators through survey by experts based on and their long years of professional experience after pairwise comparison of the significance of each indicator and then calculation using analytic hierarchy process. Here the Delphi – modified analytic hierarchy process will be used to assess the weights. Modified analytical hierarchy process and the traditional analytical hierarchy process differ mainly in the scaling method for experts' marking while using Delphi method to arrange the evaluation indicators' relative importance judgment matrix. In traditional AHP, 1–9 scaling is adopted. But due to the complexity and fuzziness of indicator, it is difficult for experts to make precise assessment on each indicator into the 9 grades of the 1–9 scale; instead, they may give relatively fuzzy judgment of the indicators' relative importance. For example, Indicator A is more important than Indicator B, but how much more important is not clearly given. The judgment matrix obtained this way is less accurate and needs several times of adjustment. Therefore, the AHP is modified to adopt the scale of 0–2, which is less time-consuming and convenient, and more acceptable to experts (CHENG Jian-quan 2002). 0–2 Scaling is to first form a comparison matrix B, in which b_{ij} is defined as:

$$\mathrm{B} = \left(\mathrm{b}_{ij}\right)_{n \times n}$$

$$b_{ij} = \begin{cases} 2 & \text{When Factor i is more important than Factor j} \\ 1 & \text{When Factor i is equally important as Factor j} \\ 0 & \text{When Factor j is more important than Factor i} \end{cases}.$$

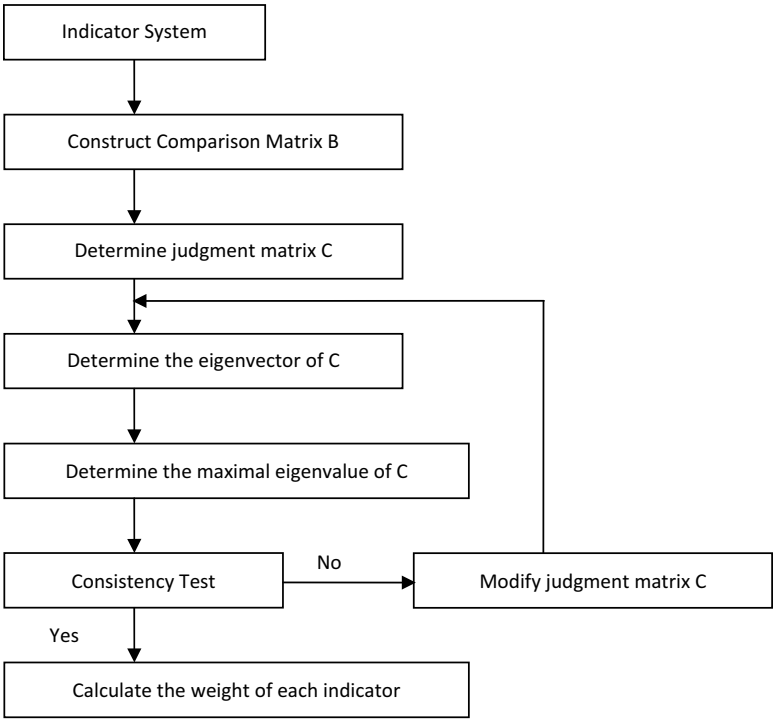

Fig. 4.4 Procedures of modified AHP

Next calculate $r_i = \sum b_{ij} (i = 1, 2, \cdots, n)$, i.e. summation by row, and then obtain the judgment matrix $C = (c_{ij})_{N \times N}$ using the following formula, in which $r_{\max} = Max\{r_i\}$, $r_{\min} = Min\{r_i\}$ and $b_m = r_{\max}/r_{\min}$.

$$c_{ij} = \begin{cases} \left[\left(r_i - r_j\right)/\left(r_{\max} - r_{\min}\right)\right] \times (b_m - 1) + 1 & r_i \geq r_j \\ \left\{\left[\left(r_j - r_i\right)/\left(r_{\max} - r_{\min}\right)\right] \times \left(b_m - 1\right) + 1\right\}^{-1} & r_i < r_j \end{cases}$$

After establishment of judgment matrix, other procedures shall follow the traditional AHP and finally the weight of each indicator can be obtained. The procedures of modified AHP are shown in Fig. 4.4.

Based on these procedures, we sent the GEC Indicator System Weighting Survey Form for Experts to more than 50 scholars doing related researches in the academic circle and experts from government authorities; all experts are required to fill in the survey form independently and rate of return is 100 %. Through reorganization of the survey forms and deducting the highest and lowest weighting results, the weights of all indicators are obtained from the average of the remaining weighting results followed by test. The finally tested environmental competitiveness indicator weight system is shown in Table 4.2.

4.3.3 Establishment of GEC Model

After weighting of indicators, next step is to construct the GEC model for calculation of the GEC evaluation score of each country. The higher the evaluation score, the stronger the country's environmental competitiveness will be. The GEC model is determined as:

$$Y = \sum_{i=1}^{l}\sum_{j=1}^{m}\sum_{k=1}^{n} x_{ijk} w_{ijk} \tag{4.1}$$

$$Y_i^1 = \sum_{j=1}^{m}\sum_{k=1}^{n} x_{ijk} w_{ijk} \tag{4.2}$$

$$Y_{ij}^2 = \sum_{k=1}^{n} x_{ijk} w_{ijk} \tag{4.3}$$

In which, Y is the GEC comprehensive evaluation score, Y_i^1 is the evaluation score of Module Indicator i, Y_{ij}^2 is the evaluation score of Factor Indicator j, x_{ijk} is the non-dimensional data value of Foundation Indicator k under Factor j in Module i, w_{ijk} is the weight of this Foundation Indicator, l represents the number of Module Indicators in the GEC indicator system, m is the number of Factor Indicators in each Module Layer, and n is the number of Foundation Indicators in each Factor Layer.

With the GEC model, evaluation of a country's environmental competitiveness becomes a simple job, because the weight of each indicator is fixed and the only thing to be done is to input the non-dimensional data value of the Foundation Indicators of the country; then the GEC score as well as the scores of each Module Indicator and Factor Indicator can be obtained. The model can also carry out comprehensive evaluation on each country's environmental competitiveness; all countries can be ranked, compared and analyzed according to respective comprehensive evaluation scores.

4.4 Method of Determining GEC

4.4.1 Definition of GEC Evaluation Period and Area Coverage

Due to various restrictions during GEC evaluation, it is not possible to evaluate the environmental competitiveness of all countries or regions in any time period; therefore, it is necessary to first define the time period and area coverage of the evaluation.

1. **Evaluation Period.** As per the internationally released public statistical data, the latest data year is 2010 and therefore the benchmark year of GEC evaluation is also decided as 2010.
2. **Evaluation Areas.** Based on the collected data, the evaluation and analysis of the environmental competitiveness in this study are done for the 133 countries of the world. And these countries are classified according to the six continents of Asia, Oceania, North America, South America, Europe and Africa; comparative analysis is also done for G20 nations and five BRICK countries.

4.4.2 Indicator Ranking Sections

Base on the tested indicator system, this study adopts radar chart to complete the evaluation and comparative analysis on the each layer of GEC indicators. For the convenience of evaluation result analysis, the rankings are sectionalized. To judge a country's environmental competitiveness level around the globe, the rankings are divided into five sections, 1st–10th, 11th–30th, 31st–60th, 61st–100th and 101st–133rd.

4.4.3 Analysis of Indicator Scores

GEC is composed on five Sub-index and the GEC comprehensive score is obtained from the collective of the five scores; and each countries show varied performance in the five Sub-index. In order to the better demonstrate such variation, the contribution rate of each Sub-index to environmental competitiveness is measured and calculated, so as to show the strengths and/or weaknesses of a country's environmental competitiveness.

$$\mathrm{Y}_i^c = \left(Y_i^1 \times w_i\right) / Y \tag{4.4}$$

Here Y_i^c represents the contribution rate of Sub-index i to comprehensive score, Y_i^1 and Y are defined in Formula 4.1, 4.2, and 4.3, as the evaluation score of Sub-index i and the comprehensive evaluation score of GEC, and W_i represents the weight of Sub-index i in index. The contribution of five Sub-index to the index is given in Fig. 4.5 as pie graph.

At the same time, in order to see the scores of pillars and their performance in the countries, the highest and lowest scores of each pillar is also calculated; the rankings of all pillars can better show their comprehensive performance. As shown in Fig. 4.6, the dark line corresponding to each of the pillar represents the distribution of this indicator in different countries; the hollow triangle in the middle is the country's ranking place.

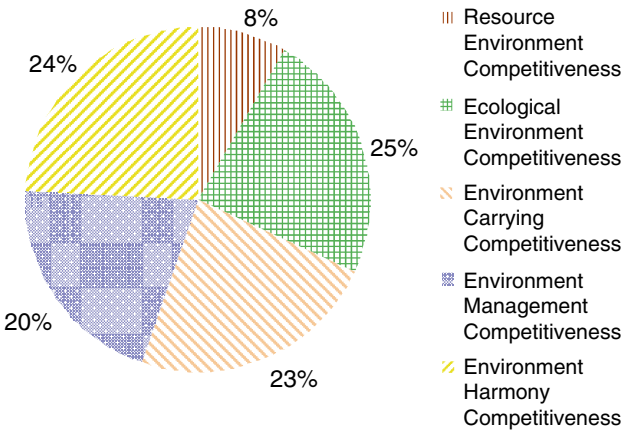

Fig. 4.5 Contribution of sub-index scores

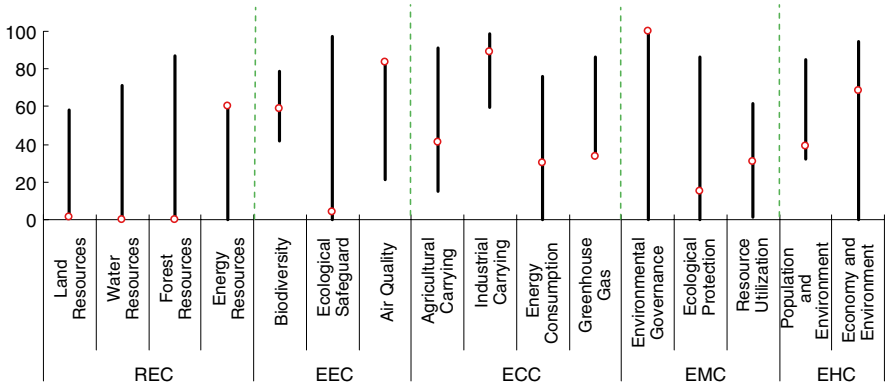

Fig. 4.6 Pillars scores

Chapter 5
Technical Roadmap of GEC Evaluation & Analysis

5.1 General Research Organization and Contents

5.1.1 Research Framework

GEC research is a whole new area; there is neither mature research model or methodology, nor existing research contents for reference. Therefore, such researches need to first summarize the related previous researches and then extend the research with more contents and innovation in methodology. GEC is a cross-discipline research involving multiple areas of environmental economics, biology, economics and sociology, which are intricately interrelated; at the same time, we need to rationally define and objectively evaluate GEC, and make innovations in methodology. In this way, we can thoroughly explore the inherent essence of GEC and reveal the laws of GEC evolution. For such a complicated research subject, it requires clear organization and correct research approach, strictly following the designed technical roadmap (See Fig. 5.1) to ensure satisfaction of research standards and quality.

In terms of contents, through substantial literature review and reference to theories about environmentology, economics and management science, the significance and necessity of GEC research is profoundly discussed from different angles; the key contents of this research is to construct the GEC theory system based on the results of previous international researches. Particularly, as a new research area, how to define the term of GEC and how to summarize the characteristics, component factors and motive power of GEC, are the focus and challenge of this study.

As to evaluation methodology, competitiveness research can't be done in separation with evaluation, which requires construction of scientific and objective evaluation model. Any evaluation model and method shows certain degree of subjectivity and orientation, and the contents reflected by such subjectivity and orientation might have certain guiding effect on the development and formation of the evaluated target. GEC evaluation model not only borrows and applies the mainstream methodology for international competitiveness study, but also shows unique features related to the

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Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_5,

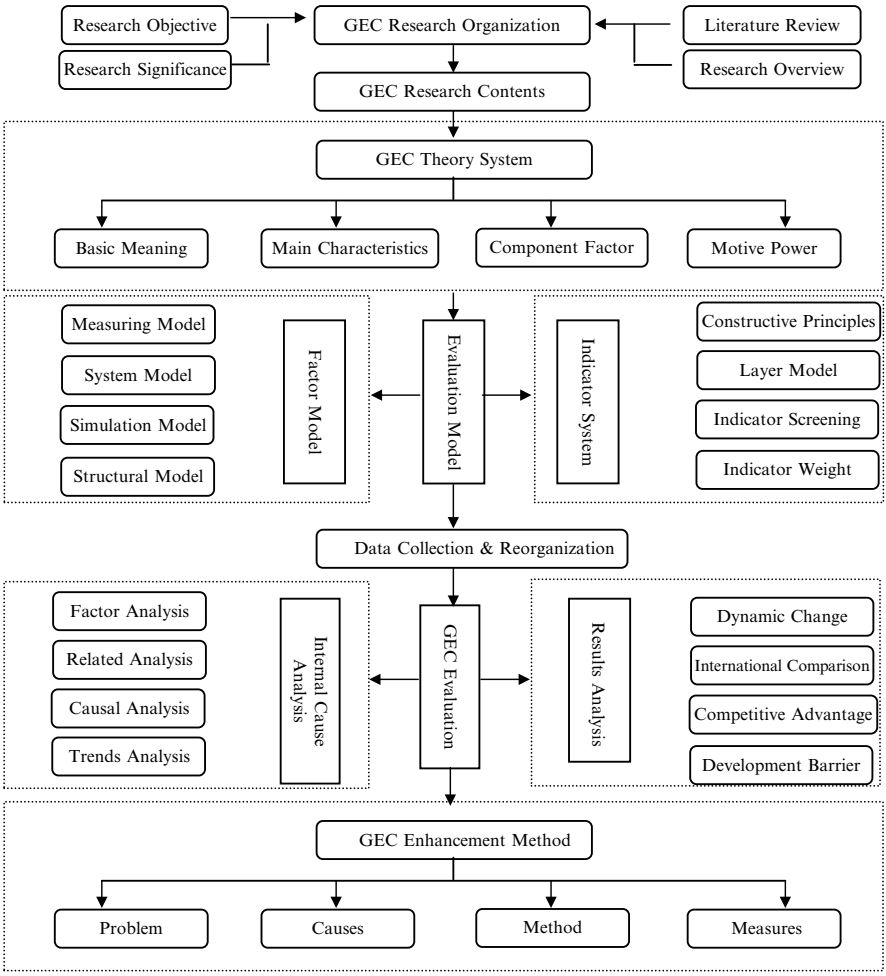

Fig. 5.1 GEC research technical roadmap

characteristics of GEC; it must be able to objectively evaluate the GEC of all countries and reflect the internal mechanism and key points of GEC; the evaluation results should also adequately reflect the philosophy behind the research, which is good to the course of global environmental protection and development of ecological economy and good to the realization of global sustainable development. The evaluation model mainly includes two parts, factor model and indicator system; the former uses quantitative analysis to conduct empirical test on the factors influencing GEC based on the connotations and characteristics of GEC, providing reference to analysis on the driving force of GEC, as the foundation of the GEC evaluation indicator system. The indicator system is the basis of competitiveness evaluation and construction of an indicator system that scientifically and objectively reflects the

connotations of GEC is a very important part of GEC research. Selection of the indicators is not random and must follow definite principles; they are screened out using hierarchical model and weighted according to certain methods after careful investigation. In terms of evaluation methodology, the most mature evaluation technology in competitiveness research is adopted to conduct comprehensive evaluation on the GEC of all countries; evaluation results are also thoroughly interpreted and analyzed, and compared horizontally and vertically. Also under analysis are the comparative advantage and history of each country, the causes for such advantage or disadvantage, and the barriers of enhancing competitiveness. These analyses are not only aiming at evaluation of history and the present, but also the intrinsic factors that influence competitiveness. Judgment and prediction of the trend of competitiveness development is likewise done.

As for application of the evaluation results, focus is put on the integration of theory and practice. Evaluation results are the objective reflections of things and therefore should be used to better guide the development of the things. Of course, evaluation itself is not the purpose, but an instrument; evaluation results are neither simply rankings nor can be more visualized scores to give a better image of GEC. On the one hand, horizontal and vertical comparison of GEC may found out the advantages and disadvantages of all countries, so as to summarize the basic features and trend of development of GEC; thus the key indicators that constrain and influence the GEC of all countries, the weak link and its root, as well as the trends of GEC can all be found out. With these findings, relevant countermeasures can be proposed to help the enhancement of GEC. On the other hand, through GEC evaluation and analysis, it will be good to raise people's awareness of the importance of environmental protection and ecological economic development; awareness of enhancing GEC will be converted into feasible actions to make new contributions to the global sustainable development.

5.2 GEC Indicators Selection and Data Source

5.2.1 Selection of Indicators

Owing to the different understanding of GEC, the designed factor module may be very different, and so are the way to construct the index system and the method to select the indicators; therefore the final evaluation results would be widely divergent. Index system is the core of evaluation and the carrier of evaluation procedures and results; whether or not a complete and objectively applicable index system can be constructed is the key to successful evaluation. First, it is very important to make the process of construction always surround the connotations and definition of GEC. Design of factor module and verification of it are also necessary, because these help to define the scope for selecting indicators and are also the reference for optimization of the index system. Secondly, there must be principles followed during construction of the index system as criteria of screening; only indicators screened

via the principles can be included by the system. Finally, the system layer, factor layer and foundation layer are designed for the index system and each indicator is selected with breaking down of the layers and after several rounds of expert discussions and the final complete GEC evaluation index system is confirmed under repeated consideration. The confirmed index system is composed of 1 index, 5 Subindex, 16 Pillars ad 60 Individual indicators; each of the individual indicators is objective indicator carrying statistical data, which avoids the impact of uncertain and discrete subjective indicators on the impartiality of evaluation results.

5.2.2 Data Collection, Statistics and Calculation

Data are the basic elements of GEC evaluation; the authenticity of data directly influences the quality of evaluation results; therefore, source of data is of vital importance to evaluation results. Although the United Nations has unified the System of National Accounting (SNA) as a reference to all countries, as the countries have different state system and at different stage of development, there will be distinct differences while doing national economic accounting, especially in terms of scope of statistics, statistical range and statistical time period, which severely influences the comparability of even the same indicator in different countries.

In 1993, the United Nations formally released the System of Integrated Environment and Economic Accounting, which is featured in taking SNA as the basis to build satellite accounting covering various natural resources and environmental ecological fields and which connects the accounting of natural resources and environment with the traditional national accounting. This system added large number of estimation methods about resource consumption and reduction and environmental degradation, accompanied with enormous indicators about resources and environment. But, as the theory about resource environment accounting is not mature, practice in this area shows many problems and weaknesses; consequently, many countries failed to establish a complete accounting system, either with incomplete indicators, or inaccurate.

These problems make the selection of indicators and collection of data for this study more difficult, which actually become a bottleneck of GEC evaluation and research. In order to guarantee objectiveness and impartiality of the data source, here are the principles to be followed during selection of indicator and collection of data: (1) Better use a less number of indicators as possible, trying to select the typical indicators that can reflect the influence on GEC in certain aspect and avoiding excessive influence of the indicators on data collection; (2) Select general indicators, or the universally recognized and frequently used indicators in related researches, avoiding using obscure indicators with unclear definition or ambiguity in meaning; (3) Collect data only from international organization sources such as the UN and World Bank to guarantee the uniform scope of statistics and comparability, statistical yearbook of the countries as the alternative source of missing data. Description of the indicators and source of the data are given in Appendix I. The sources listed in the appendix means the key channel of data collection, mainly the

UN, World Bank and International Energy Agency that have provided the majority of data for the countries; but many indicators lack data for certain countries, and these are obtained from the statistical yearbook or government sector official website. As these sources are in great number, details are omitted for convenience.

5.2.3 Data Extreme Value Analysis

Among the substantial statistical indicator data, it is inevitable to have some "noise" data (maximum or minimum value), i.e. individual datum that shows big difference from the majority of the data. Such phenomena might be the problem of the indicators due to the wide gap between themselves, or the error during the process of data collection and reorganization. Particularly under current circumstance when the resource environment statistics system is far from sound, statistical survey and method of reorganizing the data might both lead to "noise" data. The numerous indicators in GEC evaluation indicator system involve many entirely new areas, and some, including resource and environment areas, do not have well established sound statistical system; actually, some of the statistical methods are still under modification. These are all challenges for the authenticity and objectivity of the GEC indicator data. In addition, the geographical scope of evaluation covers more than 130 countries widely distributed around the globe and the national conditions in each country are varied; it is quite possible to see data error in the process of accounting. The existence of "noise" data is a negative factor for the evaluation of GEC. Especially, the evaluation adopts comprehensive weighting method, under which the comprehensive competitiveness score is obtained from the weighted score of the lower-layer indicators and the bottommost individual indicator scores are obtained from the non-dimensional value of evaluation samples by efficiency coefficient method; in other words, the score of single indicator will affect the total evaluation score through weighting layer by layer. If some indicator carries maximum or minimum value, the scores of the samples calculated according to the non-dimensional formula by efficiency coefficient method will be enormously different and the distribution of evaluation scores turn to be irrational, which all influences the evaluation result. In addition to analysis on the characteristics of each indicator and making judgment, it is also fully necessary to find possible extreme values of the indicator using appropriate quantitative approach and process the extreme values.

The judgment of extreme value is carries out according to the variance of data distribution. Indicator data shows certain distributional characteristics among the samples and the distance between each datum and their average value always follows certain laws and is related to the standard deviation of the sample data. Suppose data are in normal distribution, then 99.97 % of the data will be distributed within the range of 3 standard deviation of the average value, i.e.:

$$P\left(\left|\left(x-\bar{x}\right)/\sigma\right|<3\right)=0.9997$$

$$\sigma = \sqrt{\sum \left(x - \bar{x}\right)^2 / \left(n - 1\right)} \tag{5.1}$$

$\bar{x}$ is the average value of sample data and σ is the standard deviation of sample data. Of course, the actual distribution of indicators would not be strictly in normal state, but according to the Law of Large Numbers, even the indicator data is other state of distribution, such feature also exists. So, if certain sample value of the indicators goes beyond the range of 3 standard deviation of the average value, the value can be judged as the extreme value of the indicator and needs regression to within the range after treatment of re-check and revision.

5.3 GEC Indicator System Correlation Analysis

In the process of GEC evaluation, setting up the index system is a core step. In order to adequately reflect the different factors that influence environmental competitiveness, the index system becomes huge with enormous indicators and covers substantial contents. The merit of such setting is to avoid insufficiency of information because of too small number of indicator and to reflect multiple aspects of GEC. At the same time, such arrangement can prevent improper influence on the evaluation results caused by extraordinary fluctuation of individual indicator, unless the number of indicator is too small; in this way, the evaluation results will be ore stabilized and rational. But, the problem faced during construction of the comprehensive index system is that the indicators, more or less, shows correlation, or, different indicators containing same information; actually, during the process of evaluation, repetition of information is quite often. If the contents reflected by two indicators are similar or of the same nature, then the indicators contain repeated information; and if both of the indicators are included by the indicator system, the consequence is overlapping of indicator and information redundancy, or even contradiction. During evaluation, this part of information would be calculated doubly, which influences the precision of evaluation results. The indicators in the GEC evaluation index system cover multiple aspects including ecological environment, resource environment, environmental management, environmental carrying and environmental harmony, 5 Sub-index, 16 pillars and 60 individual indicators in total. There has been large amount of information commonly reflected by indicators, particularly those, that are related to economic and social activities, very often showing strong correlation in between. This is also bad for analysis on the driving power of competitiveness. Therefore, a correlation analysis on the indicators should be done first. When obvious correlation is diagnosed, relevant treatment is necessary to remove such correlation.

Indicator correlation analysis is a study of whether there is dependent relation between existing phenomena and discussion of the direction and degree of correlation in specific phenomena having dependent relationship; it is a kind of statistical method to study the correlativity between random variables. By the direction of changing in the two variables, correlativity includes positive correlation, negative correlation and

no correlation. (1) Positive Correlation: When one variable increases or decreases, the other variable is also increasing or decreasing and the directions of changing for both variables are the same, which is called positive correlation. (2) Negative Correlation: When one variable increases or decreases, the other variable is also decreasing or increasing and the directions of changing for both variables are opposite, which is called negative correlation. (3) No Correlation: Between two variables, the change in one variable is not related to the change of the other variable; such relationship is also called zero correlation. Of course, such classification is only a simple judgment of the relationship between two variables, which is not precise. A more precise statistical indicator is needed to reflect such relationship between two variables, i.e. using a statistic to reflect the correlation between two variables. According to the type of variable data, different calculation method should be used. GEC indicator system data are continuous variable using scale and dimension of definite proportion and therefore can use "product moment method" to calculate the correlation coefficient, measuring the degree of correlation. This method uses the product of the dispersion of the two variables and the respective mean value, i.e. Pearson's formula:

$$r_{xy} = \frac{\sum (x - \bar{x})(y - \bar{y})}{\sqrt{\sum (x - \bar{x})^2} \sqrt{\sum (y - \bar{y})^2}} \tag{5.2}$$

x and y are the two variables to be measured in terms of correlation coefficient. r_{xy} is the coefficient, reflecting the statistic of correlativity between x and y, also called simple correlation coefficient. The sign symbol of r_{xy} determines the positive or negative correlation between x and y and the value of r_{xy} is between −1 and 1. The closer the absolute value is to 1, the higher the correlation between x and y will be; vice versa, the closer the absolute value of ρ_{xy} is to 0, the less obvious the correlation between x and y will be. There is reference standard to judge and test the correlativity, by the test statistic of:

$$t = \sqrt{\frac{r_{xy}^2 (n-2)}{1 - r_{xy}^2}} \sim t_{\partial/2}(n-2) \tag{5.3}$$

Although correlativity only reflects the relevancy between two indicators, in a comprehensive indicator system, the relationship between multiple indicators is complicated, mutually influencing and interrelated. Multiple correlation is right the study of correlativity between one variable and another set variables; it can reflect the correlation of multiple indicators. The philosophy behind this is the same as simple correlation coefficient; the larger the value, the closer relation between the variables. It is generally used in multiple regression analysis and suitable for factor analysis.

Through calculation of the correlation coefficients between each layer of indicators, the summarized results after test of significance are given in Table 5.1.

The indicator correlation statistics show that correlation between the original data of some environmental competitiveness indicators is relatively obvious and

Table 5.1 Correlation analysis on GEC indicators

	Indicator type	Number of subordinate indicator	Number of correlation coefficient	Max. value of correlation coefficient	Significance tests of correlation coefficient
Land resources	Pillar	3	3	0.407	2
Water resources	Pillar	4	6	0.858	6
Forest resources	Pillar	3	3	0.454	3
Energy resource	Pillar	4	6	0.564	3
Biodiversity	Pillar	4	6	0.761	6
Ecological safeguard	Pillar	2	1	0.341	1
Air quality	Pillar	5	10	0.879	5
Agricultural carrying	Pillar	3	3	0.419	2
Industrial carrying	Pillar	4	6	0.516	1
Energy consumption	Pillar	4	6	0.876	1
Greenhouse gas	Pillar	4	6	0.143	0
Environmental governance	Pillar	3	3	0.542	2
Environmental safety	Pillar	3	3	0.056	0
Resource utilization	Pillar	4	6	0.243	0
Population and environment	Pillar	6	15	0.960	3
Economy and environment	Pillar	4	6	0.597	2

that the correlation coefficient between the four pillar and the subordinate individual indicators is relatively larger. More number of correlation coefficient that passes the significance test indicates that many original indicators show higher correlation. But, except that the individual indicators show certain correlation, the correlation between sub-index and between pillars are not high, which means little influence on the calculation of comprehensive evaluation score and the reliability of both scores and rankings of GEC.

Appendix I: Indicators in Foundation Layer and Description

Resource Environmental Competitiveness (REC)

Land Resource

Description: Land resource refers to the land has been used or can be used by the human being in the foreseeable future. It is the basic means of production and labor objects, and it is the basic place to the society. It reflects the support of resources for economic production.

Rationale: It reflects the usage of land resource and the capacity of land resource to be exploited in economic production.

Land Area per Capita

Direction: Positive
Description: Land area per capita = Land area/total population.
Unit: square kilometers/ten thousands
Rationale: Land is the basic material of the national actives, existence and development. And it's the carrier place of the country's resources. Land area per capita reflects the relative abundance of the country's land resources.
Source: http://data.worldbank.org/indicator

Percentage of Arable Land to Total Land Area

Direction: Positive
Description: Percentage of arable land to total land area = Arable land area/total land area × 100 %. Arable land includes land defined by the FAO as land under temporary crops (double-cropped areas are counted once), temporary meadows for mowing or for pasture, land under market or kitchen gardens, and land temporarily fallow. Land abandoned as a result of shifting cultivation is excluded.
Unit: %.
Rationale: Arable land is the core part of the land resources, and it's also the most important means of agricultural production. Arable land of the land area reflects the ownship of the land resources can be used for in agricultural production in a country.
Source: http://data.worldbank.org/indicator

Arable Land per Capita

Direction: Positive
Description: Arable land per capita = Arable land area/total population. Population is defined by the conventional Description. It includes all residents, except the refugees in the country of refuge. Generally, the refugees are considered part of the population of their native country.
Unit: Hectare.
Rationale: Arable land per capita reflects the situation of the country's arable land relative abundance.
Source: http://data.worldbank.org/indicator

Water Resource

Description: Water resource is an essential material to human being and all living. And it's the key resources to the industrial and agricultural production, economic development and environmental improvement. The storage and distribution of water resource is an important content of resources and environment competitiveness.

Rationale: The index can reflect the guarantee degree of a country's water resource on the social life and economic production.

Surface Water

Direction: Positive
Description: Surface water = Surface water produced internally + Surface water entering and bordering. Surface water is water in a river, lake, fresh water wetland, or glaciers and ice sheets.
Unit: billion cubic meters.
Rationale: Surface water is the most important water sources of human being, and it is an important part of water resources to a country. The abundant degree can reflect the competitiveness of a country's water resources.
Source: http://www.fao.org/nr/water/aquastat/water_res/index.stm

Annual Precipitation

Direction: Positive
Description: Annual precipitation = precipitation (mm/year)/1,000,000 × land area of the country (1,000 ha) × 10. It refers to the quantity of water deposited, in a year, that no leakage, no loss, no evaporation.
Unit: billion cubic meters.
Rationale: Precipitation is the main sources of fresh water resources of a country. It reflects the renewal and supplement of freshwater resources in the country.
Source: http://www.fao.org/nr/water/aquastat/water_res/index.stm

Groundwater

Direction: Positive
Description: Groundwater = Groundwater produced internally + Groundwater entering the country. Groundwater refers to the country's natural groundwater volume.
Unit: billion cubic meters.
Rationale: Ground water is an important part of the available freshwater resources; the abundant degree can reflect the competitiveness of the country's water resources.
Source: http://www.fao.org/nr/water/aquastat/water_res/index.stm

Total Internal Renewable Water Resources

Direction: Positive
Description: Renewable internal freshwater resources flows refer to internal renewable resources (internal river flows and groundwater from rainfall) in the country.

Unit: billion cubic meters.
Rationale: It reflects the country's renewable capability of freshwater resources.
Source: http://www.fao.org/nr/water/aquastat/water_res/index.stm

Forest Resource

Description: Forest can regulate the climate effectively, and conservation the soil. It can purify the air, eliminate the noise also. It is a kind of intangible resource. It is the place for forest biological diversity. So it is an important content of resources and environment competitiveness.
Rationale: Forest resources can reflect the abundance level of a country's forest resources and biological resources, and the environmental self-purification ability.

Growing Stock in Forest and Other Wooded Land

Direction: Positive
Description: Growing stock refers to volume over bark of all living trees. Volume over bark of all living trees more than X cm in diameter at breast height (or above buttress if these are higher). Including the stem from ground level or stump height up to a top diameter of Y cm, and may also include branches to a minimum diameter of W cm.
Unit: million cubic meters.
Rationale: It is the basic index to reflect forest resources total scale and level, and the forest ecological environment of a country.
Source: http://www.fao.org/forestry/publications/zh

Proportion of Land Area Covered by Forest

Direction: Positive
Description: Proportion of land area covered by forest = forest area/land area. Forest area is land under natural or planted stands of trees of at least 5 meters in situ, whether productive or not, and excludes tree stands in agricultural production systems (for example, in fruit plantations and agroforestry systems) and trees in urban parks and gardens.
Unit: %.
Rationale: Proportion of land area covered by forest reflects the abundance level of forest resources, and the country's efforts to achieve green.
Source: http://data.worldbank.org/indicator

Forest Area per Capita

Direction: Positive
Description: Forest area per capita = forest area/total population.

Unit: square kilometer.
Rationale: It reflects the forest resources possession per capita. It reflects the relative abundance degree of forest resources to the country.
Source: http://data.worldbank.org/indicator

Energy Resource

Description: Energy is the important elements of economic production, because it can provide a large amount of energy for human being, so it is a significant element of the resource and environment competitiveness.
Rationale: Energy resources reflect the ability of the country to maintain the economic production.

Fossil Energy

Direction: Positive
Description: Fossil energy including coal, oil and Natural gas, the reserves refers volume to the proved reserves volume, and all converted into oil equivalents. The coal including Anthracite and bituminous, Sub-bituminous and lignite.
Unit: Mtoe.
Rationale: Fossil energy storage quantity reflects the ability of a country relies on its own reserves energy to maintain economic production.
Source: http://www.bp.com/productlanding.do?categoryId=9041910&contentId=7075397

Energy Production

Direction: Positive
Description: Energy production refers to forms of primary energy – petroleum (crude oil, natural gas liquids, and oil from nonconventional sources), natural gas, solid fuels (coal, lignite, and other derived fuels), and combustible renewables and waste – and primary electricity, all converted into oil equivalents.
Unit: thousand toe.
Rationale: It reflects the primary energy production situation, and the energy produced ability to maintain the country's economic production.
Source: http://data.worldbank.org.cn/indicator/EG.EGY.PROD.KT.OE?display=graph

Proportion of Combustible Renewables and Waste
to Total Energy Consumption

Direction: Positive
Description: Proportion of combustible renewables and waste to total energy consumption=combustible renewables and waste volume÷ total energy consumption.

Combustible renewables and waste comprise solid biomass, liquid biomass, biogas, industrial waste, and municipal waste, measured as a percentage of total energy consumption.

Unit: %.

Rationale: It reflects the renewable capability of the country's resources, and the level of saving the primary energy.

Source: http://data.worldbank.org.cn/indicator

Net Energy Imports of the Energy Consumption

Direction: Negative

Description: Net energy imports of the energy consumption = Net volume energy imports/total energy consumption. Net energy imports are estimated as energy consumption less production, both measured in oil equivalents. A negative value indicates that the country is a net exporter. Energy consumption refers to use of primary energy before transformation to other end-use fuels, which is equal to indigenous production plus imports and stock changes, minus exports and fuels supplied to ships and aircraft engaged in international transport.

Unit: %.

Rationale: It reflects the relationship between a country's energy consumption and reserves. The degree of net imports is high, which means the level of the country's energy consumption is higher than its energy reserves.

Source: http://data.worldbank.org.cn/indicator/

Ecological Environmental Competitiveness (EEC)

Biodiversity

Description: Biodiversity refers to the steady ecological complex composed of various live organism (animal, plant and microorganism) incorporated in regular pattern. It reflects the abundance of biotic resources and also the intricate relations between biotic lives as well as between environments; it even reflects the degree of human influence on ecological system. The species diversity is the key part of biological diversity.

Rationale: Biodiversity is one of the important indicators of EEC. Usually, we choose the number of species interactive in the ecological system, which can reflect the biological resource ownership and has important effects on the improvement of the ecological environment.

Increase of Threatened Fish Species

Direction: Negative
Description: Threatened species is the number of species classified by IUCN as threatened, vulnerable, rare, indeterminate, out of danger or less known species. Increase of threatened fish species = threatened fish species this year − threatened fish species last year.
Unit: species
Rationale: By making a comparison between the threatened fish species in 2 years to reflecting the change trend of fish biodiversity. It could also reflect the threatened fish species increased impacting on the EEC.
Source: Froese, R. and Pauly, D. (eds). 2008, http://data.worldbank.org/indicator/EN.FSH.THRD.NO/countries

Increase of Threatened Mammal Species

Direction: Negative
Description: Threatened species is the number of species classified by IUCN as threatened, vulnerable, rare, indeterminate, out of danger or less known species. Increase of threatened mammal species = threatened mammal species this year − threatened mammal species last year.
Unit: species
Rationale: By making a comparison between the threatened mammal species in 2 years to reflecting the change trend of mammal biodiversity. It could also reflect the threatened mammal species increased impacting on the EEC.
Source: http://data.worldbank.org/indicator

Increase of Threatened Plant Species

Direction: Negative
Description: Threatened species is the number of species classified by IUCN as threatened, vulnerable, rare, indeterminate, out of danger or less known species. Increase of threatened plant species = threatened plant species this year − threatened plant species last year.
Unit: species
Rationale: By making a comparison between the threatened plant species in 2 years to reflecting the change trend of plant biodiversity. It could also reflect the threatened plant species increased impacting on the EEC.
Source: http://data.worldbank.org/indicator/EN.HPT.THRD.NO/countries

GEF Benefits Index for Biodiversity

Direction: Positive
Description: GEF benefits index for biodiversity is a composite index of relative biodiversity potential for each country based on the species represented in each country, their threat status, and the diversity of habitat types in each country. It has many method to figure out the diversity index, like Simpson's diversity index, Shannon-Weiner index. The index has been normalized so that values run from 0 (no biodiversity potential) to 100 (maximum biodiversity potential).
Rationale: GEF benefits index for biodiversity can reflect the level of diversity.
Source: http://data.worldbank.org.cn/indicator/ER.BDV.TOTL.XQ/countries

Ecological Safeguard

Description: Ecological safeguard reflects the effects of ecological recovery and reconstruction in a region, usually we use the area of the nature preserve to reflect it; it has big impact on ecological environmental competitiveness.
Rationale: By using the protected areas, it can reflect the influence degree of ecological protection policy initiatives on EEC.

Terrestrial Protected Areas

Direction: Positive
Description: Establishing nature reserves is the most important, economical and effective measures to protect the ecological environment, biological diversity and natural resources. Reserved by law or other effective means of land and related plants and historical and cultural characteristics in order to protect part or all of the enclosed environment. Terrestrial protected areas (% of total territorial area) = Terrestrial protected areas/total area of the territory.
Unit: %
Rationale: It not only reflect the ecosystem service value of preventive use, but also reflect the guarantee ability for sustainable utilization of vulnerable species and long-term stable development. It plays an important role in improving EEC.
Source: http://unstats.un.org/unsd/ENVIRONMENT/marine_and_terrestrial.htm

Marine Protected Areas

Direction: Positive
Description: Marine protected areas are areas of intertidal or subtidal terrain – and overlying water and associated flora and fauna and historical and cultural features – that have been reserved by law or other effective means to protect part or all of the enclosed environment. Marine protected areas (% of territorial waters) = Marine protected areas/territorial waters areas

Unit: %

Rationale: It reflects a country or region to protect the marine environment and natural resources, in accordance with the law to a certain area including the protection of objects, the coast, estuary, wetland, islands or waters with special protection and management area. It plays an important role in improving the EEC.

Source: UN-Environment Statistics Database; http://data.worldbank.org/indicator/ER.PTD.TOTL.ZS

Air Quality

Description: Air quality reflects the extent of air pollution, which is based on the concentration of pollutants in the air to determine the level of air quality. The main sources of air pollutants including dust, total suspended particles, Inhalable particles (PM10), particulate matter (PM2.5), nitrogen dioxide, sulfur dioxide, carbon monoxide, ozone and volatile organic compounds.

Rationale: Air pollution is a complex phenomenon, in a specific time and place, the air pollutant concentration is affected by many factors, including vehicle, ship, aircraft exhaust, industrial production emissions, residents living and heating, waste incineration, development density, city land topography and weather. with this index, it can affect the degree of air pollution on the ECC.

Inhalable Particles Matter (PM10)

Direction: Negative

Description: Inhalable particles matter (PM10) can stay in ambient air for a long time which has great influence on human health and atmospheric visibility. Estimated value represents the annual average exposure level of outdoor particles by common urban residents. It can use the LD-5 laser to test the PM10.

Unit: ug/M^3

Rationale: It can reflect the influence of inhalable particulate matter on human disease, air visibility and health and growth of the plant. It is an important index to measure the air quality, which can reflect the degree of influence on the ECC.

Source: http://data.worldbank.org/indicator

Particulate Matter (PM2.5)

Direction: Negative

Description: Particulate matter (PM2.5) refers to the diameter of particles in the atmosphere is less than or equal to 2.5 ug. It mainly comes from the residues of daily power, industrial production process, car emissions after combustion and emissions, mostly contain heavy metals and other toxic substances. It can use the LD-5 laser to test the PM2.5.

Unit: 10 ug/m^3

Rationale: PM2.5 has an important influence on air quality and visibility, it contains large amounts of toxic, harmful substances, therefore, it has great influence on human health and atmosphere quality. It is an important cause of air pollution, so it can be used to reflect the particles impact on the ecological environment competitiveness.

Source: NASA Goddard Data and Applications Center; NASA Socioeconomic Data and Applications Center hosted by CIESIN at Columbia University

Index of Indoor Air Pollution

Direction: Negative

Description: Indoor air pollution is harmful chemical factor, physical factor and (or) biological factor entering into the indoor air and has reached directly or indirectly, short-term or long-term to the body and mind health. Index of indoor air pollution is a form which it changed several indoor air pollutions into one. The higher of the index, the more serious in pollution, the more obvious effects on human health.

Unit: %

Rationale: People usually spend more than 80 % of the time in indoors. It reflects all kinds of harmful substances such as formaldehyde, benzene, ammonia, radon and radioactive impact on human health, this index can reflect the extent of its influence on a country or a region's EEC.

Source: WHO/UNICEF Joint Monitoring Programme (JMP) for Water Supply and Sanitation

Nitrogen Oxides Emission

Direction: Negative

Description: Common nitrogen oxides include nitrogen monoxide (NO, colorless), nitrogen dioxide (NO_2, reddish brown), laughing gas (N_2O) and dinitrogen pentoxide (N_2O_5). Nitrogen oxides discharged due to human activities mostly come from the combustion process of fossil fuel, such as the combustion process in car, airplane, internal combustion engine and commercial-size kiln, and particularly from production and the process of using nitric acid, such as nitrogen fertilizer factory, organic intermediate factory, and nonferrous and ferrous metal smelters.

Unit: Tons of carbon dioxide equivalent.

Rationale: Nitrogen oxides influence human health by respiratory tract invasion. It is not only one of the main factors in the air quality, but also one of the air pollutants which can be used to reflect the nitrogen oxide content effects on the ECC.
Source: http://unstats.un.org/

Sulfur Dioxide Emission

Direction: Negative
Description: As coal and petroleum normally contain sulfur compounds, they produce sulfur dioxide while burning, mainly the sulfur dioxide produced during industrial process. We usually use the Material balance method to count it.
Unit: kg
Rationale: Sulfur dioxide will produce industrial smoke, which can stimulate the human respiratory system, Therefore, it can reflect the degree of influence on the ECC.
Source: http://unstats.un.org/
Smith et al. 2001; World Development Indicators; CIA Factbook

Environmental Carrying Competitiveness (ECC)

Agricultural Carrying

Description: Agriculture is the basic source of food and other subsistence. It inevitably involves the exploitation and protection of land resources, water source. Agricultural carrying is an important part of the environmental bearing capacity and has a direct influence on it.
Rationale: It reflects the influence of agricultural production on the vegetation, soil and water and so on, and also reflects the influence on the environmental carrying competitiveness.

Cereal Yield per Unit of Arable Land

Direction: Positive
Description: Cereal yield per unit of arable land = Cereal yield/arable land area. Cereal yield includes wheat, rice, maize, barley, oats, rye, millet, sorghum, buckwheat, and mixed grains. Production data on cereals relate to crops harvested for dry grain only. Cereal crops harvested for hay or harvested green for food, feed, or silage and those used for grazing are excluded.
Unit: kg/hectare.

Rationale: This indicator reflects the circumstances to maintain the soil fertility, and the influence of farming on the ecological environment.
Source: http://data.worldbank.org/indicator

Fertilizer Consumption per Unit of Arable Land

Direction: Negative
Description: Fertilizer consumption per unit of arable land = Fertilizer consumption/arable land area. Fertilizer products cover nitrogenous, potash, and phosphate fertilizers (including ground rock phosphate). Traditional nutrients-animal and plant manures-are not included.
Unit: kg/hectare.
Rationale: In the process of agricultural production, fertilizer use will be a great impact on arable soil, thereby affecting the ecological environment. This indicator, which measures the fertilizer usage per unit of arable land, reflects the influence of fertilizer usage on soil quality and the environmental bearing capacity.
Source: http://data.worldbank.org/indicator; http://www.nationmaster.com

Annual Freshwater Withdrawals for Agriculture per Unit of Arable Land

Direction: Negative
Description: Annual freshwater withdrawals for agriculture per unit of arable land = Annual freshwater withdrawals for agriculture/arable land area. Annual freshwater withdrawals refer to total water withdrawals, not counting evaporation losses from storage basins. Withdrawals also include water from desalination plants in countries where they are a significant source. Withdrawals for agriculture are total withdrawals for irrigation and livestock production.
Unit: cubic meters/hectare.
Rationale: In the agricultural production process, the use of fresh water will directly affect the quality of the environment. This indicator, which measures the freshwater withdrawals per unit of arable land, reflects the utilization of freshwater resources in the agricultural production process and also reflects the impact on the environment.
Source: http://data.worldbank.org/indicator

Industrial Carrying

Description: Industrial production is the most important human activity and the main source of consuming resource and environment. Industrial bearer is an important part of the environmental carrying capacity and has a great influence on it.

Rationale: It reflects the resource consumption of industrial production and its impact on air quality and environmental carrying competitiveness.

Exports as a Percentage of GDP

Direction: Negative
Description: Exports as a percentage of GDP = export of goods/GDP × 100 %.
Unit: %.
Rationale: The industrial products are the main export goods and consume large amount of energy and resource. This indicator reflects the resources consumption of the industrial production and the impact on the environmental bearing capacity.
Source: UN-Commodity Trade Statistics Database; http://www.fmprc.gov.cn

Electric Power Consumption per Unit of Value Added of Industry

Direction: Negative
Description: Electric power consumption per unit of value added of industry = Electric power consumption/value added of industry. Electric power consumption measures the production of power plants and combined heat and power plants less transmission, distribution, and transformation losses and own use by heat and power plants.
Unit: kWh/U.S. dollar.
Rationale: The industrial production consumes a lot of electric power, in essence, that it consumes a lot of energy and will have a great impact on the environment. This indicator reflects the utilizing efficiency of electric power in the industrial production process and the impact on the natural environment.
Source: http://data.worldbank.org/indicator

SO_2 Emissions per Unit of Value Added of Industry

Direction: Negative
Description: SO_2 emissions per unit of value added of industry = SO_2 emissions/value added of industry
Unit: kg/U.S. dollar.
Rationale: In the industrial production process, it is inevitable to emit some pollutant gases. And the sulfur dioxide is an important pollution gas, causing great harm to the environment. This indicator reflects the emissions intensity of SO_2 in the industrial production process, and further reflects the influence of industrial industry on the environment.
Source: http://unstats.un.org/; CIA Factbook

Annual Freshwater Withdrawals for Industry per Value Added of Industry

Direction: Negative
Description: Annual freshwater withdrawals for industry per value added of industry = Annual freshwater withdrawals for industry/value added of industry. Freshwater withdrawals for industry are total withdrawals for direct industrial use (including withdrawals for cooling thermoelectric plants).
Unit: cubic meters/U.S. dollar.
Rationale: The industrial production will consume a large amount of freshwater resources, and thus have a great impact on the natural environment. This indicator reflects the utilization of freshwater resources in the industrial production process, and also reflects the impact on the environment.
Source: http://data.worldbank.org/indicator

Energy Consumption

Description: Currently, the countries need to consume large amounts of energy, mainly fossil energy. It causes great pressure on the environment and has an important influence on the environmental bearing capacity.
Rationale: It reflects the influence of human production and life on the energy and environment, and further reflects the impact on the environmental bearing competitiveness.

Energy Consumption per Unit of Land Area

Direction: Negative
Description: Energy consumption per unit of land area = Energy consumption/land area. Energy consumption refers to use of primary energy before transformation to other end-use fuels, which is equal to indigenous production plus imports and stock changes, minus exports and fuels supplied to ships and aircraft engaged in international transport.
Unit: Mtoe/square km.
Rationale: This indicator reflects the country's bearing capacity on the energy consumption. It also reflects the influence of energy consumption on the environmental bearing competitiveness.
Source: IEA: <2012 Key World Energy Statistics> http://data.worldbank.org/indicator

Ratio of Clean Energy Consumption

Direction: Positive
Description: Ratio of clean energy consumption = clean energy consumption/energy consumption × 100 %. Clean energy refers to the non-carbohydrate energy sources which do not produce carbon dioxide in the generation process, including hydro, nuclear, geothermal and solar energy.

Unit: %.

Rationale: Different types of energy have different effects on the environment. The clean energy is clean and will not produce pressures on the ecological environment. This indicator measures the country's energy consumption structure, and reflects the impact on the environmental bearing capacity.

Source: IEA: <2012 Key World Energy Statistics> http://www.tititudorancea.com

Elasticity of Energy Consumption

Direction: Negative

Description: Elasticity of energy consumption = growth rate of energy consumption/growth rate of GDP.

Rationale: The countries have different energy consumption demands because of the different economic developments. This indicator reflects each country's demand for energy consumption and its impact on environmental bearing capacity.

Source: IEA: <2012 Key World Energy Statistics> http://data.worldbank.org/indicator

Elasticity of Electric Power Consumption

Direction: Negative

Description: Elasticity of electric power consumption = growth rate of electric power consumption/growth rate of GDP.

Rationale: The countries have different electric power consumption demands because of the different economic developments. This indicator reflects each country's demand for electric power consumption and its impact on environmental bearing capacity.

Source: http://data.worldbank.org/indicator

Greenhouse Gases

Description: Greenhouse Gases has an important impact on human activities and may even lead to ecological disaster. Its impact on the environment bearing capacity can not be ignored.

Rationale: The climate change reflects the impact of human activities on the natural environment and the environmental bearing competitiveness.

Growth Rate of CO_2 Emissions

Direction: Negative
Description: Growth rate of CO_2 emissions = CO_2 emissions/CO_2 emissions $(-1) \times 100$ %. Carbon dioxide emissions are those stemming from the burning of fossil fuels and the manufacture of cement. They include carbon dioxide produced during consumption of solid, liquid, and gas fuels and gas flaring.
Unit: %.
Rationale: Carbon dioxide is the most important greenhouse gas. The change of carbon dioxide emissions directly reflects the influence of human activities on climate change. This indicator reflects the change of the bearing capacity on the carbon dioxide emissions.
Source: IEA: <2012 Key World Energy Statistics>

Growth Rate of Methane Emissions

Direction: Negative
Description: Growth rate of Methane emissions = Methane emissions/Methane emissions $(-1) \times 100$ %. Methane emissions are those stemming from human activities such as agriculture and from industrial methane production.
Unit: %.
Rationale: Methane is an important greenhouse gas. The change of Methane emissions also reflects the influence of human activities on climate change. This indicator reflects the change of the bearing capacity on the methane emissions.
Source: UN-Greenhouse Gas Inventory Data

CO_2 Emissions per Unit of Land Area

Direction: Negative
Description: CO_2 emissions per unit of land area = CO_2 emissions/land area.
Unit: Million tons/square km
Rationale: This indicator reflects the country's bearing capacity on the carbon dioxide emissions. It also reflects the influence of carbon dioxide emissions on the environmental bearing competitiveness.
Source: IEA: <2012 Key World Energy Statistics>

CO_2 Emissions per Unit of Energy Consumption

Direction: Negative
Description: CO_2 emissions per unit of energy consumption = CO_2 emissions/energy consumption.
Unit: Million tons/Mtoe

Rationale: The carbon dioxide emissions mainly come from the energy consumption. This indicator measures the carbon dioxide emission intensity of the energy consumption and reflects the influence of energy consumption on climate change.
Source: IEA: <2012 Key World Energy Statistics>

Environmental Management Competitiveness (EMC)

Environmental Governance

Description: Environmental governance refers to the human activities, in order to achieve the desired environmental objectives, of governing the natural environment through the institution, control, supervision and so on. The effective environmental governance can reduce the negative impact of human activities on the environment, and improve the environmental conditions making the environmental systems working well.
Rationale: This indicator measures the country's governance and supervision level on the natural environment. It reflects the country's positive influence on the natural environment and the efforts to protect and improve the environment.

Agricultural Chemicals Regulation

Direction: Positive
Description: It refers to the regulation implement and supervision on the use of agricultural chemicals.
Rationale: The better or the worse of pesticide regulation in agricultural production can directly reflect the impact of pesticide in water, atmosphere, soil, vegetation and related biological ecological environment.
Source: UNEP-Chemicals; http://chartsbin.com/view/1473

Percentage of the Rural Population with Access to an Improved Water Source to Rural Population

Direction: Positive
Description: Percentage of the rural population with access to an improved water source to rural population = rural population with access to an improved water source/rural population × 100 %. Access to an improved water source refers to the percentage of the population with reasonable access to an adequate amount of water from an improved source, such as a household connection, public standpipe, borehole, protected well or spring, and rainwater collection. Unimproved sources include vendors, tanker trucks, and unprotected wells and springs.

Unit: %.

Rationale: The governance of rural water is an important part of environmental management and protection. This indicator reflects the basic situation of rural water sources, and also shows the protection and improvement of water quality of rural water source.

Source: http://data.worldbank.org/indicator

Percentage of the Urban Population with Access to an Improved Water Source to Urban Population

Direction: Positive

Description: Percentage of the urban population with access to an improved water source to rural population = urban population with access to an improved water source/urban population × 100 %.

Unit: %.

Rationale: The governance of urban water is an important part of environmental management and protection. This indicator reflects the basic situation of urban water sources, and also shows the protection and improvement of water quality of urban water source.

Source: http://data.worldbank.org/indicator

Ecological Protection

Description: Ecological protection reflects the effects of ecological recovery and reconstruction in a region; it has big impact on ecological environmental competitiveness.

Rationale: It can reflect the influence degree of ecological protection policy initiatives on EEC through the efforts to protect and improve the ecological environment.

Biome Protect

Direction: Positive

Description: Biological communities mean all kinds of creatures which live in certain natural areas have direct or indirect relation between them. Biome protect = Biome protect species/Biome species.

Unit: %.

Rationale: It not only reflects the community species diversity, community growth form, the number of different species of dominant species, the relative proportion of features, but also reflects the degree of influence on the EEC.

Source: UNEP World Conservation Monitoring Centre; World Wildlife Fund USA

Area of Plantation and Afforestation

Direction: Positive
Description: Planted forests are composed of trees established through planting and/or through deliberate seeding of native or introduced species.
Rationale: This indicator of planted forest can show the effort to fix a large amount of carbon dioxide and other greenhouse gases, to slow global warming, to improve the environment.
Source: http://www.fao.org/forestry/fra/fra2010/en/

Overfishing of Fishing Resources

Direction: Negative
Description: Catching and fishing from offshore fishery resources influence the normal reproduction of fish stock and cause decrease of species and reduction in quantity.
Rationale: If the management of overfishing on fishery resources is not enough, it will destroy the marine ecological environment, thus it will seriously affect the sustainable development of marine fishery resources.
Source: Sea Around Us Project, Fisheries Centre, University of British Columbia

Resource Utilization Resources

Description: Resource utilization refers to the exploitation, allocation and use of natural resources by humans. It is an important part of environmental management to rationally and effectively optimize the allocation of resources and improve the utilization efficiency of resource, and it produces an important impact on environmental management competitiveness.
Rationale: Modern economy must consume the natural resources. And it is inevitable to face the over-exploitation of resources, environmental pollution and damage. This indicator reflects the country's utilization states of various resources and the influence of resource utilization on resources and environment.

Utilization Rate of Water

Direction: Negative
Description: It refers to the ratio of water consumption to the total water resources in the drainage basin or region.
Unit: %.
Rationale: The indicator is to test the country's use of water resources, reflecting the degree of exploitation and utilization of water resources. The international community generally believes that the exploitation and utilization of a river can not exceed 40 % of its water resources.
Source: http://unstats.un.org/

Percentage of Total Internal Renewable Water Resources to Total Water Resources

Direction: Positive

Description: Percentage of total internal renewable water resources to total water resources = total internal renewable water resources/total water resources × 100 %.

Unit: %.

Rationale: This indicator reflects the renewable capability of freshwater resources in the process of using water resource, and also reflects the effect of wastewater treatment and water recycling.

Source: http://data.worldbank.org/indicator; http://www.fao.org/nr/water/aquastat/water_res/index.stm

Percentage of Agricultural Land to Total Land Area

Direction: Positive

Description: Percentage of agricultural land to total land area = agricultural land area/total land area × 100 %. Agricultural land refers to the land that is arable, under permanent crops, and under permanent pastures.

Unit: %.

Rationale: It can not achieve the good protection and management of ecological environment without the exploitation and protection of land resources, especially agricultural land. Compared to the non-agricultural land, the agricultural land is relatively more conducive to the protection of the ecological environment. This indicator reflects the influence of the exploitation and utilization of agricultural land on the environment.

Source: http://data.worldbank.org/indicator

Percentage of Fossil Fuel Energy Consumption to Total Energy Consumption

Direction: Negative

Description: Percentage of fossil fuel energy consumption to total energy consumption = fossil fuel energy consumption/total energy consumption × 100 %. Fossil fuel comprises coal, oil, petroleum, and natural gas products.

Unit: %.

Rationale: Fossil fuel is the primary energy. It supports the country's economic and social development, but it causes a great impact on the environment. This indicator reflects the utilization state of fossil fuel energy and its impact on the environment.

Source: http://data.worldbank.org/indicator

Environmental Harmony Competitiveness (EHC)

Population and Environment

Description: There is interdependence between population and environment influence each other close relationships.

Rationale: This index can reflect the degree of coordinated development of population and the environment.

Improved Sanitation Facilities (% of Population with Access)

Direction: Positive

Description: Improved sanitation facilities (% of population with access) = the population access to improved sanitation facilities/mid-year population. Access to improved sanitation facilities refers to the percentage of the population with at least adequate access to excreta disposal facilities that can effectively prevent human, animal, and insect contact with excreta. Improved facilities range from simple but protected pit latrines to flush toilets with a sewerage connection.

Unit: %.

Rationale: Improved sanitation facility is one of the important contents to protect basic survival and development of members of society. It is not only able to protect human health, but also to protect the ecological environment. Improved sanitation facilities (% of population with access) reflect the coordinated development degree between population and the environment.

Source: World Health Organization and UNICEF Joint Monitoring Programme (JMP) (http://www.wssinfo.org/)

Motor Vehicles (per 1,000 People)

Direction: Negative

Description: Motor vehicles (per 1,000 people) = Motor vehicles/mid-year population. Motor vehicles include cars, buses, and freight vehicles but do not include two-wheelers. Population refers to midyear population in the year for which data are available.

Unit: vehicles per 1,000 people.

Rationale: Automobile exhaust emissions are important sources of carbon emissions, causing serious air pollution, endangering human health and environmental effects. With population expansion and the increase in car ownership, car and environment, energy and other related contradictions have become increasingly prominent. Motor vehicles (per 1,000 people) can be a reflection of the population impact on the environment.

Source: http://data.worldbank.org/indicator

Renewable Internal Freshwater Resources per Capita

Direction: Positive
Description: Renewable internal freshwater resources per capita = Renewable internal freshwater resources/mid-year population. Average renewable internal freshwater resources calculated by mid-year population. Renewable internal freshwater resources flows refer to internal renewable resources (internal river flows and groundwater from rainfall) in the country.
Unit: cubic meters per capita
Rationale: Fresh water as a renewable resource, mainly recharged by atmospheric precipitation. With the increase in population and economic development, freshwater resources are becoming scarce. Economical use of freshwater resources, reduce pollution and improve renewable freshwater resources per capita ownership for achieving the coordinated development of population and the environment has important significance.
Source: FAO, Agriculture and Water Information System (AQUASTAT)

SO_2 Emissions (metric tons per capita)

Direction: Negative
Description: SO_2 emissions (metric tons per capita) = SO_2 emissions/mid-year population. Average SO_2 emissions calculated by mid-year population. Sulfur dioxide emissions are mainly industrial enterprises in the fuel combustion and production processes in the atmosphere of total sulfur dioxide.
Unit: metric tons per capita
Rationale: Sulfur dioxide is one of the main pollutants in the atmosphere. It is an important indicator to measure whether there has been an atmospheric pollution. Sulfur dioxide emissions not only damage to human health, but also to the ecosystems and agriculture, forestry, aquatic resources. Sulfur dioxide emissions per capita reflect the harmful levels to human and ecological environment.
Source: http://unstats.un.org/; CIAFactbook

CO_2 Emissions (metric tons per capita)

Direction: Negative
Description: CO_2 emissions (metric tons per capita) = CO_2 emissions/mid-year population. Average carbon dioxide emissions calculated by mid-year population. Carbon dioxide emissions are those stemming from the burning of fossil fuels and the manufacture of cement. They include carbon dioxide produced during consumption of solid, liquid, and gas fuels and gas flaring.
Unit: metric tons per capita

Rationale: Carbon dioxide accounted for 50 % of the effect of global warming. The total population has an incremental effect on carbon dioxide emissions, the more the population, the more energy and resource consumption, carbon dioxide emissions will be greater. CO_2 emissions per capita reflect the impact of human activities on climate level. It has an important role for promoting the development of low-carbon economy.
Source: IEA: <2012 Key World Energy Statistics>

Energy Consumption per Capita

Direction: Negative
Description: Energy consumption (kg of oil equivalent per capita) = Energy consumption/mid-year population. Average energy consumption calculated by mid-year population. Energy consumption refers to use of primary energy before transformation to other end-use fuels, which is equal to indigenous production plus imports and stock changes, minus exports and fuels supplied to ships and aircraft engaged in international transport.
Unit: kg of oil equivalent per capita
Rationale: The total consumption of energy is strictly related to the volume of population of one country or area, and due to the difference of population in different countries, the indicator of total consumption of energy cannot reveal the difference of level of consumption, so the indicator of energy consumption per GDP can more accurately express the level of consumption of energy and its variation trend.
Source: IEA: <2012 Key World Energy Statistics>

Economy and Environment

Description: Economy and the environment is a system of two factors. The two have the dialectic relationship of the unity of opposites.
Rationale: Reflect the degree of coordinated development of economy and environment.

Land Resource Utilization Efficiency

Direction: Positive
Description: Land resource utilization efficiency = GDP/Land area. Land area per unit of GDP (PPP) is gross domestic product converted to international dollars using purchasing power parity rates.
Unit: USD/sq km
Rationale: The land resource utilization efficiency can not only tell the economic discrepancy of different countries and areas, but also the degree of industrialization

and pollution of one country or area, so as to reveal the coordinated development of economy and environment in different countries and areas.
Source: http://data.worldbank.org/indicator

Sulfur Dioxide Emissions per Unit of GDP

Direction: Negative
Description: Sulfur dioxide emissions per unit of GDP = Sulfur dioxide emissions/GDP. Calculated per unit of GDP by sulfur dioxide emissions. PPP GDP is gross domestic product converted to international dollars using purchasing power parity rates.
Unit: metric tons per $1,000 GDP
Rationale: The emission of sulfur dioxide per GDP is an important indicator of the quality of economic development. By using such indicator as intensity of the emission of sulfur dioxide per GDP, we can have the idea of happiness and well-being and economic transformation and the development of human living areas of one country.
Source: http://unstats.un.org/; CIA Factbook

Carbon Dioxide Emissions per Unit of GDP

Direction: Negative
Description: Carbon dioxide emissions per unit of GDP = Carbon dioxide emissions/GDP. Calculated per unit of GDP by carbon dioxide emissions. PPP GDP is gross domestic product converted to international dollars using purchasing power parity rates.
Unit: metric tons per $1,000 GDP
Rationale: The emission of sulfur dioxide per GDP is an important indicator of the achievement of controlling of the emission of carbon dioxide and slowing down the climate change. The data reveal that emission of carbon dioxide increases in proportion to the GDP per capita. By using the emission of carbon dioxide per GDP, we can guide the different countries and areas to emit less carbon dioxide while achieving the economic growth, so as to promote the sustainable development of economy, society and environment.
Source: IEA: <2012 Key World Energy Statistics>

Energy Consumption per Unit of GDP

Direction: Negative
Description: Energy consumption per unit of GDP = Energy consumption/GDP. GDP per unit of energy consumption is the PPP GDP per kilogram of oil equivalent of energy consumption. PPP GDP is gross domestic product converted to

current international dollars using purchasing power parity rates. An international dollar has the same purchasing power over GDP as a U.S. dollar has in the United States.

Unit: kg of oil equivalent per $1,000 GDP

Rationale: Energy consumption per unit of GDP is a main indicator that reveal the level of energy consumption and energy saving, which can also reveal energy consumption efficiency and dependence. It expresses the use of energy of one country or area, and the change of economic structure and energy using structure, which could guide one country or government to make appropriate policies to save energy.

Source: IEA: <2012 Key World Energy Statistics>

Part II
General Report

Chapter 6
Overall Evaluation and Comparative Analysis on GEC

What the tide of globalization brings is unprecedented impact on humankind by global environmental problems and these problems have become the economic, political and cultural problems that restrict human existence and development. It can be said that the humankind is entering the era when the competition begins to focus on environment. This book for the first time introduces Global Environment Competitiveness (GEC) as a new way of weighing competitiveness and demonstrates a nation's environment competitiveness through five elements, ecological environment, resource environment, environment carrying, environmental management and environment harmony, in the hope of providing reference for all countries to do complete and scientific analysis on environmental situation and to propose environmental development strategy. This part selects 133 countries of the world (See Fig. 6.1) as samples to analyze the distribution and rankings of global and regional environment competitiveness in 2012 so that the development changes, influencing factors and future trends of global competitiveness can be revealed, which will provide helpful reference for realization of sustainable development around the globe.

6.1 Overall Evaluation of GEC

6.1.1 GEC Evaluation Results

The research group completes the evaluation and analysis on the Global Environment Competitiveness in 2012 based on the GEC Evaluation Indicator System and mathematical model. Table 6.1 gives the environment competitiveness rankings and scores of the countries in 2012 and Fig. 6.2 shows the environment competitiveness scores of the six continents of the world and the top 3 countries in each continent.

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_6,

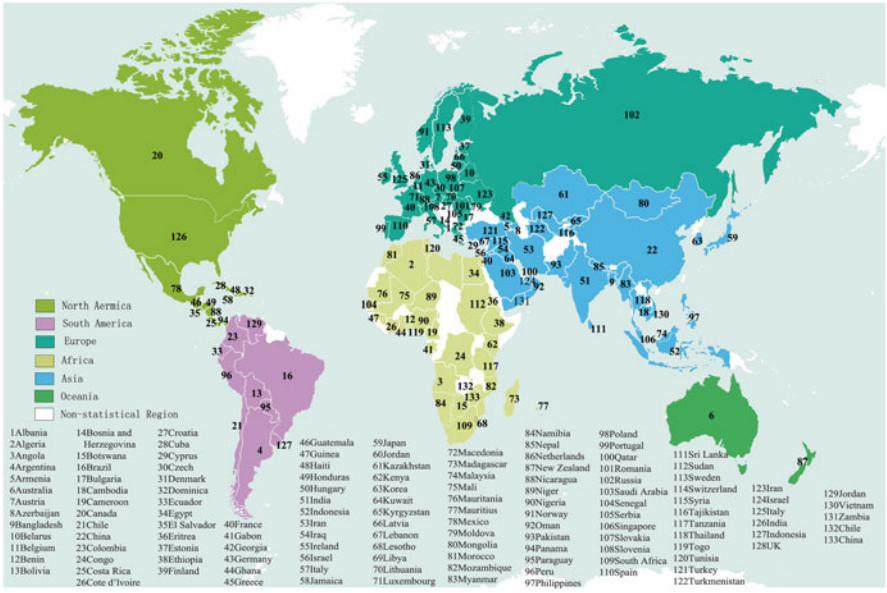

Fig. 6.1 Distribution of evaluated countries on world map

6.1.1.1 GEC Comprehensive Ranking

As Table 6.1 shows, countries with global environment competitiveness ranking 1st–10th include Switzerland, Germany, Norway, New Zealand, Brazil, Japan, Costa Rica, Austria, United Kingdom and France; the 11th–20th rankings are Ecuador, Venezuela, RB, Slovak, Sweden, Bolivia, Honduras, Guatemala, Canada, Gabon and Colombia; the 21st–30th rankings are Australia, Nicaragua, Panama, Chile, Belgium, United States, Slovenia, Finland, Philippines and Denmark; and the bottom ten countries are Kuwait, Yemen, Rep., Libya, Uzbekistan, Kazakhstan, Mauritania, Mali, Iraq, Lesotho and Niger, all listed in order of rank.

6.1.1.2 Overall GEC Scores

In 2012, the highest GEC score was 58.7 points, the lowest score was 32.3 points and the average score was 49.6 points; this indicates that the overall environment competitiveness in all countries of the world is yet to be improved, as there is not a single country that scored over 60 points.

The distribution of GEC scores of the countries shows ladder pattern. Among these, 18 countries scored over 55 points; 47 countries scored between 50 and 55 points; 49 countries scored between 45 and 50 points; 13 countries scored between 40 and 45 points; 5 countries scored between 35 and 40 points; 1 country scored

Table 6.1 GEC primary & sub-index scores and rankings 2012

	Indicator											
	GEC		REC		EEC		ECC		EMC		EHC	
Country	Rank	Score	Rank	Score	Rank	Score	Rank	Score	Rank	Score	Rank	Score
Switzerland	1	58.7	63	17.9	2	70.3	7	74.7	12	59.6	30	71.0
Germany	2	58.5	72	16.9	1	73.0	6	75.2	11	60.3	74	66.9
Norway	3	58.2	6	30.4	25	58.1	21	71.5	23	57.1	15	73.9
New Zealand	4	57.7	12	28.6	6	67.6	55	68.0	29	56.1	56	68.1
Brazil	5	57.5	14	28.2	14	61.4	43	69.2	43	54.2	8	74.4
Japan	6	57.2	31	22.5	19	59.8	35	70.2	4	65.4	55	68.2
Costa Rica	7	57.2	7	30.1	47	52.5	107	64.1	9	62.4	2	77.0
Austria	8	56.7	55	18.5	5	67.9	28	70.8	21	57.3	49	68.8
United Kingdom	9	56.6	96	14.3	10	63.4	14	72.5	5	63.7	48	69.1
France	10	56.3	65	17.8	18	60.0	2	77.6	20	57.4	51	68.7
Ecuador	11	55.9	30	22.8	9	63.6	113	63.4	40	54.4	7	75.3
Venezuela, RB	12	55.8	25	23.9	4	68.7	53	68.2	86	46.6	26	71.6
Slovak	13	55.7	85	15.8	3	69.1	10	73.6	57	51.5	50	68.7
Sweden	14	55.3	45	19.8	28	57.3	15	72.4	25	56.8	36	70.1
Bolivia	15	55.2	28	22.8	41	53.6	94	65.2	2	67.9	77	66.6
Honduras	16	55.2	22	24.9	70	47.5	98	64.9	1	68.0	32	70.7
Guatemala	17	55.2	34	21.2	49	52.3	38	69.9	13	59.4	19	73.1
Canada	18	55.0	13	28.3	35	55.0	32	70.2	46	54.0	69	67.4
Gabon	19	54.9	3	32.5	72	47.3	42	69.5	80	48.4	3	76.9
Colombia	20	54.9	26	23.1	36	54.7	56	68.0	27	56.2	21	72.5
Australia	21	54.8	16	27.4	8	65.7	73	66.7	36	55.0	108	59.4
Nicaragua	22	54.7	5	30.9	11	62.8	68	66.9	104	43.0	37	70.0
Panama	23	54.5	10	29.1	60	49.4	95	65.1	38	54.9	13	74.1
Chile	24	54.3	47	19.7	26	57.7	57	67.9	52	52.3	16	73.6

(continued)

Table 6.1 (continued)

	Indicator											
	GEC		REC		EEC		ECC		EMC		EHC	
Country	Rank	Score	Rank	Score	Rank	Score	Rank	Score	Rank	Score	Rank	Score
Belgium	25	54.0	103	13.3	16	60.5	12	73.1	26	56.4	76	66.6
United States	26	53.8	39	20.4	23	58.7	11	73.4	17	57.8	110	58.8
Slovenia	27	53.8	17	26.5	68	48.0	20	71.6	30	56.1	72	67.0
Finland	28	53.2	43	20.0	32	56.5	46	68.8	35	55.3	85	65.6
Philippines	29	53.2	11	29.0	81	45.6	72	66.8	56	51.6	20	72.8
Denmark	30	53.1	68	17.5	42	53.4	23	71.3	42	54.2	46	69.2
Albania	31	53.1	35	21.1	93	44.7	39	69.8	41	54.4	6	75.6
Italy	32	53.0	82	16.1	24	58.3	27	70.8	24	57.0	94	63.1
Greece	33	53.0	94	14.4	33	55.9	24	71.2	31	55.6	59	68.0
Peru	34	52.9	18	26.3	79	46.2	60	67.3	61	50.6	12	74.2
Jamaica	35	52.9	33	21.2	56	50.3	88	65.6	15	58.6	52	68.6
Latvia	36	52.8	41	20.3	46	52.7	89	65.5	22	57.3	54	68.3
Netherlands	37	52.8	84	15.9	22	58.8	22	71.5	64	50.0	62	67.7
Poland	38	52.8	88	15.1	17	60.1	100	64.9	10	60.8	93	63.1
Sri Lanka	39	52.6	32	21.3	91	44.8	80	66.3	28	56.1	10	74.3
Zambia	40	52.5	29	22.8	7	66.2	79	66.4	66	50.0	114	57.2
Myanmar	41	52.5	1	36.6	121	36.8	33	70.2	106	42.7	5	76.0
Botswana	42	52.4	92	14.6	12	62.2	111	63.6	47	54.0	66	67.5
Portugal	43	52.1	95	14.3	38	53.9	37	70.0	49	53.2	44	69.4
Cambodia	44	52.0	15	27.9	74	46.7	54	68.1	65	50.0	68	67.4
Mauritius	45	51.8	20	25.7	43	53.4	4	76.0	32	55.6	126	48.4
Indonesia	46	51.7	8	29.7	110	40.6	44	69.2	60	51.0	58	68.1
Czech Republic	47	51.7	87	15.6	27	57.6	62	67.2	45	54.0	91	64.0
Luxembourg	48	51.7	102	13.4	13	61.6	70	66.9	37	55.0	99	61.4
Cuba	49	51.6	71	16.9	62	49.1	67	67.0	53	52.2	22	72.5

Malaysia	50	51.5	9	29.6	37	53.9	123	59.4	84	47.1	64	67.6
Ireland	51	51.4	90	14.7	52	51.6	34	70.2	58	51.4	47	69.2
Tanzania	52	51.4	49	19.3	67	48.0	58	67.6	44	54.1	60	68.0
Croatia	53	51.4	57	18.4	75	46.6	19	71.7	70	49.3	31	70.9
Saudi Arabia	54	51.3	109	11.0	20	59.4	64	67.1	3	66.3	120	52.8
Lithuania	55	51.3	73	16.8	21	59.1	90	65.5	78	48.6	78	66.5
Nepal	56	51.1	21	25.3	71	47.4	48	68.7	81	48.2	84	65.7
Congo, Rep.	57	50.9	2	34.8	92	44.8	114	63.3	121	37.8	14	74.0
Georgia	58	50.8	60	18.3	113	39.1	63	67.2	34	55.4	11	74.2
El Salvador	59	50.6	61	18.3	109	41.0	16	72.2	83	47.3	9	74.3
Dominican Republic	60	50.6	54	18.6	44	52.9	31	70.3	117	38.9	23	72.2
Mexico	61	50.5	93	14.4	69	47.6	50	68.3	50	52.9	43	69.4
Senegal	62	50.5	76	16.4	84	45.4	81	66.2	39	54.7	42	69.8
Benin	63	50.3	66	17.7	39	53.8	45	69.1	77	48.6	96	62.2
Korea, Rep.	64	50.3	51	19.0	57	49.7	76	66.6	63	50.2	83	65.8
Hungary	65	50.0	83	16.0	48	52.3	51	68.3	102	43.3	38	70.0
Argentina	66	49.9	100	13.5	55	50.3	18	72.0	100	43.5	35	70.1
Spain	67	49.7	97	14.1	51	51.8	26	70.8	94	44.1	63	67.7
Romania	68	49.5	79	16.3	65	48.9	29	70.7	92	45.2	79	66.5
Israel	69	49.5	127	7.3	29	56.9	92	65.5	67	49.9	61	67.9
Uruguay	70	49.5	78	16.4	118	38.2	9	74.5	110	41.7	4	76.7
Estonia	71	49.5	64	17.9	30	56.6	130	57.0	14	59.1	115	56.8
Cyprus	72	49.4	122	8.3	34	55.5	91	65.5	54	52.0	86	65.6
Namibia	73	49.3	104	13.1	82	45.5	97	64.9	7	63.6	109	59.3
Ghana	74	49.2	67	17.6	101	42.5	61	67.3	55	51.9	75	66.8
Cameroon	75	49.2	23	24.7	129	34.8	40	69.8	90	45.3	27	71.4
Paraguay	76	49.2	58	18.4	104	41.9	47	68.7	98	43.7	18	73.3
Armenia	77	49.2	111	10.3	95	43.9	36	70.1	68	49.8	25	71.6
Zimbabwe	78	49.0	75	16.6	15	60.7	118	62.3	33	55.5	124	49.8

(continued)

Table 6.1 (continued)

	Indicator											
	GEC		REC		EEC		ECC		EMC		EHC	
Country	Rank	Score	Rank	Score	Rank	Score	Rank	Score	Rank	Score	Rank	Score
Thailand	79	48.7	48	19.7	100	43.0	109	63.7	74	48.7	53	68.5
Nigeria	80	48.5	37	20.9	114	39.1	71	66.9	73	48.7	70	67.1
Russia	81	48.5	24	24.3	61	49.4	85	65.7	107	42.1	103	60.8
Tunisia	82	48.5	118	8.7	58	49.6	105	64.3	69	49.8	40	70.0
Belarus	83	48.4	77	16.4	31	56.6	120	61.3	87	46.1	98	61.8
Togo	84	48.4	69	17.5	87	45.0	41	69.6	75	48.7	101	61.3
Bulgaria	85	48.2	86	15.6	63	49.1	101	64.9	16	57.8	118	53.8
Singapore	86	48.1	42	20.0	45	52.8	133	43.1	124	35.5	1	80.3
China	87	48.0	89	14.8	124	36.1	87	65.6	6	63.6	106	60.1
Angola	88	48.0	27	23.0	108	41.2	119	61.7	113	40.9	17	73.4
Turkey	89	48.0	106	12.7	112	39.5	66	67.1	76	48.6	24	72.1
Kenya	90	47.8	107	12.3	99	43.6	59	67.4	62	50.6	88	64.9
Mongolia	91	47.7	59	18.4	83	45.5	128	57.3	8	63.4	117	53.9
Sudan	92	47.6	38	20.8	130	32.9	52	68.2	88	46.1	39	70.0
Macedonia	93	47.6	101	13.4	98	43.8	104	64.5	82	48.0	57	68.1
Lebanon	94	47.5	105	12.8	54	50.4	115	63.2	101	43.3	65	67.6
Morocco	95	47.5	119	8.5	102	42.0	13	72.9	97	43.7	33	70.2
Ukraine	96	47.4	40	20.3	94	44.1	110	63.6	19	57.6	122	51.4
South Africa	97	47.2	112	9.8	96	43.9	30	70.6	59	51.2	104	60.5
Haiti	98	47.0	52	18.9	119	37.9	17	72.0	116	39.2	73	67.0
Bangladesh	99	47.0	4	32.3	132	27.9	74	66.6	119	38.3	41	69.8
Guinea	100	46.8	62	18.2	122	36.5	3	77.6	96	43.9	112	57.9
Vietnam	101	46.8	19	26.2	126	35.2	121	60.8	85	47.0	89	64.7
Cote d'Ivoire	102	46.5	46	19.7	86	45.3	65	67.1	51	52.6	127	47.9
Bosnia and Herzegovina	103	46.5	50	19.2	115	39.0	102	64.7	71	49.1	105	60.4

Algeria	104	46.5	123	7.9	77	46.5	82	66.2	114	40.5	28	71.4
Mozambique	105	46.4	44	19.9	80	45.6	106	64.2	99	43.6	111	58.5
Azerbaijan	106	46.2	98	14.0	78	46.5	84	65.8	120	37.8	71	67.0
Egypt	107	46.1	132	4.7	66	48.1	75	66.6	112	41.0	34	70.1
Serbia	108	46.1	81	16.1	88	45.0	83	65.9	48	53.3	123	50.0
Oman	109	46.0	128	7.2	59	49.5	49	68.5	91	45.2	107	59.7
Iran	110	45.9	116	9.1	64	48.9	78	66.5	95	43.9	102	61.0
Ethiopia	111	45.7	80	16.1	97	43.9	25	70.8	115	39.9	113	57.8
Pakistan	112	45.2	108	11.7	128	34.9	69	66.9	79	48.5	90	64.1
Syria	113	45.0	129	6.5	85	45.3	108	63.8	108	42.1	67	67.4
United Arab Emirates	114	45.0	110	11.0	73	47.1	132	47.9	18	57.6	100	61.4
Moldova	115	44.9	53	18.8	106	41.4	127	57.5	111	41.3	87	65.4
Tajikistan	116	44.7	115	9.4	105	41.5	117	62.5	118	38.8	29	71.4
India	117	44.3	36	21.1	133	23.8	93	65.2	72	49.1	95	62.5
Qatar	118	44.3	56	18.5	50	52.2	131	51.9	89	45.3	119	53.6
Madagascar	119	44.1	91	14.7	117	38.2	1	82.4	109	41.8	131	43.2
Jordan	120	43.9	133	4.0	40	53.8	126	58.1	126	34.6	45	69.2
Eritrea	121	43.5	114	9.7	120	37.4	77	66.5	122	37.6	81	66.4
Turkmenistan	122	43.3	113	9.8	53	50.7	112	63.4	105	42.9	125	49.6
Kyrgyz Republic	123	42.5	117	9.0	107	41.3	103	64.6	128	34.0	92	63.8
Kuwait	124	42.4	70	17.0	90	44.9	125	58.7	93	44.4	129	46.9
Yemen, Rep.	125	41.6	131	6.0	123	36.3	99	64.9	125	34.8	82	65.9
Libya	126	40.3	99	13.9	76	46.6	116	63.0	133	11.7	80	66.4
Uzbekistan	127	40.3	126	7.5	111	39.7	86	65.7	123	36.4	121	52.2
Kazakhstan	128	39.8	74	16.7	103	42.0	124	59.2	127	34.4	128	46.9
Mauritania	129	39.3	124	7.9	89	44.9	8	74.5	132	23.7	130	45.4
Mali	130	38.9	121	8.4	131	30.7	5	75.7	131	24.5	116	55.4
Iraq	131	38.0	130	6.2	125	35.2	122	59.7	130	27.2	97	61.8
Lesotho	132	35.7	125	7.7	116	39.0	96	65.0	103	43.1	133	23.8

(continued)

Table 6.1 (continued)

	Indicator											
	GEC		REC		EEC		ECC		EMC		EHC	
Country	Rank	Score	Rank	Score	Rank	Score	Rank	Score	Rank	Score	Rank	Score
Niger	133	32.3	120	8.5	127	34.9	129	57.1	129	31.7	132	29.2
Highest score	**–**	**58.7**	**–**	**36.6**	**–**	**73.0**	**–**	**82.4**	**–**	**68.0**	**–**	**80.3**
Lowest score	**–**	**32.3**	**–**	**4.0**	**–**	**23.8**	**–**	**43.1**	**–**	**11.7**	**–**	**23.8**
Average score	**–**	**49.6**	**–**	**17.8**	**–**	**49.1**	**–**	**67.0**	**–**	**49.1**	**–**	**65.1**
Standard deviation	**–**	**4.8**	**–**	**6.8**	**–**	**9.3**	**–**	**5.3**	**–**	**9.1**	**–**	**8.9**

Fig. 6.2 Environment competitiveness scores of six continents and top 3 countries in each continent

between 30 and 35 points; and no country scored below 30 points. It is obvious that most countries scored above 45 points and only a few countries obtained scores lower than 45 points. Furthermore, the standard deviation of GEC scores was as small as 4.8, which means the difference between the environment competitiveness in the countries are not large, and particularly the difference between countries with close rankings was very small.

Countries with higher scores are mainly developed countries and there are 17 developed countries among the top 30 rankings, accounting for a ratio of 56.7 %, and 8 developed countries among the top 10 rankings, accounting for a ratio of 80.0 %. Countries with lower scores are mostly developing countries, mainly because of the long-existing wide gap in socioeconomic development foundation, environmental protection input, environment management and environmental technology between developed and developing countries.

In order to intuitively make a comparative analysis on the environment competitiveness of the countries, the environment competitiveness scores in 2012 are presented in Fig. 6.3. As the figure shows, there are 67 countries that scored higher than the average score, accounting for 50.38 % of total countries. As a whole, the difference between all countries was not large, but the scores of bottom ten countries were left far behind other countries, especially Niger ranking the last, whose score was 32.3, leaving 26.4 points of gap from the highest score and even 17.3 points of gap from the average score. Among developed countries, the highest score 58.7 goes to Switzerland, ranking the 1st place; the lowest score 44.3 goes to Qatar, ranking 118th place. Among developing countries, the highest score 57.5 goes to Brazil, ranking the 5th and the lowest score 32.3 goes to Niger, ranking the 133rd.

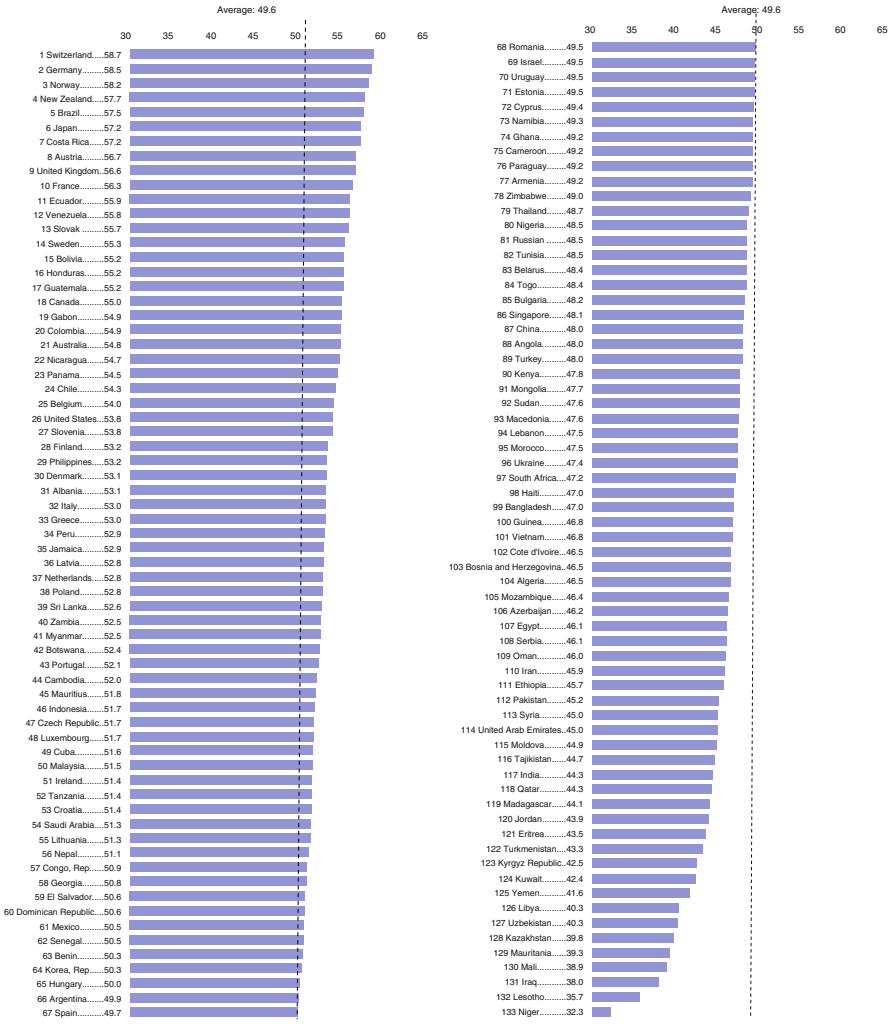

Fig. 6.3 GEC rankings and scores 2012

6.1.2 GEC Factor Scores and Contribution Rate

Table 6.1 is the evaluation result of the sub-indexes for GEC in 2012 and shows the scores and rankings of the five sub-indexes.

The standard deviation of Ecological Environment Competitiveness (EEC) in 2012 is 9.3, indicating that the indicator demonstrates the largest difference between countries and it is the key factor leading to the difference in environment

competitiveness among the countries. Besides, the standard deviation values of Environmental Management Competitiveness (EMC) and Environmental Harmony Competitiveness (EHC) are also as high as 9.1 and 8.9, which are also the important causes of competitiveness difference. As for the standard deviation values of Resource Environment Competitiveness (REC) and Environment Carrying Competitiveness (ECC) are relatively small. ECC's standard deviation is the smallest, at 5.3, which means that ECC has little influence on the environment competitiveness difference between the countries. Basically, the overall environment competitiveness of the countries shows no big difference, while the major causes for competitiveness difference are reflected in EEC, EMC and EHC; of course, REC and ECC also exert certain influence, but at lesser degree. Therefore, countries with weak environment competitiveness need to especially strengthen the efforts in EEC, EMC and EHC, so as to narrow the gap between them and other countries and to significantly enhance their environmental competitiveness.

In order to better analyze sub-indexes' contribution to primary indicator, the scores of sub-indexes are multiplied by respective weights and converted to the scores reflected on primary indicator; after divided by the total score of primary indicator, the contribution rates of each sub-index can be obtained. In this way, each sub-index's contribution to the primary indicator will be straightforward, as shown in Fig. 6.4.

Figure 6.4 shows that ECC made the greatest contribution to GEC, with an average contribution rate of 27.0 %; EHC was the second greatest contributor, at a rate of 26.2 %; the contribution rate of REC and EMC were both 19.8 %; REC made the least contribution, at a rate of 7.2 %. Therefore, ECC and EHC are the two indicators that deserve special attention for all countries in their process of enhancing environmental competitiveness. Of course, the effects of REC, EEC and EMC must not be neglected.

6.1.3 GEC Echelon Scores

Table 6.2 lists the average scores of the five echelons (First Echelon: countries ranking 1st–10th; Second Echelon: countries ranking 11th–30th; Third Echelon: countries ranking 31st–60th; Fourth Echelon: countries ranking 61st–100th; Fifth Echelon: countries ranking 101st–133rd) of GEC in 2012.

As shown in the table, the average environmental competitiveness scores of first, second and third echelons are close with small difference, presenting a ratio of 1.11:1.05:1. The difference between the fourth and fifth echelons and the previous three echelons are larger and the score of First Echelon is 1.33 times that of Fifth Echelon, leaving a gap of 14.1 points.

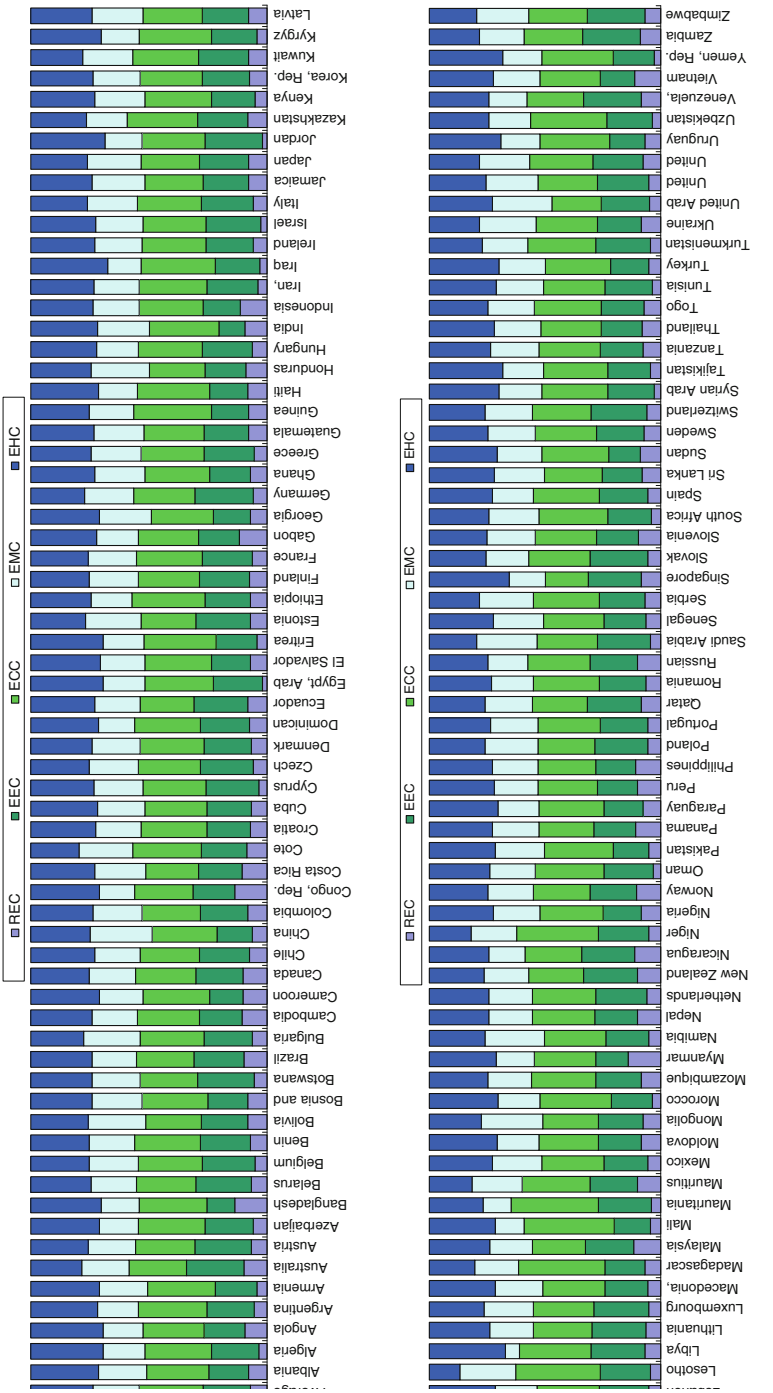

Fig. 6.4 Contribution rates of GEC sub-indexes 2012

Table 6.2 Average environmental competitiveness scores of each echelon 2012

	Indicator					
Average score	Environmental competitiveness	REC	EEC	ECC	EMC	EHC
First echelon	57.4	22.5	63.4	71.4	59.3	70.6
Second echelon	54.6	23.4	56.4	68.8	55.0	69.5
Third echelon	51.9	20.5	51.5	68.0	52.1	67.7
Fourth echelon	48.7	16.4	45.7	66.4	48.8	65.8
Fifth echelon	43.3	12.2	42.3	64.3	40.0	57.6

The average REC score of each echelon shows very big difference, presenting a ratio of 1.83:1.91:1.67:1.34:1.

The average EEC score of each echelon also shows big difference, presenting a ratio of 1.50:1.33:1.22:1.08:1.

The difference of average ECC scores between the echelons is slight, presenting a ratio of 1.11:1.07:1.06:1.03:1.

The average EMC score of each echelon shows big difference, presenting a ratio of 1.48:1.38:1.30:1.22:1.

The difference of average EHC scores between the echelons is small, presenting a ratio of 1.23:1.21:1.18:1.14:1.

Table 6.2 and Fig. 6.5 together may better describe the scores of the primary indicator and sub-indexes in each echelon and it is each to find that, except for REC, the scores of environmental competitiveness and the other four sub-indexes diminishes from first to fifth echelon; the REC score of each echelon is the lowest and the highest case is only 23.4 points; the difference between the EEC scores of first and fifth echelons is most distinct, while the difference of ECC scores among all echelons is the least.

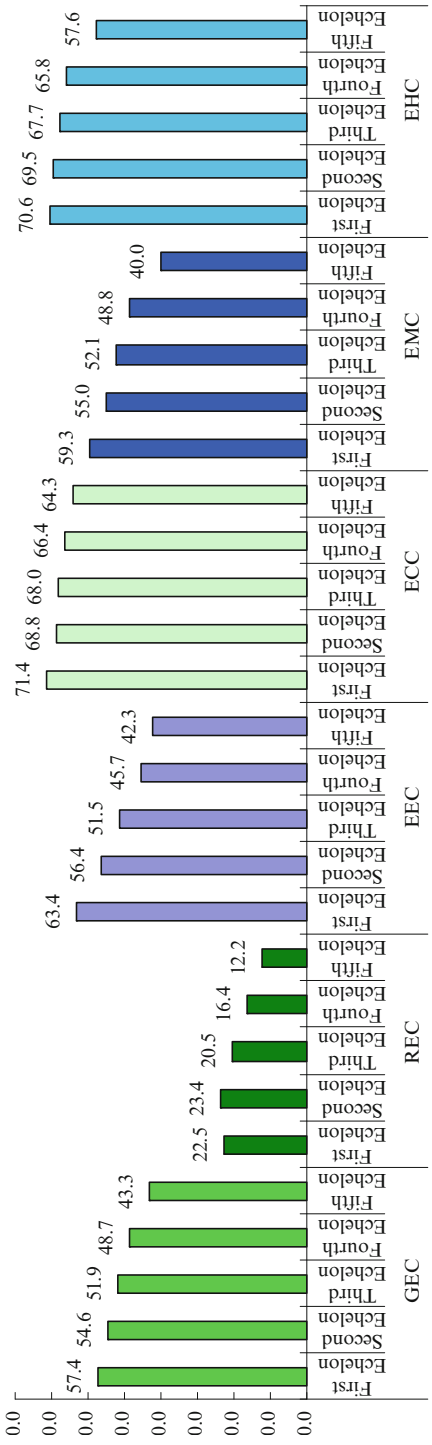

Fig. 6.5 2012 GEC and sub-index scores by echelon

Chapter 7
Regional Analysis of GEC

7.1 Balance Analysis of GEC

The GEC scores and rankings of the countries obtained through non-dimensional processing with threshold method and weighted summing only reflect the status of environmental competitiveness of single country. To reflect the physical variance and overall status of the GEC in each country, GEC scores and its distribution as well as the physical difference and balance among the scores need in-depth study and analysis. Figure 7.1 shows the evaluation scores of GEC in 2012 and distribution of such scores.

It can be found from Fig. 7.1 that the GEC scores of the countries are not distributed in balance, with most countries scoring 45–55 points, accounting for 72.93; countries scoring 40–45 points account for 9.77 %; countries scoring higher than 55 account for 12.78 %; and countries scoring lower than 40 are few in number, accounting for 4.51 %. Generally speaking, GEC evaluation scores are in symmetrical distribution, and the GEC scores demonstrate wide gap between the countries, as the lowest score 32.3 for Niger is only 55 % of that of the highest score for Switzerland, a gap of 26.4 points. It should be pointed out that the score difference between close rankings is generally very small, and therefore the relative ranking of the indicators is not Stable.

7.2 Regional Evaluation and Analysis of GEC

Table 7.1 lists the average GEC and sub-index scores of the 133 countries covered by this study by six contents of the world (Antarctica is excluded since there is no country on the continent).

According to the GEC scores of the six continents in 2012, Oceania obtained the highest GEC score, at 56.3 points; Europe, South America and North America scores were also high, all over 50 points; the lowest score occurred to Africa, at 46.7

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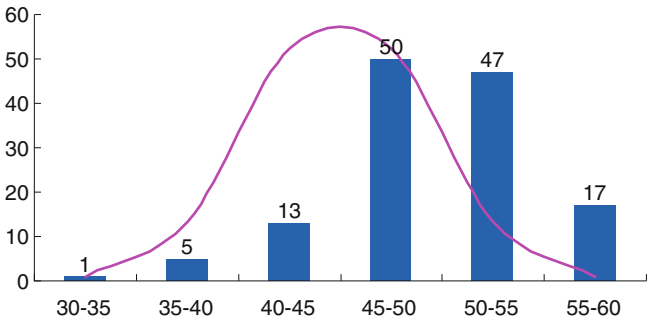

Fig. 7.1 GEC evaluation scores and distribution 2012

Table 7.1 2012 average GEC and sub-index scores of six continents

Region		Score					
		GEC	REC	EEC	ECC	EMC	EHC
Asia	East Asia	50.8	18.7	47.8	64.9	60.6	62.0
	Southeast Asia	50.6	27.3	44.3	62.7	46.7	70.7
	South Asia	48.0	22.3	35.8	66.7	48.0	67.3
	West Asia	46.1	10.6	47.3	63.0	45.8	63.9
	Central Asia	42.1	10.5	43.0	63.1	37.3	56.8
	Average score	**47.5**	**17.9**	**43.6**	**64.1**	**47.7**	**64.1**
Europe	East Europe	49.0	19.2	51.4	62.3	50.3	61.6
	South Europe	49.8	16.7	47.9	68.2	52.2	64.1
	West Europe	53.1	14.7	57.7	71.6	53.9	67.5
	North Europe	55.0	21.9	56.3	71.0	55.9	69.7
	Central Europe	54.7	17.8	62.3	70.8	55.3	67.4
	Average score	**52.3**	**18.1**	**55.1**	**68.8**	**53.5**	**66.0**
Africa	East Africa	47.0	16.4	40.1	68.8	45.5	64.2
	South Africa	47.3	14.9	48.2	66.9	49.1	57.3
	West Africa	45.0	14.8	42.0	67.7	42.9	57.6
	North Africa	45.2	11.5	43.5	67.7	36.4	67.1
	Central Africa	49.1	17.2	49.1	68.8	50.7	59.9
	Average score	**46.7**	**15.0**	**44.6**	**68.0**	**44.9**	**61.2**
Oceania		**56.3**	**28.0**	**66.6**	**67.3**	**55.6**	**63.8**
North America		**53.0**	**22.5**	**50.5**	**68.5**	**53.0**	**70.4**
South America		**53.5**	**21.5**	**53.6**	**68.4**	**51.1**	**72.8**

points. As a whole, the gap between the GEC of six continents was narrow, showing a score ratio of 1.02:1.12:1:1.20:1.13:1.14.

Within Asia, the GEC scores of East Asia and Southeast Asia were relatively higher, at 50.8 points and 50.6 points respectively; next to them is South Asia that scored 48.0 points; Central Asia scored the lowest, only at 42.1 points.

Within Europe, the highest GEC score went to North Europe, at 55.0 points and it is also the second highest score among all regions in the six continents; scores of

Central Europe and West Europe were also high, all above 50 points; the score of East Europe was the lowest, at 49.0 points.

Within Africa, scores of all regions showed no big difference, all below 50 points. Central Africa's score was the highest, at 49.1 points; next to it is East Africa, at 47.0 points; West Africa's score was the lowest.

According to the sub-index scores of the six continents in 2012, the REC, EEC and EMC scores of Oceania were all the highest, but its ECC and EHC both ranked only the 2nd from bottom; Africa's REC, EMC and EHC scores were all the lowest among six continents and its EEC ranked the 2nd from bottom.

With respect to REC, scores of all continents showed narrow difference, in which Oceania scored the highest and Asia and Africa scored lower; within Asia, only Southeast Asia and South Asia scored no less than 20 points and all other regions scored below 20, while the scores of all African regions were below 20. Among all regions, Central Asia's score was the lowest, at 10.5 points and only 37.4 % of the highest score for Oceania.

With respect to EEC, the gap between six continents was relatively wider; Oceania obtained the highest score of 66.6 points, while Asia scored the lowest, leaving wide gap between itself and other five continents. Within Asia, each region scored below 50 points and South Asia scored the lowest 35.8 points. Within Europe, regional scores showed big difference, leaving a gap of 14.4 points between the highest and the lowest scores. Africa showed small difference in scores, with a gap of 9.0 points between the highest and the lowest scores.

With respect to ECC, scores of six continents were relatively high, all above 60 points with small difference, in which West Europe scored the highest 71.6 points; next to West Europe was North Europe, scoring 71.0 points; East Europe's score was the lowest, but still as high as 62.3 points. Scores of Asian regions were the lowest in the six continents, with South Asia having the highest score and Southeast Asia having the lowest among all regions. Africa's score was on the moderate level, and scores of regions were about 68 points; East Africa and Central Africa scored the highest 68.8 points and South Africa had the lowest score, still arriving at 66.9 points.

With respect to EMC, scores of six continents showed no big difference, with Oceania having the highest score and Europe next to it; scores of Asia and Africa were lower than 50 points, especially within Africa where only Central Africa scored over 50 points and the lowest score was as low as 36.4 points. In Asia, all regions obtained low scores, except for East Asia, the other four regions all scored below 50 points; European regions' scores were all above 50 points, and Central Europe had the highest EMC score 55.9 points, which was also the second highest score among all regions of the six continents.

With respect to EHC, scores of six continents were all relatively high with big difference, in which South America had highest score 72.8 points and next to it was North America and Europe, but scores of Africa and Oceania were lower. Asian scores showed big difference, with Southeast Asia having the highest score 70.7 but Central Asia having the lowest score 56.8, also as the lowest among all regions of the six continents.

7.3 Special Evaluation & Analysis on Regional Environment Competitiveness

7.3.1 Evaluation and Analysis on Asia's GEC

7.3.1.1 General Analysis on the GEC of Asian Countries

In order to further analyze the GEC difference between Asian countries, the GEC rankings in Asia and in the world for the 39 Asian countries covered by this study are provided in Table 7.2.

As indicated by the rankings of the Asian countries in 2012, Japan, Philippines and Sri Lanka were the top 3 Asian countries in terms of environment competitiveness, China ranked the 17th place and Iraq ranked the last place.

If looking at the worldwide rankings in 2012, it can be found that only Japan entered the First Echelon (1st–10th rankings) and even neither a single country ranked top 20; there were only 1 countries in Second Echelon (11th–30th rankings), 8 in Third Echelon (31st–60th rankings), 11 in Fourth Echelon (61st–100th rankings) and as many as 18 countries in Fifth Echelon (101st–133rd rankings), accounting for 54.5 % of all countries in Fifth Echelon. Thus a conclusion may be reached that the environment competitiveness of Asian countries were at a low level and most countries had low rankings.

From the sub-index rankings, Asian countries' performance in the 5 sub-indexes were not consistent and no single country showed consistent performance in every aspects, always having one or two low rankings. For instance, Armenia, which ranked 14th worldwide in terms of GEC, had very high rankings in REC and EHC, at 1st and 5th respectively, and its ECC was above the middle level, at 33rd, but its worldwide EEC and EMC rankings were very low, which significantly pulled down its GEC rank. Saudi Arabia was faced with similar situation as Armenia, as its REC and EHC rankings were also very low. There were many more similar Asian countries that always had one or two low-ranking indicators which pulled down their overall GEC rank. Therefore, while making efforts in enhancing environment competitiveness, coordinated development of all aspects is very important and the "short slab" in certain field must be made up to improve the overall environment competitiveness; otherwise, global ranking would be seriously affected. For countries whose GEC rankings fell into Fifth Echelon, most of the countries had 3 sub-indexes ranking lower than 100th place, which made their overall rankings very low.

7.3.1.2 Present Status and Trends of Environment Competitiveness: Major Asian Countries

In order to further understand the characteristics and physical circumstances of the environment competitiveness in Asian countries, we selected China, Japan and India as typical Asian countries for analysis and listed in Table 7.3 the rankings of the indicators

Table 7.2 Comparison of Asian countries' GEC rankings 2012

	Rank											
	Rank in Asia						Rank worldwide					
Country	GEC	REC	EEC	ECC	EMC	EHC	GEC	REC	EEC	ECC	EMC	EHC
Japan	1	9	1	2	2	12	6	31	19	35	4	55
Philippines	2	5	18	12	9	5	29	11	81	72	56	20
Sri Lanka	3	10	22	16	6	3	39	32	91	80	28	10
Myanmar	4	1	32	1	28	2	41	1	121	33	106	5
Cambodia	5	6	16	7	12	18	44	15	74	54	65	68
Indonesia	6	3	28	4	10	13	46	8	110	44	60	58
Malaysia	7	4	5	32	20	15	50	9	37	123	84	64
Saudi Arabia	8	25	2	9	1	35	54	109	20	64	3	120
Nepal	9	8	14	5	19	22	56	21	71	48	81	84
Georgia	10	17	31	8	7	4	58	60	113	63	34	11
Korea, Rep.	11	14	11	14	11	21	64	51	57	76	63	83
Israel	12	34	3	21	13	14	69	127	29	92	67	61
Cyprus	13	32	4	20	8	23	72	122	34	91	54	86
Armenia	14	27	23	3	14	7	77	111	95	36	68	25
Thailand	15	13	24	26	16	11	79	48	100	109	74	53
Singapore	16	12	7	39	34	1	86	42	45	133	124	1
China	17	20	34	19	3	31	87	89	124	87	6	106
Turkey	18	23	30	10	17	6	89	106	112	66	76	24
Mongolia	19	16	19	36	4	33	91	59	83	128	8	117
Lebanon	20	22	10	28	26	16	94	105	54	115	101	65
Bangladesh	21	2	38	13	31	9	99	4	132	74	119	41
Vietnam	22	7	36	30	21	24	101	19	126	121	85	89
Azerbaijan	23	21	17	17	32	19	106	98	78	84	120	71
Oman	24	35	12	6	23	32	109	128	59	49	91	107
Iran	25	30	13	15	25	30	110	116	64	78	95	102
Pakistan	26	24	37	11	18	25	112	108	128	69	79	90
Syria	27	36	20	25	29	17	113	129	85	108	108	67
United Arab Emirates	28	26	15	38	5	29	114	110	73	132	18	100
Tajikistan	29	29	26	29	30	8	116	115	105	117	118	29
India	30	11	39	22	15	27	117	36	133	93	72	95
Qatar	31	15	8	37	22	34	118	56	50	131	89	119
Jordan	32	39	6	35	36	10	120	133	40	126	126	45
Turkmenistan	33	28	9	27	27	37	122	113	53	112	105	125
Kyrgyz Republic	34	31	27	24	38	26	123	117	107	103	128	92
Kuwait	35	18	21	34	24	39	124	70	90	125	93	129
Yemen	36	38	33	23	35	20	125	131	123	99	125	82
Uzbekistan	37	33	29	18	33	36	127	126	111	86	123	121
Kazakhstan	38	19	25	33	37	38	128	74	103	124	127	128
Iraq	39	37	35	31	39	28	131	130	125	122	130	97

Table 7.3 Distribution and comparison of GEC rankings of major Asian countries 2012

Country	Indicator	Number	1st–10th	11th–30th	31st–60th	61st–100th	101st–133rd
China	Sub-index	5	1	0	0	2	2
	Pillar	16	2	1	4	5	4
	Individual indicator	60	3	1	13	26	17
Japan	Sub-index	5	1	1	3	0	0
	Pillar	16	4	3	4	2	3
	Individual indicator	60	9	13	8	12	17
India	Sub-index	5	0	0	1	3	1
	Pillar	16	0	1	5	6	4
	Individual indicator	60	4	4	14	22	15

of all levels in the 3 countries. Taking their efforts in enhancing their environment competitiveness into consideration, we summarized the findings as follows:

1. **China's environment competitiveness remains steady and still moves forward, with obvious achievements in environmental protection.**

In 2012, China's environment competitiveness ranked 87th worldwide, located in the down-middle position among the list. Among China's indicators ranking higher than 60th, 1 was sub-index, accounting for 20 % of total number of indicators and this indicator ranked top 10; 7 were pillars, accounting for 43.75 % of total indicators and 2 of them entered top 10; 17 were individual indicators, accounting for 28.33 % of total indicators and 3 of them were among top 10. However, among the indicators ranking below 60th, 80 % were sub-indexes, 56.25 % were pillars and 71.67 % were individual indicators; these directly influenced the global ranking of China's environment competitiveness.

Since the start of this new century, especially after the 16th CPC National Congress, the CPC Central Committee led by Secretary General Hu Jintao adhered to leading social and economic development with scientific outlook of development as well as the fundamental national policy of resource conservation and environment protection, thoroughly implemented the strategy of sustainable development, and initially put forward the key proposal and strategic mission of constructing ecological civilization; this has provided a solid theoretical basis, a far-reaching goal and driving force for Chinese people to realize harmonious development between human and nature, environment and economy, and human and society, pushing the socialism under Chinese context into a new space. Particularly during the "11th Five-Year" period, the entire environmental protection input reached RMB 2.1 trillion, the installed capacity of thermal power units over 300 MW as a proportion of total capacity increased from 47 % to 71 %, and the proportion of blast furnace over 1,000 m^3 capacity in steel industry also increased from 21 % to 52 %. In the future, there will be more energy conservation and emission reductions projects to accelerate the structuring of clean and efficient industrial system and

promote green development; prevention and control measures against water pollution and air pollution are also key areas of work to improve people's living and production environment, so that both economic development and environmental protection can be realized as double wins.

1. REC and EEC are at the upper-middle positions, having higher competitiveness rankings. In the GEC rankings 2012, China's EMC ranked 6th, going ahead of other countries, but its REC and EEC ranked 89th and 87th respectively, located in the down-middle among the ranking list of 133 countries. China is a developing country; this three indicators can ranked relatively high, because, in addition to its resource environment advantages (e.g., its Growing stock in forest and other wooded land ranked the 5th place), the Chinese government attached high importance to and actively promoted coordinated and sustainable scientific development under humanitarian approach, with government departments and all regions carefully implementing the strategic deployment of ecological environment protection and the construction of "Two oriented society"(resource-saving and environmentally-friendly society), increasing the environmental protection (e.g., its Area of plantation and Afforestation ranked the 5th place). With these efforts, China's socioeconomic development and resource environment are in better balance, the capacity to realize sustainable development is built up and the quality of ecological environment is improved. These policies and steps will continue strengthen China's ecological environment competitiveness.
2. Ranks of various per capita indicators are lower, which constrains the climbing speed of overall competitiveness rank. It is true that the Chinese government has taken many effective steps in areas like environmental protection input, closing backward production facilities and combating climate change, but due to the large population accounting and the imbalance in town/rural, regional and socioeconomic development, there are many more difficulties so that many of the per capita indicators ranked below 80th worldwide and the global ranking of China's overall environment competitiveness is pulled down accordingly. Faced with such situation and problems, the Chinese government even paid more attention to environmental protection in recent years and have been aggressively exploring for new way of achieving sustainable environmental protection at lower cost, better benefit and lower emission. Not only is the environmental protection input increased year by year, but also strict policies are adopted, such as project environmental assessment, necessary regional restriction and closing backward production facilities; these can greatly promote green development. Execution of such measures and steps will further enhance the competitiveness of per capita type of indicators of China.
3. Ranks of various resource and energy consumption related and air quality related indicators are low, requiring strengthened environmental management and utilization. In recent years, the Chinese government put much emphasis on strengthening energy conservation and increasing energy efficiency. According to statistics, the energy consumption elasticity coefficient has dropped from 1.04 in the "10th Five-Year" period down to 0.59 in the "11th

Five-Year" period, saving 630 million tons of standard coal equivalents. It is clearly pointed out in The Twelfth Five-Year Plan for Energy Conservation and Emission Reduction released by the State Council in 2012 that "Till 2015, the energy consumption per 10,000 Yuan of GDP should drop down to 0.869 t of SCE, a decrease of 16 % compared with the 1.034 t SCE in 2010." At present, China's energy utilization efficiency is generally on the low side, and such indicators as power consumption, gross energy consumption and energy consumption per unit GDP all rank below 100th globally. At the same time, due to the excessive energy consumption, quite a few air quality indicators such as sulfur dioxide emission and nitrogen oxide emission also rank low; this thus requires the Chinese government to strengthen the binding force of energy conservation and emission reduction goals, further integrate climate change resilience into economic and social development plan and continue taking strict measures to strengthen and accelerate the transformation of economic development mode, so as to enhance the ability for sustainable development. Effective use of resource and great efforts to strengthen environmental management by government will be an important guarantee for China to enhance the competitiveness in environment carrying, management and coordinating.

2. **Japan's environment competitiveness takes the lead in Asia and has advantages even worldwide.**

In 2012, Japan's environment competitiveness ranked 6th worldwide, going ahead of other Asian countries and even having its advantages compared with other countries globally. Among the indicators ranking higher than 60th, 5 were sub-indexes, accounting 100 % of total indicators and 1 indicator ranked within top 10; 11 were pillars, accounting for 68.75 % of total indicators and 4 indicators entered the top 10; 30 were individual indicators, accounting for 50 % of total indicators and 9 indicators were one of the top 10. Among the indicators ranked below 60th, no sub-index, 31.25 % were pillars and 50 % were individual indicators; these directly influenced the global ranking of Japan's environment competitiveness.

It's beyond all doubt that since the 1970s the Japanese government has released series of environmental protection policies and legislation with high operability, advocated pollution control at the production and consumption links and tried to find the connection point of both environmental protection and economic growth, which have effectively reduced pollution and thus made Japan the world recognized advanced country in public pollution control. Entering the 21st century, Japan has initiated "open-loop economy" pattern formed from linear flow of "nature-resource-product utilization-waste treatment" and "reuse economy" emphasizing resource conservation & recycle and thus takes the lead globally in constructing circular economy.

1. EHC ranks in the front and shows obvious advantage in the world. In 2012, Japan's EHC ranked 4th worldwide, showing advantageous status among the 133 evaluated countries. The pillars environmental governance and ecological protection under EHC ranked the 24th and 6th place, which explains that

the policies and measures about economic development and environmental governance, ecological protection taken by the Japanese government are scientific and effective. This is closely related to Japan's "reuse economic model" advocating resource saving and reuse & recycle and also guarantees that Japan remains one of the leading countries in coordinating development of economy and environment.

2 REC,EEC and EBC rank in the front of the list too. Japan's REC, EEC and EBC ranked 31st, 19th and 35th respectively, both in the obvious advantage positions among the 133 countries. This of course has something to do with the domestic resource, economic and environmental situations in Japan after WWII; particularly, after the War, Japan put economic recovery as priority that for a time ecological environment protection was overlooked and government investment was seldom used in ecological environment construction, which led to a wide gap in this field between Japan and western developed countries. With decades of efforts, it should be admitted that Japan has made great achievements in ecological environment protection, but there are still areas requiring further efforts, such as environmental protection input, ecological environmental infrastructure construction and biodiversity protection, so that REC and EEC can be effectively enhanced.

3. ECC ranks low, ranked 55th in the worldwide, located in the up-middle position, and thus requires attention and strengthened efforts.

The pillar Economy and Environment under ECC ranked the 7th, but the pillar Population and Environment ranked the 111th, which significantly pulled down ECC and the overall environment competitiveness of Japan. Such phenomenon should arouse close attention and the Japanese government needs to promote the coordinated development of population and environment.

3. **India is weak in enhancing environment competitiveness and faced with great pressure from environmental protection.**

In the global environment competitiveness rankings of 2012, India was the 117th country, a rather weak position along the list. Among the indicators ranking higher than 60th, 1 was sub-indexes, accounting 20 % of total indicators and no indicator ranked within top 10; 6 were pillars, accounting for 37.5 % of total indicators and no indicator entered the top 10; 22 were individual indicators, accounting for 36.67 % of total indicators and 4 indicators were one of the top 10. Among the indicators ranked below 60th, 80 % were sub-indexes, 71 % were pillars and 68 % were individual indicators; these directly influenced the global ranking of India's environment competitiveness.

Although India is the first country that put environmental protection into the Constitution and it also released series laws and policies to strengthen environmental protection, effect has been very small. At present, India is still a country dominated by service industry, but in the forthcoming few years of economic development, the industry with manufacturing as the typical will rise quickly; considering the construction of weak infrastructure facilities that requires a centralized and fast

development period, India is going to face enormous pressure from environmental protection. How to achieve the subtle balance between environment and development has to do with to what degree India can realize continued fast development.

1. Resource environment competitiveness has advantage in global market. REC of India was ranked 36th, which is an advantaged position among the 133 countries of the world. The pillars Land resources competitiveness under this indicator is ranked 13th. And the individual indicators Agricultural acreage as a percentage of national land area, Growing stock in forest and other wooded land ranked 5th and 9th. India has a variety of geographic formations and almost all types of geographic environment can be found in this country, like snow mountain, mountain range, desert and rain forest; therefore, India is a country with abundant natural resources like land resources and water resources. Of course, India needs to maintain such advantage by rational development and utilization of resources and adopt an approach of conservation and sustainable development.
2. Economic development decides strong need for energy while consumption is high, which makes development of new energy and clean energy imperative under the situation. It can be found by looking at the energy consumption type of indicators that the indicators related to energy consumption all ranked low; for instance, Energy consumption per unit of land area ranked 96th, Energy consumption per unit of GDP ranked 113th. This undoubtedly has to do with the heavy demand for energy due to reinforced development of manufacturing industry in India, but substantive energy consumption has put great pressure on environment. Sulfur dioxide emission per unit GDP in India ranked 100th and Carbon dioxide emission per unit GDP ranked 113th; economic and environmental development are extremely unbalanced. Therefore, development of new energy and clean energy as well as increasing energy utilization efficiency could be a solution. It should also be noticed that India is starting collaboration on new energy internationally, with great efforts in solar energy, nuclear energy and biological fuel, and actively engaged in the hot wave of shale gas reserve development in Asia.
3. Indicators related to air quality and climate change is very lower-ranking, presenting challenging missions in fighting climate change. The pillars Air quality ranked 133rd, in which Inhalable particles (PM10), Particulate matter (PM2.5), Index of Indoor air pollution , Nitrogen oxides emission , Sulfur dioxide emission ranked 99th, 133rd, 100th, 129th and 129th. The pillars Greenhouse Gas ranked 87th, in which CO_2 emissions per unit of land area and CO_2 emissions per unit of energy consumption ranked 102ed and 82ed. These rankings almost are all bottommost, revealing the terrible air quality and uncontrollable climate change in India. India has always been trying to build itself into a low-carbon economic power; according to statistics, during the past 20 years India has maintained about 8 % of annual average GDP growth rate, but its energy consumption only increased 4 % and energy consumption per unit GDP decreased almost by half, from 0.3 falling down to 0.16. However, as India is located in the tropic and subtropical zone, its ability to fight climate change is rather fragile compared

with other countries and regions of the world; its energy structure is dominated by coal, which accounting for 53 % of its total energy. Therefore, India needs to further optimize its structure of energy use, actively promote clean energy and coordinate the relationship between economic development and environmental protection so as to take more initiative in fighting climate change.

7.3.2 Evaluation and Analysis on Europe's GEC

7.3.2.1 General Analysis on the GEC of European Countries

In order to further analyze the GEC difference between European countries, the GEC rankings in Europe and in the world for the 36 European countries covered by this study are provided in Table 7.4.

From the 2012 environment competitiveness rankings in Europe, Switzerland, Germany and Norway were the top 3 European countries, the old-brand capitalist countries like UK, France and Netherlands were located in the upper middle of the list, and Moldova was the bottommost country.

If looking at the worldwide rankings of 2012, it can be found that 6 European countries entered First Echelon (1st–10th rankings), claiming the largest proportion among the six continents; there were 6 countries in Second Echelon (11th–30th rankings), 12 in Third Echelon (31st–60th rankings), 9 in Fourth Echelon (61st–100th rankings) and only 3 countries in Fifth Echelon (101st–133rd rankings). Thus a conclusion may be reached that the environment competitiveness of European countries were relatively high and most countries had high rankings.

From the sub-index rankings, the EEC, ECC and EMC rankings of European countries were relatively high, showing better performance. Actually, all European countries' performance in the 5 sub-indexes were balanced, except individual indicators that ranked lower but was pulled up by other indicators; particularly the pulling force from indicators with larger weight has driven the overall ranking of Europe's environment competitiveness to the front. For countries whose GEC rankings fell into Fifth Echelon, all of them had 4 sub-indexes ranking lower than 70th place, which made their overall rankings very low.

7.3.2.2 Present Status and Trends of Environment Competitiveness: Major European Countries

In order to further understand the characteristics and physical circumstances of the environment competitiveness in European countries, we selected Switzerland, Germany, Italy, Russia and UK as typical European countries for analysis and listed in Table 7.5 the rankings of the indicators of all levels in the 5 countries. Taking their efforts in enhancing their environment competitiveness into consideration, we summarized the findings as follows:

Table 7.4 Comparison of European countries' GEC rankings 2012

	Rank											
	Rank in European						Rank worldwide					
Country	GEC	REC	EEC	ECC	EMC	EHC	GEC	REC	EEC	ECC	EMC	EHC
Switzerland	1	13	2	3	4	3	1	63	2	7	12	30
Germany	2	17	1	2	3	20	2	72	1	6	11	74
Norway	3	1	13	10	11	2	3	6	25	21	23	15
Austria	4	11	4	16	9	11	8	55	5	28	21	49
United Kingdom	5	32	5	6	1	10	9	96	10	14	5	48
France	6	15	9	1	8	13	10	65	18	2	20	51
Slovak	7	25	3	4	24	12	13	85	3	10	57	50
Sweden	8	8	15	7	13	5	14	45	28	15	25	36
Belgium	9	36	7	5	14	21	25	103	16	12	26	76
Slovenia	10	2	29	9	15	19	27	17	68	20	30	72
Finland	11	7	18	21	17	24	28	43	32	46	35	85
Denmark	12	16	21	12	20	8	30	68	42	23	42	46
Albania	13	4	32	20	19	1	31	35	93	39	41	6
Italy	14	22	12	15	12	28	32	82	24	27	24	94
Greece	15	30	19	13	16	16	33	94	33	24	31	59
Latvia	16	6	22	27	10	14	36	41	46	89	22	54
Netherlands	17	24	11	11	26	17	37	84	22	22	64	62
Poland	18	28	8	29	2	27	38	88	17	100	10	93
Portugal	19	31	20	19	23	7	43	95	38	37	49	44
Czech Republic	20	27	14	23	21	26	47	87	27	62	45	91
Luxembourg	21	35	6	24	18	30	48	102	13	70	37	99
Ireland	22	29	25	18	25	9	51	90	52	34	58	47
Croatia	23	12	30	8	27	4	53	57	75	19	70	31
Lithuania	24	18	10	28	29	22	55	73	21	90	78	78
Hungary	25	23	23	22	34	6	65	83	48	51	102	38
Spain	26	33	24	14	33	18	67	97	51	26	94	63
Romania	27	20	28	17	32	23	68	79	65	29	92	79
Estonia	28	14	16	36	5	33	71	64	30	130	14	115
Russia	29	3	26	26	35	31	81	24	61	85	107	103
Belarus	30	19	17	34	31	29	83	77	31	120	87	98
Bulgaria	31	26	27	30	6	34	85	86	63	101	16	118
Macedonia	32	34	34	32	30	15	93	101	98	104	82	57
Ukraine	33	5	33	33	7	35	96	40	94	110	19	122
Bosnia and Herzegovina	34	9	36	31	28	32	103	50	115	102	71	105
Serbia	35	21	31	25	22	36	108	81	88	83	48	123
Moldova	36	10	35	35	36	25	115	53	106	127	111	87

1. **Switzerland's environment competitiveness led the entire globe.**

Among Switzerland's indicators ranking higher than 60th in 2012, 4 were sub-indexes, accounting for 80 % of total indicators and 2 indicators ranked top 10; 12 were pillars, accounting for 75 % of total indicators and 5 indicators entered top 10;

Table 7.5 Distribution and comparison of GEC rankings of major European countries 2012

Country	Indicator	Number	1st–10th	11th–30th	31st–60th	61st–100th	101st–133rd
Switzerland	Sub-index	5	2	2	0	1	0
	Pillar	16	5	1	6	3	1
	Individual indicator	60	12	13	11	15	7
Germany	Sub-index	5	2	1	0	2	0
	Pillar	16	4	1	4	6	1
	Individual indicator	60	13	11	11	17	8
Italy	Sub-index	5	0	3	0	2	0
	Pillar	16	1	2	8	2	3
	Individual indicator	60	4	10	21	17	7
Russia	Sub-index	5	0	1	0	2	2
	Pillar	16	2	1	3	7	3
	Individual indicator	60	8	7	11	20	14
UK	Sub-index	5	2	1	1	1	0
	Pillar	16	2	5	4	4	1
	Individual indicator	60	10	11	14	15	10

36 were individual indicators, accounting for 60 % of total indicators and 12 indicators were among top 10. However, among the indicators ranking below 60th, only 20 % were sub-indexes, 25 % were pillars and 40 % were individual indicators; most of the indicators ranked high and these directly influenced the global ranking of Switzerland's environment competitiveness.

1. REC ranks in the medium level due to the congenital natural factors.

   Switzerland has a land area of over 40,000 km^2, in which mountainous area accounts for 60 %. Because of such restrictions of natural factor, the land resources and forest resources rankings of Switzerland were all in the lower middle. Switzerland's REC ranked 63rd in 2012, which does not match with the situation of GEC ranked 1st. Further, land resources ranked 117th, forest resources ranked 64th and energy resources ranked 91st. Influenced by these, the per capita indicators, such as land area per capita, arable land per capita and forest area per capita, also ranked lower; for example, arable land per capita ranked 117th and forest area per capita ranked 83rd. At the same time, due to the lack of resources, net energy imports of the energy consumption also ranked low at 91st.
2. Due to the benefits of ecological environment protection and management, Switzerland's EEC, ECC and EMC rankings are all very high.

   In spite of the low ranking of REC in 2012, Switzerland's EEC, ECC and EMC ranked 2nd, 7th and 12nd. This has to do with Switzerland's awareness of environmental protection and territorial harnessing as well as the methods they used. The country has accumulated extensive experience in ecological protection

(nature reserve area), safeguarding and improving air quality and environmental management. It has very strict legislation for environmental protection, such as legal sanction on any person who cuts down a single tree. Environmental measures of government are also strict and concrete, requiring green surface and vegetation cover for all land except for mountain, lake, farmland and buildings, regardless in cities and in rural areas and no single piece of bare land is allowed to be exposed to the air. In order to reduce environmental pollution, the 5,300 km of railroad line of Switzerland is electric, cities are encouraged to develop tramcar and trolley bus and in recent years environmental protection projects like battery car were initiated; hotels, restaurants, office buildings and even privately owned houses are not allowed to install air conditioner without special permit and instead natural ventilation or electric fan are recommended, and 3 individual indicators in environmental governance ranked first in the world. Participation by Swiss citizens is also active. The public may directly participate in the preparation for environmental legislation, make suggestions, and may vote by ballot the proposals and finally determine the environmental measures to be adopted.

3. A few individual indicators still rank low and require further improving the coordination of population and the environment.

   In the 2012 GEC rankings, some of the individual indicators of Switzerland ranked extremely low, such as GEF benefits index for biodiversity, fertilizer consumption per unit of arable land, energy consumption per unit of land area, CO_2 emissions per unit of land area, motor vehicles per 1,000 people and energy consumption per capita, which ranked 109th, 102nd, 114th, 115th, 119th and 98th. According to the Swiss newspaper *20 Minutes*, the average quantity of energy, food, wood and other natural resources consumed by one Swiss is about twice of the average quantity per capita worldwide, the per capita consumption is 8 times higher than in poor countries such as Bangladesh. WWF also said that if human beings live like the Swiss, that we need at least 2.8 earth. Therefore, as the richest country of the world, Switzerland may consider, while improving the quality of life for Swiss people from financial and technology angles, reducing consumption of natural resources at the same time. For example, the Swiss should bear more responsibility in constructing environmental protection building, using low energy consumption car, reducing the consumption of meat and dairy foods, and realizing coordinated and sustainable development of both humans and nature.

2. **Germany achieved remarkable results in environmental protection initiatives.**

Among Germany's indicators ranking top 60 in 2012, 3 were sub-indexes, accounting 60 % of total indicators and 2 indicator ranked top 10; 9 were pillars, accounting for 56.25 % of total indicators and 4 indicators entered top 10; 35 were individual indicators, accounting for 58.33 % of total indicators and 13 indicators were among top 10. However, among the indicators ranking below 60th, 40 % were sub-indexes, 43.75 % were pillars and 41.67 % were individual indicators; most of

the indicators ranked high and these directly influenced the global ranking of Germany's environment competitiveness.

1. REC and EHC rank in the middle and lower levels, the coordination capability between population and environment needs to be further ascension.

   In the 2012 GEC rankings, Germany's REC and EHC ranked 72nd and 70th, which in no sense matched its overall environment competitiveness ranking of 2nd worldwide. The low rankings of the 2 sub-indexes were mainly because of arable land per capita, annual precipitation, forest area per capita, net energy imports of the energy consumption, motor vehicles per 1,000 people, renewable internal freshwater resources per capita, CO_2 emissions per capita, and energy consumption per capita, ranking 76th, 72nd, 90th, 99th, 127th, 89th, 113rd and 102nd respectively. Germany's proportion of land area covered by forest was very high In the history, but due to irrational deforestation reclamation, overexploitation of early industrialization, as well as the destruction of war, the original forest area quickly dropped, proportion of land area covered by forest decreased, causing serious ecological and timber crisis.
2. EEC ranks 1st globally and ECC, EMC rank in the top, ecological protection measures have produced excellent effects.

   The top 1 ranking of Germany's EEC benefits from the series steps about ecological protection. Similar to Switzerland, the German government makes much account of public awareness on environmental protection and emphasizes environmental protection relying on public involvement. They publicize and popularize environmental protection knowledge to the public by means of free lectures and pamphlets; the German people put environmental protection as the second important domestic issue only next to employment. And, Germany issued related laws and monitoring measures to strengthen prevention and control over environment, such as Waste Management Law, "Regulation on Large Combustion Equipment" and "Technical Guide for Air Purification". The country also put the development of renewable energy on a strategic height and established series of sound laws and regulations for development of renewable energy and increasing energy efficiency for the purpose of climate change resilience. Germany launched a massive campaign to restore forests, first proposed the science business ideas of sustainable use of forest, carry out the construction of artificial afforestation, which gradually reversing the situation of the forest's continuing sharp decline. The number of forest increasing, area of plantation and afforestation in 2012 ranks 10th, ecological protection effect was apparent.
3. Some of the individual indicators still rank low and require further strengthening of environmental governance.

   Among the individual indicators, low-ranking indicators include nitrogen oxides emission, sulfur dioxide emission, energy consumption per unit of land area, CO_2 emissions per unit of land area, motor vehicles per 1,000 people, CO_2 emissions per capita and Energy consumption per capita, ranking 125th, 103rd, 117th, 123rd, 127th, 113rdand 102nd respectively; these indicators by no means match with the overall environment competitiveness ranking at the 2nd place. In

the future, the country needs to strengthen governmental governance and adopt measure to build up its ability for sustainable development.

3. **Italy still needs to keep increasing the harmony competitiveness of population and environment.**

Among Italy's indicators ranking higher than 60th in 2012, 3 were sub-indexes, accounting for 60 % of total indicators and no indicator ranked top 10; 11 were pillars, accounting for 68.75 % of total indicators and 1 indicator ranked top 10; 25 were individual indicators, accounting for 41.67 % of total indicators and 4 indicators ranked top 10. Among the indicators ranking below 60th, only 40 % were sub-indexes, 31.25 % were pillars and 58.33 % were individual indicators; most of the indicators ranked high and these directly influenced the global ranking of Italy's environment competitiveness.

1. EEC, ECC and EMC rank high and the ability of environmental governance is strong.

   In the 2012 GEC rankings, Italy's EEC, ECC and EMC ranked 24th, 27th and 24th respectively, which are rather high. Italy's environmental management competitiveness is more prominent, ranked 24th, thereinto Agricultural chemicals regulation ranked 20th and the rankings of the percentage of the rural population with access to an improved water source and the percentage of the urban population with access to an improved water source both ranked at the top. Italy through the classification of garbage collection, demolition of illegal construction and strengthen the green protection measures, to actually improve the environment and promote environmental protection.
2. The ranking of EHC was low and the main reason was due to the less harmony competitiveness of population and environment.

   In the 2012 GEC rankings, Italy's EHC ranked 94th, mainly because of the rankings of the harmony competitiveness of population and environment was at 125th, which was extremely low. Thereinto the rankings of motor vehicles per 1,000 people and SO_2 emissions per capita were at 129th and 96th. At present, Italy has become the world's fifth largest car market, and the car consumption level ranked the forefront in Europe. Every thousand people have 581 passenger cars, and the average family owns 1 cars. Because car ownership is direct influence factors of the number of carbon dioxide emissions, it indirect effected the local environment, which makes the low rankings. While Italy's harmony competitiveness of economy and environment ranked 9th, and land resource utilization efficiency, sulfur dioxide emissions per unit of GDP, carbon dioxide emissions per unit of GDP, energy consumption per unit of GDP ranked 14th, 13th, 17th, and 6th respectively, the resource utilization efficiency is higher.
3. Ranks of some individual indicators are extremely low, which constrains the climbing speed of environment competitiveness rank.

   In the 2012 GEC rankings, Italy's land area per capita, net energy imports of the energy consumption, threatened fish species, nitrogen oxides emission, energy consumption per unit of land area, CO_2 emissions per unit of land area

and motor vehicles per 1,000 people ranked extremely low, at 112th, 115th, 103rd, 112th, 112th, 117th and 129th respectively, which in no way match with the 32nd ranking of its global environment competitiveness and restrict the enhancement of competitiveness. The development of biofuels has influenced the development of biodiversity. Also owing to global climate change, the sea level near Italy moved up due to temperature rise, which further influenced the development of biological varieties.

4. **Russia's environment competitiveness ranks in the middle and it needs to keep increasing its capacity in coordinating environment with economy and population.**

Among Russia's indicators ranking higher than 60th in 2012, 1 was sub-indexes, accounting for 20 % of total indicators and no indicator ranked top 10; 6 were pillars, accounting for 37.5 % of total indicators and 2 indicators ranked top 10; 26 were individual indicators, accounting for 43.33 % of total indicators and 8 indicators ranked top 10. Among the indicators ranking below 60th, 80 % were sub-indexes, 62.5 % were pillars and 56.67 % were individual indicators; most of the indicators ranked low and these directly influenced the global ranking of Russia's environment competitiveness.

1. Russia's REC ranks in the middle and upper level, which is the benefit of its unique environment advantages.

   In the 2012 GEC rankings, Russia's REC ranked 24th, under which land resources, forest resources and energy resources ranked 20th, 2nd and 38th respectively. Russia is the biggest country in the world, which is rich in natural resources and the natural resources in Russia accounts for 22 %–28 % of that in the whole world. There are deposits of coal, petroleum, natural gas, oil shale, iron, manganese, chromium, copper, lead, zinc, nickel, titanium, gold, potash, asbestos and so on. Russia's forest areas account for 1/3 of Russia's total territory, which is the world's largest subarctic coniferous forest. Although the runoff volume ranks second in the world, Russia's annual precipitation ranked 103rd, that becomes a short board to further enhance the REC. The ranking of proportion of combustible renewables and waste to total energy consumption was at 106th, which further restrict the increasing of its energy resources competitiveness.
2. EMC and EHC rank so low that Russia should pay attention to enhancing the coordination of economy and environment.

   And reduction of energy consumption should be one of the focal areas for efforts. In the 2012 GEC rankings, Russia's ECC and EMC ranked 107th and 103rd, thereinto the ability of environmental governance ranked 123rd, resource utilization ranked 104th, especially the utilization rate of water resources is very low, which ranked 106th, and the harmony of economy and environment ranked 107th. Russia has become the largest crude and natural gas producer of the world and also the fourth largest energy user of the world, only next to China, USA and India. Compared with the OECD member countries, the energy utilization level

in Russia is low with severe waste. If Russia could make achievements in industrial modernization and vehicle exhaust emission reduction, the saved energy per year would satisfy the energy demand of the entire UK, equivalent to the energy of 200 million tons of crude oil. Disposal of household and industrial solid wastes in Russia is still a tough job; the equipment in some traditional industries like chemical engineering, petrifaction and microorganism are badly aged and frequent leakage accidents are also the cause for environmental pollution. For Russia, it must fully understand the high degree of consistency of environmental protection and scientific development, adhere to the "environment protection first" principle, correctly handle the relationship between environment and development, and establish the ecological philosophy that man and nature is harmony. And Russia should regard environmental protection as an important part in the process of production and consumption, vigorously develop the circular economy, transform the mode of economic development.

3. Some of individual indicators ranked so low, that should speed up to develop green economy.

   Russia's overall biodiversity ranked fourth, thanks to its GEF benefits index for biodiversity ranked 10th, but the threatened mammal species ranked 110th. In the air quality index, it ranked 66th, but the rankings of nitrogen oxides emission and sulfur dioxide emission were at 127th and 128th. There were 185 cities and industrial districts in Russia's air pollution index were overproof. The exhaust emissions and automobile exhaust emissions exceed the standard from some metallurgical, chemical, petrochemical, construction, power and other enterprises are the main reason of air pollution. In addition, the waste which contain sulfur and nitrogen oxides discharged into the Russian forest, lakes and agriculture and forestry generated from other countries, such as Ukraine, Poland and Germany, also have a serious impact on Russia's air quality. In ECC, SO_2 emissions per unit of value added of industry ranked 108th. In recent years, Russia has also taken a series of measures to improve air quality and control pollution, such as Russia has approved the state environmental protection plan from 2012 to 2020, aimed at developing "green economy", to reduce the negative influence on environment from enterprises, legislated to implement fees and hefty fines for polluting enterprises and through the development plan of national forest economy from 2013 to 2020, called for the strengthening of forest protection, which have a positive effect on air quality improvement.

5. **The effect of all the UK's environmental policy is obvious.**

Among UK's indicators ranking higher than 60th in 2012, 4 were sub-indexes, accounting for 80 % of total indicators and 2 indicators ranked top 10; 11 were pillars, accounting for 68.75 % of total indicators and 2 indicators ranked top 10; 35 were individual indicators, accounting for 58.33 % of total indicators and 10 indicators ranked top 10. Among the indicators ranking below 60th, only 20 % were sub-indexes, 31.25 % were pillars and 41.67 % were individual indicators. These directly influenced the global ranking of UK's environment competitiveness.

1. REC ranked low, and forest resources and energy resources more deficient.

   In the 2012 GEC rankings, UK's REC ranked 96th, in the lower middle level, which do not match with its global environment competitiveness rank 9th. the main reason is that the rankings of UK's forest resources and energy resources were low at 92nd and 101st. According to the date from global forest resources assessment report published by FAO in 2010, UK's forest area is 2,881 thousand hm^2, accounting for 12 % of the land area, so UK is the lower forest coverage country in the developed countries (the average of European forest coverage rate is 44.3 %). According to the assessment report issued by the office of gas and electricity markets, from 2015 to the winter in 2016, the remaining proportion of UK energy will decrease from the current 14 to 4 %, which will lead to the United Kingdom is more dependent on imports of natural gas.
2. EEC, ECC and EMC rank high, which is the benefit of UK's various environmental laws and legal system.

   In the 2012 GEC rankings, UK's EEC, ECC and EMC ranked 10th, 14th and 5th respectively. It is mainly benefits of various laws on managing air quality and environmental governance. UK made tremendous efforts in the governance of the haze. The first stage is to announce "environmental law in industrial development", the second stage is mainly to govern soot, through the "Clean Air Act", the local authority provided to set smokeless zone, strictly control the emissions of smokeless coal, no black smoke emission in the smokeless zone, the height like chimney, the upper limit of sulfur in the Industrial dye, the third stage is to control traffic pollution, and the fourth stage is the strategic stage. UK's government emphasis on improving energy efficiency and developing renewable energy, have established the target of developing "low carbon economy". UK has a series of projects and home users with recommendations for effective utilization of energy. Each new family in England and Welsh must comply with the standardized evaluation process designed for home energy tax, which fully embodies the efficiency of energy and the impact on the environment, and household equipment must have the energy label. All these measures make UK resource utilization in the world ranked 18th. In 2010, UK pointed out that it will build the world's biggest nature reserve in the waters around chagos islands of the Indian Ocean, to make the coral reefs exempted from the threat of global warming and protect the sea ecology and deep trenches, which are the efforts UK have made in ecological security. In 2012, UK'S ecological security competitiveness ranked 20th.
3. Ranks of some individual indicators are extremely low, which constrains the climbing speed of overall competitiveness rank.

   Although UK government has attached much importance to environmental issues and put forward the concept of "Zero-energy development", which aims at maximally utilizing natural resources, reducing environment damage and pollution, realizing application of zero fossil energy, and finally realizing the residential mode of basic recycle between energy demand and waste treatment, in fact, the rankings of nitrogen oxides emission, sulfur dioxide emission,

fertilizer consumption per unit of arable land, energy consumption per unit of land area, elasticity of energy consumption, CO_2 emissions per unit of land area, motor vehicles per 1,000 people, CO_2 emissions per capita were at 116th, 106th, 110th, 116th, 103rd, 122nd, 111th and 103rd respectively. UK is the birthplace of the industrial revolution. The pollution brought by this revolution to UK is very serious, and the "Oliver twist" is called connected with the pollution by the factories at the time. According to goals established by the UK government, the renewable energy generating capacity will account for 15.4 % by 2015, and the CO_2 emissions will be reduced 60 % by 2050. There will be more funds invested into the research in development of clean technologies, increasing of energy utilization rate and so on in the next two years, so enterprises should be aware of the advantage of environmental protection industry as early as possible.

7.3.3 Evaluation and Analysis on Africa's GEC

7.3.3.1 General Analysis on the GEC of African Countries

In order to further analyze the GEC difference between African countries, the GEC rankings in Africa and in the world for the 33 African countries covered by this study are provided in Table 7.6.

In terms of national rankings within Africa in 2012, Gabon, Zambia and Botswana were top 3 environmentally competitive countries in Africa and Niger was the bottommost country.

If looking at the worldwide rankings of 2012, we can see that none of the African countries entered the First Echelon (1st–10th rankings); there was only 1 country in Second Echelon (11th–30th rankings), 5 in Third Echelon (31st–60th rankings), 15 in Fourth Echelon (61st–100th rankings) and 12 countries in Fifth Echelon (101st–133rd rankings), accounting for 36.4 % of all countries in Fifth Echelon. Lesotho and Niger were the bottommost 1st and 2nd respectively. Therefore, the environment competitiveness of African countries is generally at low level, and most countries ranked in the bottom part, falling into the fourth and fifth echelons.

From the rankings of sub-indexes, African countries' performance in REC, EEC and ECC were relatively better; Congo, Rep.'s REC ranked 2nd, Zambia's EEC ranked 7th, and Madagascar's ECC ranked 1st. Although certain sub-indexes of some countries ranked relatively in the front, the overall environment competitiveness ranking was not high, since other sub-indexes all ranked lower. For countries whose GEC rankings fell into Fifth Echelon, almost all of them had 3 sub-indexes ranking lower than 100th place, which made their overall rankings very low, particularly for Mali, Lesotho and Niger that all had 4 sub-indexes ranking lower than 100th place.

Table 7.6 Comparison of African countries' GEC rankings 2012

	Rank											
	Rank in Africa						Rank worldwide					
Country	GEC	REC	EEC	ECC	EMC	EHC	GEC	REC	EEC	ECC	EMC	EHC
Gabon	1	2	9	11	16	1	19	3	72	42	80	3
Zambia	2	6	1	21	11	25	40	29	7	79	66	114
Botswana	3	20	2	28	6	12	42	92	12	111	47	66
Mauritius	4	3	5	3	2	28	45	20	43	4	32	126
Tanzania	5	11	8	14	5	11	52	49	67	58	44	60
Congo, Rep.	6	1	18	29	28	2	57	2	92	114	121	14
Senegal	7	17	14	22	4	10	62	76	84	81	39	42
Benin	8	13	4	12	15	18	63	66	39	45	77	96
Namibia	9	22	13	25	1	21	73	104	82	97	7	109
Ghana	10	14	22	16	8	14	74	67	101	61	55	75
Cameroon	11	4	31	9	18	4	75	23	129	40	90	27
Zimbabwe	12	16	3	31	3	27	78	75	15	118	33	124
Nigeria	13	7	25	18	13	13	80	37	114	71	73	70
Tunisia	14	26	6	26	12	9	82	118	58	105	69	40
Togo	15	15	16	10	14	19	84	69	87	41	75	101
Angola	16	5	24	32	25	3	88	27	108	119	113	17
Kenya	17	23	21	15	10	17	90	107	99	59	62	88
Sudan	18	8	32	13	17	8	92	38	130	52	88	39
Morocco	19	27	23	6	20	6	95	119	102	13	97	33
South Africa	20	24	19	8	9	20	97	112	96	30	59	104
Guinea	21	12	29	2	19	23	100	62	122	3	96	112
Cote d'Ivoire	22	10	15	17	7	29	102	46	86	65	51	127
Algeria	23	30	11	23	26	5	104	123	77	82	114	28
Mozambique	24	9	12	27	21	22	105	44	80	106	99	111
Egypt	25	33	7	19	24	7	107	132	66	75	112	34
Ethiopia	26	18	20	7	27	24	111	80	97	25	115	113
Madagascar	27	19	27	1	23	31	119	91	117	1	109	131
Eritrea	28	25	28	20	29	16	121	114	120	77	122	81
Libya	29	21	10	30	33	15	126	99	76	116	133	80
Mauritania	30	31	17	5	32	30	129	124	89	8	132	130
Mali	31	29	33	4	31	26	130	121	131	5	131	116
Lesotho	32	32	26	24	22	33	132	125	116	96	103	133
Niger	33	28	30	33	30	32	133	120	127	129	129	132

7.3.3.2 Present Status and Trends of Environment Competitiveness: Major African Countries

In order to further understand the characteristics and physical circumstances of the environment competitiveness in African countries, we selected South Africa, Gabon and Kenya as typical African countries for analysis and listed in Table 7.7 the rankings of the indicators at all levels in the 3 countries. Taking their efforts in enhancing their environment competitiveness into consideration, we had the following findings:

Table 7.7 Distribution and comparison of GEC rankings of major African countries 2012

Country	Indicator	Number	1st–10th	11th–30th	31st–60th	61st–100th	101st–133rd
South Africa	Sub-index	5	0	1	1	1	2
	Pillar	16	0	3	3	7	3
	Individual indicator	60	3	7	14	21	15
Gabon	Sub-index	5	2	0	1	2	0
	Pillar	16	2	3	6	3	2
	Individual indicator	60	10	14	13	13	9
Kenya	Sub-index	5	0	0	1	3	1
	Pillar	16	0	3	3	5	5
	Individual indicator	60	2	7	13	19	18

1. **South Africa's environment competitiveness ranked relatively low in the world; its economic development has pushed the country to work on ecological recovery.**

In the global environment competitiveness rankings of 2012, South Africa was the 97th country, in the down-middle among the list. Among the indicators ranking top 60, there was 2 sub-indexes, accounting for 40 % of total indicators; 6 were pillars, accounting for 37.5 % of total indicators; 24 were individual indicators, accounting for 40 % of total indicators and 3 indicators were among the top 10. However, among the indicators ranked below 100th, 60 % were sub-indexes, 18.8 % were pillars and 25 % were individual indicators, which seriously influenced the global ranking of South Africa's environment competitiveness.

Restricted by the natural conditions in South Africa, such as not so many grassland and forest resources and lack of water resources, as well as the environmental damage caused by exploitation of the rich mineral resources throughout the years, enhancing environment competitiveness in the country has been constrained. Of course, as the most developed economic country in Africa, South Africa has established solid material foundation for environmental protection and ecological recovery programs relying on fast developing economy; besides, the government paid close attention to administration of environmental protection and ecological recovery, through active investment in recovery of ecological vegetation, and set the requirement for all mining enterprises that a plan for recovery of ecological vegetation should be made ready before opening a mine. In order to protect natural ecological environment, South Africa also established various large-scale natural wildlife reserve in ecologically fragile arid and semiarid areas. In November 2011, the climate conference held in Durban of South Africa further promoted the country's awareness and efforts in enhancing environment competitiveness.

1. Lack of indicators that have high potential for pulling up rank; Quite a few indicators rank low. Among the 5 sub-indexes, 1 was in the up middle position, with

ECC ranking 30th. 2 were in the lower middle positions, with EEC and EMC ranking 96th and 59th. And the other 2 indicators were all in absolute disadvantage, REC ranking 112th and EHC ranking 109th. Due to the lack of indicator with high potential of ranking up, South Africa's environment competitiveness ranking was in the lower part. Therefore, the country should, on the basis of preventing further declining of indicator rankings, improve the short-slab indicators and thus enhance the overall environment competitiveness. For example, among the 2 pillars under EHC, Population and Environment ranked 83rd, Economy and Environment ranked 106th. So, it's obvious that the Economy and Environment was the main cause for hard climbing up of EHC. So it would be possible for ECC ranking to roll up, through adequate utilization of the material basis built up by the economic development, changing the industrial structures to promote technical innovation in environmental protection and through reduction of energy consumption and carbon emission.

2. The country emphasizes the ecological environment protection and keeps on improving EMC. During the evaluation period, South Africa's EMC is ranked 59th, in the middle position. Among the 3 pillars reflecting EMC, Resource Utilization ranked 16th, reflect that resource utilization is ideal, but using more fossil energy partly affected to further improve the position of resource utilization indicators; Ecological Protection ranked 59th, reflect that South African mine ecological environment restoration work has made progress, but the biological community protection efforts should to be further strengthened; Environmental Governance ranked 93rd, reflect that South Africa need to further improve the efficiency of environmental governance, to strengthen the environmental protection policies. to track supervision and enhance the governance effect, which is the effective way to further improve the country's EMC.
3. REC and EHC related indicators apparently rank low and thus require emphasized efforts for improvement and optimization. During the evaluation period, South Africa's REC and EHC were ranked 112th and 104th. Among the 4 pillars that reflect the REC, Water Resources and Forest Resources ranked after 100 places, reflect that South African should further focus on the protection and utilization of water resources and the forest resources. Among the individual indicators that reflect the EHC, Sulfur dioxide emissions per unit of GDP and Carbon dioxide emissions per unit of GDP ranked after 110 places, reflect that in economic developing, South Africa environmental pollution is relatively serious, low carbon industry development relative lag. In the future, South Africa should actively adjust the structure of economic development by encouraging technology and capital intensive industries promote technical innovation and reduce the carbon emission by mining and industrial sectors; efficient, rational and sustainable utilization of resources and improvement of utilization efficiency would also increase the EMC and EHC of South Africa.

2. **Gabon's environment competitiveness takes the lead in Africa and ranks in the front even worldwide.**

In 2012, Gabon's environment competitiveness ranked 19th worldwide, going ahead of other African countries and even having its advantages compared with other countries globally. Among the 5 sub-indexes, 2 ranked top 10, accounting for 40 %; no indicator EMC ranked below the 100th. Among the 16 pillars, 11 were in the top 60, accounting for 68.8 %; 2 ranked below 100th, accounting for 12.5 %. Among the 60 individual indicators, 37 were in the top 60, accounting for 61.7 %; and only 9 indicators ranked below the 100th, accounting for 15 %. As a whole, the indicator rankings were in the front, which determines the advantage of Gabon's environment competitiveness.

Republic of Gabon, which has been known as "forest republic" and "country of green gold", has 22 million hectares of forest, about 85 % of national land. But, Gabon didn't start large-scale exploitation of forest; instead, it took the protection of ecological environment and wildlife resources as a fundamental policy and established long-term mechanism for sustainable development to keep a balance between economic development and protection of ecological environment. In 2002, President Bongo announced that the country would build 13 national parks covering an area of nearly 2.6 million hectares of land in order to protect the important habitat of wildlife. The central government of the Republic of Gabon also strengthened the protection of ecological environment and wildlife through legislation and organization structuring, specifically establishing two ministries, i.e. the Ministry of Environment, Nature Conservation and Sustainable Development and the Ministry of Tourism and National Parks. The government believes that the national park program is of global significance as certain medium-/short-term sacrifice may preserve this natural wealth for human descendants. The series of environmental protection measures made Gabon a model country in the field of protecting ecological environment and wildlife.

1. EHC and REC rank in the front in Africa and shows advantages even worldwide. During the evaluation period, Gabon's REC ranked 3rd, and the Forest Resources pillar is ranked 1st, which was the most direct result and most effective reflection of the strong awareness of forest conservation and protection measures. EHC ranked 3rd, and the Renewable internal freshwater resources per capita pillar is ranked 2nd, which are closed to the natural resources and the country's ecological environment protection consciousness and effective measures. The superiority of natural endowment of resources and effective protection of the natural resources of the country related index ranking in front, so it enhance the environmental competitiveness of Gabon.
2. ECC ranks in the middle and has large space for improvement. During the evaluation period, Gabon's ECC ranked 42nd, an up-middle position among the 133 countries of evaluation objects. Pillars Industrial Carrying and Greenhouse Gas in ECC, were ranked 11th and 16th. The Individual indicator of Electric power consumption per unit of value added of industry is ranked 5th, which vigorously raise the pillar of Industrial Carrying ranking. It reflects that country's industrial

production less power consumption. The Individual indicator of Growth rate of Methane emissions is ranked 1st, which caused the pillar of Greenhouse Gas ranking front. It reflects that the country has made positive efforts in the control of greenhouse gas emissions. However, the 2 pillars of Agricultural Carrying and Energy Consumption were ranked 71st and 67th, reflect that the country's agricultural production level is lag behind, and this can be reflect by the Individual indicator of Cereal yield per unit of arable land, which ranked 94th. The main cause of Energy Consumption ranking low is that the proportion of clean energy is low in the energy consumption, and the Elasticity of energy consumption is low. Then, rapidly improving the Gabon's industrial and agricultural production capacity and increasing the proportion of clean energy, making up for the "short slab", can further improve the Gabon's environmental competitiveness.

3. EEC and EMC apparently ranks in the lower part and thus needs more attention and improvement. Gabon's EEC ranked 72nd during the evaluation period, and pillar of Biodiversity ranked 122nd caused the sub-indexes ranked low. So, the country should increase the protection of endangered species to improve Gabon's biological diversity. During the evaluation period, Gabon's EMC is ranked 80th, in which the pillar of Environmental Governance is ranked 108th. It reflects that Gabon still need to further efforts in environmental governance, especially to improve the infrastructure and the percentage of the rural population with access to an improved water source, to further enhance Gabon's EMC.

3. **Kenya' environment competitiveness ranks in the lower part but with large space for improvement.**

In 2012, Kenya's GEC ranked 90th worldwide, a down-middle position among the 133 evaluated countries. Among the indicators ranking top 60, 1 were sub-indexes, accounting for 20 % of total indicators and 0 indicator ranked top 10; 6 were pillars, accounting for 37.5 % of total indicators and 0 indicator entered top 10; 22 were individual indicators, accounting for 36.7 % of total indicators and only 2 indicators Carbon dioxide emissions per unit of GDP and Percentage of fossil fuel energy consumption to total energy consumption were among top 10. Among the indicators ranking below 60th, 80 % were sub-indexes, 62.5 % were pillars and 61.7 % were individual indicators; most indicators' rankings were in the lower part and these directly influenced the global rank of Kenya's environment competitiveness.

Kenya is located in the middle east of Africa; the country has natural environment in moderate climate and various species. Ecological construction and environmental protection is an important aspect work. Mining activities are strictly controlled, because the government thinks that such activities would seriously damage environment. So, in spite of the rich mineral resources, most of them remain untouched. However, deserts and half-deserts that account for 56 % of total national land impaired the REC of Kenya, and the fast growing population, lack of ecological protection system, caused the environmental policy difficult to play, and not timely adjustment economic structure and poor infrastructure, seriously restricted the Kenya environmental competitiveness improving.

1. Strengthening the ecological environment protection, enhance the EMC is still larger room. During the evaluation period, Kenya ranked 62nd by EMC, located in the up-middle among the ranking list of 133 countries. It reflects that the country's attention to ecological environment protection policy has achieved some effects. In 1977, the Kenyan government gave an order of complete prohibition of hunting, established strict policy for wildlife protection, and established 59 places of national park, natural conservation area or nature reserve that covering 12 % of Kenyan land area, a proportion ranking top in the world. The policy bring the country's pillar Ecological Protection ranked 49th, then improved the country's rank of EMC. But the pillar Environmental Governance ranked lower just 112th, which reflect that the country should to increase investment in environmental governance, improve the effect of environmental governance, thereby to improve the Kenya's EMC quickly.
2. The productivity of industry and agriculture should be improved to break the situation of moderate-ranking ECC. During the evaluation period, Kenya's ECC ranked 59th,located in the up-middle position. The pillar Greenhouse Gas ranked 27th, which reflect that Kenya's low carbon industry developed rapidly. In which the individual indicator CO_2 emissions per unit of energy consumption ranked 8th, it reflects that the country develop the low-carbon energy sources positively, geothermal power **generation** is one of the effective measures to reduce carbon emissions in recent years. The pillar Industrial Carrying ranked 55th, located in the up-middle position, which reflect that the industrial production is high efficiency. But the pillar Agricultural Carrying ranked 87th, in which the individual indicator Cereal yield per unit of arable land ranked 102nd, it reflects that the agricultural production is relatively backward, then Kenya should take full advantage of the country's industrial production capability to increase agricultural production level and quickly repair the "short slab", so that the rank of the indicator can be soon increased.
3. REC and EEC rank low and thus require close attention and improve. During the evaluation period, Kenya's REC ranked 107th, the pillars except Energy Resources ranked 24th, the other three pillars ranked below 100th. Therefore, how to effectively improve the country's land resources and water resources, forest resources, is the key to enhance the Kenya's REC. Kenya ranked 99th by EEC, located in the down-middle among the ranking list of 133 countries. This doesn't quite fit that Kenya attach great importance to ecological environment protection policy. The reason is although the country attaches great importance to ecological protection, but the implementation of environmental policies has not obtained the due effect. In which the pillar Biodiversity ranked 120th, it reflects that Kenya should strengthen the effort to protect the endangered species. And the Kenya government attaches great importance to ecological protection zone, while ignoring the protection out of them. Natural ecological protection within the conservation areas is strict and complete, but beyond the conservation areas, damage is severe, such desertification caused by over grazing in certain areas. Such non-systematic ecological environment concept and protection failed to correspondingly enhance the EEC of Kenya.

Table 7.8 Comparison of Oceanian countries' GEC rankings 2012

	Rank											
	Rank in Oceania						Rank worldwide					
Country	GEC	REC	EEC	ECC	EMC	EHC	GEC	REC	EEC	ECC	EMC	EHC
New Zealand	1	1	1	1	1	1	4	12	6	55	29	56
Australia	2	2	2	2	2	2	21	16	8	73	36	108

Table 7.9 Distribution and comparison of GEC rankings of major Oceanian countries 2012

Country	Indicator	Number	1st–10th	11th–30th	31st–60th	61st–100th	101st–133rd
Australia	Sub-index	5	1	1	1	1	1
	Pillar	16	5	1	4	4	2
	Individual indicator	60	13	6	11	18	10
New Zealand	Sub-index	5	1	2	2	0	0
	Pillar	16	4	4	3	3	2
	Individual indicator	60	12	14	11	13	6

7.3.4 Evaluation and Analysis on Oceania's GEC

7.3.4.1 General Analysis on Environment Competitiveness of Oceanian Countries

In order to further analyze the GEC difference between Oceanian countries, the GEC rankings in Oceania and in the world for the 2 Oceanian countries covered by this study are provided in Table 7.8.

The rankings of the two countries within Oceania in 2012 showed that New Zealand ranked 1st and Australia ranked 2nd.

From the two countries' global rankings of 2012, New Zealand ranked 4th in First Echelon (1st–10th rankings), while Australia ranked 21st in Second Echelon. Generally speaking, Oceania's environment competitiveness is at a high level.

In terms of sub-indexes, all the 5 sub-indexes for New Zealand ranked higher than those for Australia. New Zealand's REC, EEC and EMC were in the front along worldwide rankings; Australia's REC and EEC were in the front along worldwide rankings, but its EHC ranked very low.

7.3.4.2 Present Status and Trends of Environment Competitiveness: Major Oceanian Countries

In order to further understand the characteristics and physical circumstances of the environment competitiveness in Oceanian countries, we listed in Table 7.9 the rankings of the indicators of all levels in Australia and New Zealand. Taking the two

countries' efforts in enhancing their environment competitiveness into consideration, the study has the following findings:

1. **Australia's environment competitiveness remains steady and still moves forward, with orderly and effective environmental protection measures.**

Among Australia's indicators ranking top 60 in 2012, 3 were sub-index, accounting 60 % of total indicators and 1 indicator ranked top 10; 10 were pillars, accounting for 62.5 % of total indicators and 5 indicators entered top 10; 30 were individual indicators, accounting for 50 % of total indicators and 13 indicators were among top 10. As all levels of indicators were evenly distributed in different stage of rankings, Australia's environment competitiveness was slightly up from middle in the world.

Most Australian regions are in semiarid or desert belts, but with very rich ecological environment resources; the vast land has very high capacity of self purification. Both the Australian government and the public show high concern about environmental protection and environmental legislation and management have been continuously strengthened; and new public administration concepts were applied to make innovations and improvements in areas like environmental policy, decision-making mechanism and administrative mechanism. These have made the Australian government a very important role in the protection and construction of ecological environment and made great success.

1. REC shows obvious advantage and becomes an important guarantee of the advantageous overall environment competitiveness. In 2012, Australia's REC ranked 5th worldwide, a leading position among the 133 evaluated countries. Australia has large area of land, with very rich land, forest and mineral resources and has been well known as a country sitting on miner's truck. The proved economic reserves of bauxite, lead, nickel, silver, uranium, zinc and tantalum all rank world's first; and the country is also rich in iron, crude oil and natural gas resources.
2. EEC ranked in the front, EEC ranked 8th, In a leading position among the evaluated countries. As Australia has a small population and the entire country put the protection of ecological environment on an important position, with high intensity of protection on biodiversity, and the emphasized technological innovation and strictly followed environmental protection laws promoted coordinated development of resource, ecology and economic society.
3. Various energy consumption indicators rank rather low and industrial structure needs further readjustment. Australia also put great efforts in energy conservation and development of clean energy. At present, Australia is one of the countries that most widely utilized the most advanced solar energy. technology has been widely applied in industries, agriculture and civil facilities, and the taxation policy of Australia provided great support mainly for such green energy sources as clean energy and renewable energy. As the transportation sector of Australia is rather advanced, including aviation and highway sectors, the number of car per capita is very high, and the same is true with both total and per capital electric power and energy consumption as well as greenhouse gas and exhaust emissions. The total carbon emission increased by 40 % compared the level in 1990, and

carbon emission per capita exceeded 17 t, more than in most countries, which made the rankings of power and energy consumption related indicators much lower and influenced the incensement of environment competitiveness. Therefore, the Australian government should keep optimizing industrial structure, intensify the binding force of the energy conservation and emission reduction goals, strengthen the implementation and supervision on the measures fighting climate change and undertake more carbon emission reduction responsibility.

2. **New Zealand's environment competitiveness steadily sits in the front and its environmental protection system is complete and highly efficient.**

Among New Zealand's indicators ranking top 60 in 2012, 5 were sub-index, accounting 100 % of total indicators; 11 were pillars, accounting for 68.8 % of total indicators and 4 indicators entered top 10; 37 were individual indicators, accounting for 61.7 % of total indicators and 12 indicators were among top 10. As there were many indicators at different levels ranking in the front, New Zealand's environment competitiveness rankings among the top countries in the world.

New Zealand is an island country, but with very high environmental capacity and powerful environmental self purification ability; the country has comfortable climate, fresh environment, beautiful landscape and rich forest resources. And, the awareness in environmental protection has been very high among the Zelanian government, enterprises and the public. The government advocates protection and construction of ecological environment and stresses sustainable utilization and development of resources, thus legislatively establishing logical relationship between environment and economic development; its management system functions in order and with high performance, and the clean and green image from environmental protection also promotes rapid development of tourism industry, agriculture, forestry and stock farming. The perfect integration of environmental protection and economic development has made the country's environment quality among the best in the world.

1. REC, EEC and EMC all show distinct advantages and thus constitute the important basis of the top rank of New Zealand's environment competitiveness. EEC ranked 6th, and REC and EMC ranked 12nd and 29th respectively, all in advantaged positions. Because the population of New Zealand is very small and much importance has been attached to the protection of ecological environment, the government has established 1/3 of its national land into virgin forest conservation areas, national parks, coastal nature conservation areas and island and oceanic life conservation areas through legislation. The environmental protection institution of government and legislation are complete, ensuring multiple layers of guarantee for effective measures of legislation and management.
2. Various energy consumption indicators rank in the front and performance indicators are outstanding. New Zealand kept introducing and sharing with the public the concepts about environmental protection, functioning as an environmental

protection organization, promoted international exchange and collaboration and signed multiple international covenants including Convention on Biological Diversity (CBD) and Framework Convention on Climate Change that have been implemented in the country through domestic laws. In the fields of energy conservation and emission reduction as well as resource utilization efficiency, the country also achieved uncommon results, with both total energy consumption and exhaust emission indicators ranking in the front; the indicators under economy and environment also rank among the top countries. However, as the country has a small population, some per capita indicators rank in the lower part, such as carbon emission per capita at 7.23 t, which exceeded most countries and affected the improvement of overall environment competitiveness.

3. ECC and EHC rank in the middle part, the ECC, which ranked 55th, worse than most countries. As an island country, its geographic conditions have determined that the country lacks mineral resources and its ecological environment is rather fragile, with weak capacity of bearing large-scale industrial development and this, to some degree, influenced the diversity of industrial system, leading to constrained industrial structure.

7.3.5 Evaluation and Analysis on North America's GEC

7.3.5.1 General Analysis on Environment Competitiveness of North American Countries

In order to further analyze the GEC difference between the countries in North America, the GEC rankings in North America and in the world for the 13 North American countries covered by this study is provided in Table 7.10.

In terms of national rankings within North America in 2012, Costa Rica, Honduras and Guatemala were the top 3 environmentally competitive countries in North America; USA ranked 7th and Haiti was the bottommost country in the continent.

From worldwide rankings of 2012, only 1 country from North America, i.e. Costa Rica, entered First Echelon. Six countries were in Second Echelon, 4 countries in Third Echelon, 2 countries in Fourth Echelon and no country in Fifth Echelon. In general, North American countries were at relatively high level of environmental competitiveness and most countries rank in the front.

From the sub-index rankings, the REC, ECC and EHC rankings of North American countries were relatively higher, showing better performance. Actually, all the countries' performance in the 5 sub-index were balanced, except individual indicators that ranked lower but was pulled up by other indicators; particularly the pulling force from indicators with larger weight has driven the overall rank of environment competitiveness to the front, such as Costa Rica, Honduras, Guatemala and Canada. For the only country which will fall into Fifth Echelon, Haiti only had

Table 7.10 Comparison of North American countries' GEC rankings 2012

	Rank											
	Rank in North America						Rank worldwide					
Country	GEC	REC	EEC	ECC	EMC	EHC	GEC	REC	EEC	ECC	EMC	EHC
Costa Rica	1	2	5	13	2	1	7	7	47	107	9	2
Honduras	2	5	11	12	1	7	16	22	70	98	1	32
Guatemala	3	7	6	6	3	4	17	34	49	38	13	19
Canada	4	4	3	5	7	11	18	13	35	32	46	69
Nicaragua	5	1	1	9	11	8	22	5	11	68	104	37
Panama	6	3	8	11	6	3	23	10	60	95	38	13
United States	7	8	2	1	5	13	26	39	23	11	17	110
Jamaica	8	6	7	10	4	10	35	33	56	88	15	52
Cuba	9	12	9	8	9	5	49	71	62	67	53	22
El Salvador	10	11	12	2	10	2	59	61	109	16	83	9
Dominican Republic	11	10	4	4	13	6	60	54	44	31	117	23
Mexico	12	13	10	7	8	9	61	93	69	50	50	43
Haiti	13	9	13	3	12	12	98	52	119	17	116	73

2 sub-index EEC ranking lower than 100th, and its REC and EHC also ranked in the lower middle. Affected by these, the overall rank of Haiti was rather low.

7.3.5.2 Present Status and Trends of Environment Competitiveness: Major North American Countries

In order to further understand the characteristics and physical circumstances of the environment competitiveness in North American countries, we selected USA, Canada and Mexico as typical countries for analysis and listed in Table 7.11 the rankings of the indicators at all levels in the 3 countries. Taking their efforts in enhancing their environment competitiveness into consideration, we had the following findings:

1. **USA ranks higher-middle in the world and new energy industry and green economy are the important penetration points of recovery and transformation.**

Among the indicators ranking top 60 for USA in 2012, 4 were sub-index, accounting for 80 % of total indicators and no one entered top 10; 12 were pillars, accounting for 75 % of total indicators and 2 indicators entered top 10; 31 were individual indicators, accounting for 51.67 % of total indicators and 9 indicators were among top 10. These indicators directly influenced the global rank of USA's environment competitiveness, which rank 26th during 133 countries.

With the advent of the twenty-first century, new energy industry and green economy have become the focus of USA's development. Particularly after inauguration of the Obama administration, government released the economic revitalization

Table 7.11 Distribution and comparison of GEC rankings of Major North American countries 2012

Country	Indicator	Number	1st–10th	11th–30th	31st–60th	61st–100th	101st–133rd
USA	Sub-index	5	0	3	1	0	1
	Pillar	16	2	2	8	3	1
	Individual indicator	60	9	8	14	17	12
Canada	Sub-index	5	0	1	3	1	0
	Pillar	16	3	3	5	5	0
	Individual indicator	60	12	9	16	13	10
Mexico	Sub-index	5	0	0	3	2	0
	Pillar	16	0	1	6	9	0
	Individual indicator	60	1	4	21	28	5

plan integrating energy conservation & emission reduction as well as green energy environment climate that can reduce pollution. In the American Recovery and Reinvestment Act totaling USD 787 billion, a great part of the contents are about new energy development, energy conservation & synergy and climate change resilience. The USA has been actively pursuing a way for developing diversified new energy industry, including development of clean energy sources like solar energy, wind energy, biological fuel and nuclear power, and new energy sources through technical reform on traditional energy like new type automobile fuel, smart power grid, high-efficiency battery, carbon storage and carbon capture. Through development of new energy industry and green economy to push economic recovery and promote economic transformation, USA has tried not only to take control on issues about global warming, but also to be the leader of world economy.

1. ECC and EMC show obvious advantage, REC and EEC give excellent performance in the world. In the evaluation year, USA's ECC and EMC ranked 11th and 17th in the world and showed apparent advantages; both Cereal yield per unit of arable land and Net exports of goods as a percentage of GDP ranked 7th, Percentage of the urban population with access to an improved water source ranked first, Area of plantation and afforestation ranked second, all in the upper middle of the ranking list. USA has very rich natural resources and the area of plain accounts for half of national land; it is the country that has the largest area of arable land in the world. In particular, the vast plain in the east provides sufficient conditions for agriculture, forestry and animal husbandry. It also has abundant mineral resources; the aggregate mineral reserve of the country rankings among world's top. In order to further improve air quality, USA actively implemented greenhouse gas emission reduction through legislation and distinct regulation of reduced use of fossil energy and development of clean energy; and starting from 2012, USA would carry out total greenhouse gas control and emis-

sion permit trading system. These measures will further consolidate USA's advantage in REC.

2. EHC turns to be weak and become the "Achilles' heel" of environment competitiveness. Among the 133 countries for GEC evaluation in 2012, USA was ranked 110th according to EHC. Like other industrialized countries, USA also adopted the strategy of "pollution first governance next" for industrialization and thus accumulated severe environmental problems; environment carrying capacity is faced with challengeable test. Production and living resources and energy consumption has been very large. According to statistics, USA has consumed 35 % of world's resources with 6 % of global population. Take petroleum for example, USA is the largest petroleum importer and consumer of the world, its import volume accounts for over half of its total demand and consumption accounts for 21 % of global oil consumption. The environmental management ability of USA is also yet to be further improved. Resource and energy utilization efficiency needs to be increased and environmental safety supervision needs to be strengthened, so as to provide larger space for environmental improvement and optimization.
3. Resources and energy consumption and exhaust emission indicators are giving poor performance; there will be a very long way to go in emission reduction and climate change resilience. In terms of either total amount indicators or per capita indicators, USA's air quality indicators all ranked very low; such as nitrogen oxide emissions ranked 131st, sulfur dioxide emissions ranked 130th, CO_2 emissions per unit of land area ranked 105th, SO_2 emissions per capita ranked 112th, CO_2 emissions per capita ranked 128th, Energy consumption per capita ranked 120th. USA should take its responsibility of a great power of the world by decreasing the use of fossil energy and encouraging use of clean energy and reducing exhaust emissions. Of course, we can see that USA has already taken some measures in this regard, including establishing new fuel economy standards, setting upper limit on discharge of mercury from power plant and other toxic air pollutant applicable nationwide, large investment in development of clean energy, etc.; these measures will be a forceful guarantee for improvement of the air quality in USA.

2. **Canada is the environment competitiveness leader in North America and also an eye-catcher in the world.**

In the 2012 global rankings of environment competitiveness, Canada was the 18th country, showing advantage status in the GEC. Among the indicators ranking higher than 60th, 4 were sub-index, accounting for 80 % of total indicators with none indicator ranked within top 10; 11 were pillars, accounting for 68.75 % of total indicators and 3 indicators entered the top 10; 37 were individual indicators, accounting for 61.67 % of total indicators and 12 indicators were in the top 10. However, among the indicators ranking below 60th, 20 % were sub-index, 31.25 % were pillars and 38.33 % were individual indicators; these indicators constrained enhancement of the environment competitiveness of Canada and directly influenced its overall rank.

Environmental protection of Canada takes the lead in the world and adopts federal, provincial and municipal three-level management model. According to statistics, Canada has over 7,000 companies involved in environmental protection business and the yearly output value amounts to USD 15 billion, accounting for 2.2 % of GDP; the export value of Canada's environmental protection industry has exceeded USD 1 billion. The environmental protection technologies about soil, air and water has obtained world recognition, especially the water and wastewater treatment technology that ranks top in global market. At present, the Canadian government is preparing a new clean energy innovation program targeting at 97 million Canadian dollars for research, development and demonstration projects.

1. Rich natural resources guarantees the top rank of REC. Canada is the second largest country of the world in terms of territory area and natural resources are abundant. In the evaluation year, Canada's forest resources and land resources competitiveness ranked 3rd and 4th respectively, all at outstandingly advantaged positions. The vast plain provides sufficient conditions for agriculture, forestry and animal husbandry; mineral reserve occupies 3.8 % of world's total. The minable oil sand resource in west Canada is abundant, which makes Canada a country with large oil resource reserve only next to Saudi Arabia. Canada also owns numerous national parks, provincial-level parks and nature conservation nature reserves; the total land area of these parks and reserves exceeds one million square kilometers. Besides, Canada put north Canada a specially protected region. The federal government developed a North Pole environment protection plan under which the countries neighboring with the Arctic collaborate to protect the region. Rich resources together with governmental concern for development of such resources constitute an important guarantee for Canada's REC position.
2. EHC is at downstream positions, forming a biggest constraint of Canada to enhance environment competitiveness. Among the 133 countries for GEC evaluation in 2012, Canada was ranked only 69th according to EHC. In recent years, irrational tapping of resources has seriously damaged the biodiversity in Canada; problems like environmental pollution, large energy consumption and climate change caused by industrial production are still severe. How to repair the environmental damage caused by industrial production and how to actively fight climate change and to increase biodiversity are the penetration points for improving ecological environment and enhancing environment carrying capacity. It should also be noticed that Canada has already take steps in this regard and put the two largest carbon emission sectors, transportation and electric power, as the key emphasis of work; collaboration with USA and Mexico is also an emphasized aspect. Investment in clean energy technology is increased. In achieving the carbon emission reduction goals, Canada has provided 4 % of total funding, though it is only responsible for 2 % of global emissions.
3. Large amount of resource and energy consumption makes exhaust emission indicators a big concern and also reflects the relatively low efficiency of resource and energy resource utilization. In the evaluation year, Canada's resource and energy consumption indicators and air quality indicators all ranked beyond 100th place;

for example, Nitrogen oxide emissions ranked 120th, Sulfur dioxide emissions ranked 121st, SO_2 emissions per capita ranked 120th, CO_2 emissions per capita ranked 125th and Energy consumption per capita ranked 122nd. These indicators reflect that although Canada has abundant resources and energy reserves, the efficiency of utilization is rather low. A priority for industrial production is to replace and save traditional fossil energy through technological improvement and new energy development. Strengthening supervision on exhaust emission, opening and promoting use of clean energy and taking the responsibilities in air quality improvement and climate change resilience are also aspects requiring efforts.

3. **Mexico's environment competitiveness is quite satisfactory, but it lacks core indicators that may lead to enhancement of its GEC.**

In the global environment competitiveness rankings of 2012, Mexico was the 61st country, a moderate position along the list. Among the indicators ranking higher than 60th, 3 were sub-index, accounting for 60 % of total indicators and no indicator entered top 10; 7 were pillars, accounting for 43.75 % of total indicators and no indicator entered top 10; 26 were individual indicators, accounting for 43.33 % of total indicators and only 1 of them was within top 10. However, among the indicators ranking below 60th, 40 % were sub-index, 56.25 % were pillars and 56.67 % were individual indicators; these indicators constrained enhancement of the environment competitiveness of Mexico and directly influenced its overall rank.

Although Mexico's performance in the rankings shows nothing outstanding, the country takes an active part in global environment governance by releasing climate change law to reduce emission of greenhouse gases and setting objective of increasing the use of renewable energy; the law made Mexico the first developing country that established compete law against climate change. In addition to the objective for greenhouse gases emission, the law also specified that about 35 % of the energy source in Mexico will be renewable energy by 2024 and government agencies must use renewable energy. Mexico also invested active efforts in the development of clean energy, nuclear energy and wind energy with an eye to promote diversification of energy source, so as to improve environment quality and fight climate change.

1. Multiple indicators are in medium level without indicators having strong pulling force. In the evaluation year, 4 of the 5 sub-index of Mexico were all in medium level, in which EEC ranked 69th, ECC and EMC ranked 50th, EHC ranked 43rd, there was not any indicator showing outstanding performance. Due to lack of indicators with strong pulling force, Mexico's environment competitiveness was rather ordinary in worldwide scale. The country should select indicators with growth potential as key areas of efforts to form core competitiveness and at the same time shall prevent current indicator rankings from declining. For instance, Mexico has made full use of its geographic location between the Pacific Ocean and the California Gulf; it increased investment in clean energy, particularly wind energy, putting over 80 % of its energy into wind energy industry, and adopted wind power generation allowance policy, endeavoring to take the lead in the development of new energy.

2. REC performance is barely satisfactory and needs special attention. Taking a wide view on the sub-index rankings of Mexico, it is clear that ECC is obviously the "short slab". In the 2012 rankings, it ranked 93rd among the 133 countries and among the 4 pillars under it, land resources ranked 77th, water resources ranked 75th, forest resources and energy resources ranked 46th and 66th respectively. Due to the development and expansion of city need to constantly forestland, the city also needs a lot of land for industrial and expanding livestock raising, which directly led to the decrease of Mexico forest and forest degradation. Mexico has become one of the most serious national forest degradation in the world. In addition, part of Mexico's industrial development has seriously polluted the main rivers, causing the destruction of water resources is quite serious. The country needs to further take active steps in fighting climate change, enhance environment carrying capacity and finally promote the sustained growth of economy.
3. Internal structure of GEC indicators should be improved to push smooth and coordinated growth of environment competitiveness. The internal structure of the indicators of different levels in Mexico is not balanced; for instance, within EEC, ecological diversity indicator is very competitive, ranking 17th, Air quality indicator is much less competitive, ranking 83rd, reflecting the unbalance of the resource structure of Mexico. Another example is the 2 pillars under EEC. Its ecological protection ranked 62nd, while biodiversity ranked 110th, leaving wide gap within EEC. Therefore, the moderate performance of several indicators is actually the result of neutralization between high-ranking and low-ranking indicators; such imbalance in structure will certainly affect the stability of competitiveness. So, Mexico should actively improve such internal structure by improving the low-ranking indicators while at the same time maintaining the high-ranking indicators so as to narrow the gap and realize steady and coordinated enhancement of its environment competitiveness.

7.3.6 Evaluation and Analysis on South America's GEC

7.3.6.1 General Analysis on Environment Competitiveness of South American Countries

In order to further analyze the GEC difference between the countries in South America, the GEC rankings in South America and in the world for the 10 South American countries covered by this study are provided in Table 7.12.

In terms of national rankings within South America in 2012, Brazil, Ecuador and Venezuela were top 3 environmentally competitive countries in South America and Uruguay was the bottommost country.

From worldwide rankings of 2012, 1 country from South America entered First Echelon. Five countries were in Second Echelon, 1 country was in Third Echelon, 3 countries were in Fourth Echelon and no country was in Fifth Echelon. In summary,

Table 7.12 Comparison of South American countries' GEC rankings 2012

	Rank											
	Rank in South America						Rank worldwide					
Country	GEC	REC	EEC	ECC	EMC	EHC	GEC	REC	EEC	ECC	EMC	EHC
Brazil	1	1	3	3	4	3	5	14	14	43	43	8
Ecuador	2	6	2	10	3	2	11	30	9	113	40	7
Venezuela	3	3	1	5	7	8	12	25	4	53	86	26
Bolivia	4	5	6	9	1	10	16	28	41	94	2	77
Colombia	5	4	5	6	2	7	20	26	36	56	27	21
Chile	6	7	4	7	5	5	24	47	26	57	52	16
Peru	7	2	8	8	6	4	34	18	79	60	61	12
Argentina	8	10	7	2	9	9	66	100	55	18	100	35
Uruguay	9	9	10	1	10	1	70	78	118	9	110	4
Paraguay	10	8	9	4	8	6	76	58	104	47	98	18

the environment competitiveness of South American countries was generally high and most countries ranked high.

From the sub-index rankings, the REC, EEC and EHC rankings of South American countries were relatively higher, showing better performance. Actually, all the countries' performance in the 5 sub-index were balanced, except individual indicators that ranked lower but was pulled up by other indicators; particularly the pulling force from indicators with larger weight has driven the overall rank of environment competitiveness to the front, such as Brazil and Ecuador. As for Uruguay that ranked 98th, its ECC and EHC both ranked very high, but as REC and EEC both ranked lower than 100th, the overall environment competitiveness was rather low.

7.3.6.2 Present Status and Trends of Environment Competitiveness: Major South American Countries

In order to further understand the characteristics and physical circumstances of the environment competitiveness in South American countries, we selected Brazil, Colombia and Ecuador as typical countries for analysis and listed in Table 7.13 the rankings of the indicators at all levels in the 3 countries. Taking their efforts in enhancing their environment competitiveness into consideration, we had the following findings:

1. **Brazil shows excellent performance in environment competitiveness with outstanding achievements in environmental protection.**

Among Brazil's indicators ranking top 60 in 2012, 5 were sub-index, accounting for 100 % of total indicators and 1 of them was within top 10; 12 were pillars, accounting for 75 % of total indicators and 3 of them entered top 10; 39 were quaterary indicators, accounting for 65 % of total indicators and 6 of them were among top 10. These indicator rankings directly lead to the advantaged situation for Brazil

Table 7.13 Distribution and comparison of GEC rankings of Major South American countries 2012

Country	Indicator	Number	1st–10th	11th–30th	31st–60th	61st–100th	101st–133rd
Brazil	Sub-index	5	1	2	2	0	0
	Pillar	16	3	4	5	3	1
	Individual indicator	60	6	15	18	14	7
Colombia	Sub-index	5	0	3	2	0	0
	Pillar	16	1	6	4	3	2
	Individual indicator	60	5	18	17	12	8
Ecuador	Sub-index	5	2	1	1	0	1
	Pillar	16	2	3	2	3	6
	Individual indicator	60	6	7	20	18	8

in the comparison of GEC and move Brazil to the 5th place among the 133 countries.

The reasons for Brazil's outstanding environment competitiveness are the strong public awareness of environmental protection and government policies. As shown by the national survey conducted by the National Confederation of Industry (CNI) of Brazil through polling company Ibope, Brazilian people is showing increasing concern about global warming and environmental issues. According to the survey, the percentage of Brazilian people who were concerned for environmental issue has increased from 80 to 94 % during the period of from 2010 to 2011. Furthermore, the percentage of respondents who regard environmental protection as more important than economic growth also increased from 30 to 44 %; another 40 % of respondents think that a balance can be achieve between the two; only 8 % of respondents give priority to economic growth. Brazil has accumulated extensive experience in environmental protection policy and formed complete environmental management system and environmental protection law system. For instance, in order to prevent damage to natural environment, the Brazilian government sets up a special capital felony that is rarely seen in the world, i.e. crime of damaging the nature, which is equivalent to "crime of racial discrimination". Brazil is the only country of the world that never uses pure gasoline for motor fuel and also the earliest in the world to force the use of ethanol gasoline through legislation. The Brazilian Constitution also stipulates that government has the responsibility to protect environment, which provides the legal guarantee for environmental protection from foundation level.

1. REC, EEC and EHC rank high and show apparent advantage. In the GEC rankings 2012, Brazil's REC, EEC and EHC ranked 14th and 8th respectively, all at leading places among the 133 countries. On the one hand, Brazil is a developing country in South America, with very rich natural resources, and naturally has the competitive advantage in ecological environment (e.g. GEF benefits

index for biodiversity ranked first, Growing stock in forest and other wooded land ranked 4th, Proportion of land area covered by forest ranked 10th). On the other hand, the Brazilian government attached high importance to environmental protection and established a complete environmental management system that takes improving and restoring environment quality and ensuring socioeconomic development, national security and public happiness as objectives, which perfectly coordinated the sustainable development of population, resource and environment.

2. ECC and EMC rank in the above-middle place and there is still room for further improvement. In 2012, Brazil's ECC and EMC ranked 43rd worldwide, a higher middle place among the 133 evaluated countries. Among the indicators, Elasticity of energy consumption ranked 79th, Elasticity of electric power consumption ranked 72nd, Growth rate of CO_2 emissions ranked 125th, Growth rate of Methane emissions ranked 95th, these indicators still have higher improvement place. For the past few years, continued fast economic growth has led to heavy demand for energy and power supply, and consequently, consumption of oil, electric power and natural gas in Brazil increased sharply. For instance, the energy consumption in 2010 reached 265 million tons of standard oil equivalent, an increase of 9.96 % compared with the 241 million tons in 2009. In the future 5–10 years, Brazil will possibly witness fast development in such energy intensive industries as steel, which will further drive increase of energy consumption. This would be a constraint for improvement of environment competitiveness. Therefore, Brazil should focus on increasing efficiency of energy utilization and encouraging R&D on technologies for sustainable utilization and protection of resource environment realize; this way, transformation of economic development mode can be successfully achieve.
3. Due to over consumption of energy, air quality indicators as well as per capita consumption and emission indicators all rank very low and environmental governance needs to be intensified. It is expected that by 2020, the greenhouse gas emission in Brazil will be reduced by 36.1–38.9 %, in which 24.7 % will have to rely on reduction of felling and/or burning of the forest in Amazon rainforest and savanna, 6.1 % will rely on transformation of production mode in agriculture and animal husbandry as well as restoration of vegetation of pasture, and 7.7 % will rely on increasing hydropower capacity and emission reduction measures of metallurgy companies.

2. **Colombia demonstrates obvious advantage in environment competitiveness with balanced development in general.**

Among the indicators ranking higher than 60th in 2012, 5 were sub-index, accounting for 100 % of total indicators with no indicator ranked top 10; 11 were pillars, accounting for 68.8 % of total indicators and 1 of them entered top 10; 40 were individual indicators, accounting for 66.7 % of total indicators and 5 of them were among top 10. These indicator rankings directly lead to the advantaged situation for Colombia in the comparison of GEC and move Colombia to the 20th place among the 133 countries.

Colombia is a country that respects harmonious coexistence of man and nature, emphasizing economic development and environmental protection as well. Article 21 of the Constitution of Colombia includes environmental issues, requiring adequate consideration of environmental problems while achieving economic and social development; in national development plans, environmental objectives are put on the same level as economic and social objectives. In the Global Environment Outlook 5 (GEO-5) released in 2012, the integrated land use plan and the magnetic suspension city bus initiated by Bogota of Colombia are selected as the successful case for environmental policy and acts by local government. Because the Columbia has energy strategy, provide for oneself oil reserves and powerful hydroelectric power industry combined with the environmental protection, it was named "global energy competition" national ranking fifth in the world.

1. The environment competitiveness of Colombia is in balanced distribution and 5 sub-index are all in the upper middle places. EHC, REC and EMC all ranked in the front, at 21st, 26th and 27th places respectively. Colombia is also a South American country with large territory; its southeastern region is covered by the robust Amazon rainforest, which is regarded the most valuable natural resource of the world and has 10 % of world's biological species (only next to Brazil, ranking second). However, only 5 % of Colombian population lives in the Amazon area, which is to some degree a form of protection for the ecological environment. In order to promote the coordinated development of population, resource and environment and to enhance environment carrying capacity, Colombia has taken series steps. For instance, in recent years, the Colombian government spent great efforts in promoting application of biological fuel like ethanol, because the greenhouse gas emission out from biological fuel use is 70–80 % less than that from fossil fuel use. This is of course good for improving environment quality and fighting climate change. By 2014, the Colombian government will try to achieve the goal of yearly output of 340 million liters of ethanol.
2. EEC and ECC ranked 36th and 56th respectively, with overall good performance, there is room for improvement. Columbia also is known as the "Noah's Ark of humanity" by the genetics community. It has rich resources and unique natural landscape, so the ecological diversity, ecological security and other three indicators ranked front, with strong competitiveness. But relatively speaking, the air quality, agricultural bearing, energy consumption still have room for further improvement.
3. Some resource consumption indicators and greenhouse gas emission indicators rank low and need improvement. For instance, Elasticity of energy consumption ranked 68th, Fertilizer consumption per unit of arable land ranked 123rd, Growth rate of Methane emissions and Nitrogen oxides emission ranked 101st and 100th respectively, these indicators all need further improvement. Moreover, although Colombia advocates development of industries and product on the basis of continued use of biodiversity resource, illegal felling still widely exists and causes damage to ecological diversity, which makes intensified governance necessary. Due to overfishing, habitat degradation caused by

the natural fishery resources supply drop, Columbia is constantly in aquaculture instead of fishing products.

3. **Ecuador is an eye-catcher in environment competitiveness with better improved ecological environment.**

Among Ecuador's indicators ranking top 60 in 2012, 4 were sub-index, accounting 80 % of total indicators and 2 of them ranked top 10; 7 were pillars, accounting for 43.8 % of total indicators and 2 of them entered top 10; 33 were individual indicators, accounting for 55 % of total indicators and 6 indicators were among top 10. These indicator rankings directly lead to the advantaged situation for Ecuador in the comparison of GEC and move Ecuador to the 11th place among the 133 countries.

Ecuador government holds high the protection and construction of environment and emphasizes the coordination and balance between economy, society and environment. In 2011, the more than 100 cities of Ecuador committed to promoting and handling climate change and showed concern for related public policies, which was included in its national development and deployment plan. At the same time, environmental action plan about emission reduction was listed in its national climate change local action system, requiring establishment of environmental protection organization to take charge of local environmental policy and planning.

1. EEC and EHC are at the advantage positions, having higher competitiveness rankings. The two indicators ranked 9th and 7th in the global environment competitiveness rankings of 2012. In spite of limited territory area, Ecuador is the country having the largest number of biological species per 1,000 km^2 in the world. These animals and plants are distributed in very much differentiated environment, including tropical rainforest and dry forest in the south, and the country is regarded as one of the 17 most ecologically diversified countries of the world. Ecuador has large number of natural reserves, and about 20 % of the land is conservation area; and it has more than 20 national parks showing the diversified ecosystem. These are the major reasons for the high rankings of Ecuador's biodiversity and ecological protection indicators.
2. ECC ranks 113th position, which is at lower-middle positions in the 133 evaluation countries. Among these, annual freshwater withdrawals for agriculture per unit of arable land, Electric power consumption per unit of value added of industry and SO_2 emissions per unit of value added of industry are ranked 120th, 109th and 129th respectively. The agricultural acreage of Ecuador takes only 5 % of its national land, and marine fishing resources are rich, but the resources are faced with overfishing, which definitely influences the sustainable development of fishing resources. Although Ecuador has rich oil resources, with low production capacity, weak industrial base, the industrial pollution is serious.
3. Ranks of various per capita indicators and resource consumption indicators are mostly at upper-middle positions. Ecuador is an underdeveloped region. In 2010, the agricultural population accounted for about 47 % of its total population and the population in poverty accounted for about 32.8 % of total population. As the economic development is rather lagged, Ecuador is mainly an energy exporter as

Table 7.14 Comparison of G20 nations' GEC rankings 2012

	Rank											
	Rank in G20						Rank worldwide					
Country	GEC	REC	EEC	ECC	EMC	EHC	GEC	REC	EEC	ECC	EMC	EHC
Germany	1	11	1	2	5	10	2	72	1	6	11	74
Brazil	2	3	4	10	10	1	5	14	14	43	43	8
Japan	3	6	6	9	2	7	6	31	19	35	4	55
United Kingdom	4	15	3	4	3	5	9	96	10	14	5	48
France	5	10	5	1	7	6	10	65	18	2	20	51
Canada	6	2	10	8	11	9	18	13	35	32	46	69
Australia	7	4	2	15	9	17	21	16	8	73	36	108
United States	8	8	8	3	6	18	26	39	23	11	17	110
Italy	9	12	9	6	8	12	32	82	24	27	24	94
Indonesia	10	1	16	11	14	8	46	8	110	44	60	58
Saudi Arabia	11	18	7	13	1	19	54	109	20	64	3	120
Mexico	12	14	14	12	12	4	61	93	69	50	50	43
Korea, Rep.	13	9	12	16	15	11	64	51	57	76	63	83
Argentina	14	16	11	5	18	3	66	100	55	18	100	35
Russia	15	5	13	17	19	14	81	24	61	85	107	103
China	16	13	18	18	4	16	87	89	124	87	6	106
Turkey	17	17	17	14	17	2	89	106	112	66	76	24
South Africa	18	19	15	7	13	15	97	112	96	30	59	104
India	19	7	19	19	16	13	117	36	133	93	72	95

one of the largest crude exporter in South America. In 2010, the net crude oil export was about 285,000 barrels per day, while its domestic consumption of energy was very limited. Therefore, emission of greenhouse gases like carbon dioxide took only tiny part of world's total and the carbon dioxide emission data showed downtrend in recent years. In order to realize coordinated development of population, economy, society, resource and environment, Ecuador should also expedite economic development, promote social progress and keep emphasizing environmental protection during the process.

7.3.7 Evaluation and Analysis on G20 Nations' GEC

For the purpose of analyzing the GEC difference between the countries of the Group of Twenty (G20), the environment competitiveness rankings of the 19 countries of G20 within the group and worldwide in 2012 are given in Table 7.14. As EU is not taken as a single entity for ranking and evaluation in worldwide scale, it is excluded from the analysis in this part.

In terms of national rankings within G20 in 2012, Germany, Brazil and Japan were the top 3 countries among G20 nations; China ranked 16th and India was at the last place. Among the top 10 countries, only Brazil and Indonesia are developing

Table 7.15 Comparison of BRICS countries' GEC rankings 2012

	Rank											
	Rank in BRICS						Rank worldwide					
Country	GEC	REC	EEC	ECC	EMC	EHC	GEC	REC	EEC	ECC	EMC	EHC
Brazil	1	1	1	2	2	1	5	14	14	43	43	8
Russia	2	2	2	3	5	3	81	24	61	85	107	103
China	3	4	4	4	1	5	87	89	124	87	6	106
South Africa	4	5	3	1	3	4	97	112	96	30	59	104
India	5	3	5	5	4	2	117	36	133	93	72	95

countries, and the others are all developed countries, but among the 11th–19th places, only 1 country is developed country and the other 8 are all developing countries.

With respect to worldwide rankings in 2012, Germany and Brazil were the top 5 countries; Japan, United Kingdom and French were also in the front, at the top 10th place. South Africa and India ranked very low, all beyond 100th places.

In terms of rank distribution in echelons in 2012, there were 5 countries in the First Echelon, 3 in the Second Echelon, 3 in the Third Echelon, 7 in the Fourth Echelon; and 1 in the Fifth Echelon. As a whole, the environment competitiveness of G20 nations are relatively high and echelon distribution is even with the First Echelon and the Fourth Echelon including more countries.

From the sub-index rankings, the EEC, ECC and EMC rankings of G20 nations were relatively higher, showing better performance. Actually, all the countries' performance in the 5 sub-indexes were balanced, except individual indicators that ranked lower but were pulled up by other indicators; driven by combined forces, overall rank of environment competitiveness was still in the front, such as Germany, Brazil, United Kingdom and Australia. For countries whose GEC rankings falling into the Fifth Echelon, all of them had 2 sub-indexes ranking lower than 100th place, such as South Africa, Turkey and China. Although India had only 1 sub-index beyond 100th place, its overall rank of environment competitiveness was very low, due to EEC ranking 133rd place, ECC ranking 93rd place and EHC ranking 95th.

7.3.8 Evaluation and Analysis on the GEC of BRICS

In order to further analyze the GEC difference between BRICS countries, the GEC rankings within the countries and in the world for the 5 countries covered by this study are provided in Table 7.15.

In terms of national rankings within the countries in 2012, Brazil and Russia were the top 2 countries and India was the last.

From worldwide rankings in 2012, Brazil's rank was very high, at 5th; Russia and China ranked in the lower middle level; and the other 2 countries ranked rather low. As a whole, the BRICS countries are in a relatively lower level of environment competitiveness.

From the sub-index rankings, the REC and EMC rankings of BRICS countries were relatively higher and the other 3 sub-indexes ranked relatively lower, which makes the overall rank rather low.

Chapter 8
Evaluation and Comparative Analysis on REC

8.1 Evaluation Results of REC

According to the evaluation indicator system and the mathematic model of REC, the evaluation and analysis are made on REC in 2012. Table 8.1 lists the rankings and scores of REC and the subordinate indicators in 2012 and Fig. 8.1 displays the REC scores of the six continents as well as the top three countries of each continent in 2012.

According to Table 8.1, the countries with REC ranking 1st–10th include Myanmar, Congo, Rep., Gabon, Bangladesh, Nicaragua, Norway, Costa Rica, Indonesia, Malaysia and Panama; the 11th–20th rankings are Philippines, New Zealand, Canada, Brazil, Cambodia, Australia, Slovenia, Peru, Vietnam and Mauritius; the 21st–30th rankings are Nepal, Honduras, Cameroon, Russian Federation, Venezuela, RB, Colombia, Angola, Bolivia, Zambia and Ecuador; and the bottom 10 countries are Mauritania, Lesotho, Uzbekistan, Israel, Oman, Syrian Arab Republic, Iraq, Yemen, Rep., Egypt, Arab Rep. and Jordan.

In 2012, the highest score of REC is 36.6 points, the lowest score is 4.0, the average score is 17.8 and the standard deviation (SD) is 6.8; the highest score and the lowest score differ greatly with the margin of 32.6 points; 65 countries score higher than the average point. Generally speaking, the overall level of REC is rather low; the difference is very large between the countries ranking both top and bottom while the difference among the other countries is not so obvious.

The scores of REC show elliptical distribution. Seven countries score above 30 points; 36 countries score 20–30; 68 countries score 10–20; and 22 countries score below 10 points.

The countries with higher REC are mainly developing countries. Among the 20 countries ranking ahead, 15 are developing countries, accounting for 75 %. Most developed countries are middle on REC. A large part of developing countries still have rather low REC.

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Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_8,

Table 8.1 Scores and rankings of REC as well as the tertiary and individual indicators in 2012

Indicator / Country	REC	Land resources	Land area per capita	Percentage of arable land to total land area	Arable land per capita	Water resources	Surface water	Annual precipitation	Groundwater	Total internal renewable water resources
Myanmar	36.6	12.5	2.4	27.9	10.4	67.5	19.1	73.4	100.0	77.4
	1	68	68	50	55	2	8	8	2	7
Congo, Rep.	34.8	8.3	14.8	2.3	5.6	41.6	26.3	55.9	51.4	32.8
	2	95	14	121	89	20	5	26	9	36
Gabon	32.5	15.7	30.3	2.0	9.9	25.1	6.8	52.2	21.8	19.5
	3	47	8	123	62	41	47	33	34	53
Bangladesh	32.3	30.6	0.1	99.5	2.4	66.0	100.0	100.0	23.3	40.7
	4	10	132	2	119	4	1	1	31	29
Nicaragua	30.9	14.0	3.7	26.7	15.2	63.8	17.3	87.8	70.6	79.5
	5	60	49	54	29	6	12	5	6	6
Norway	30.4	8.1	11.1	4.4	7.7	43.1	13.3	50.8	45.2	63.1
	6	99	22	115	71	17	22	36	12	11
Costa Rica	30.1	3.8	1.9	7.9	2.4	71.3	15.8	69.6	100.0	100.0
	7	125	80	104	117	1	16	11	1	1
Indonesia	29.7	8.5	1.3	21.9	4.5	50.2	11.8	96.3	36.3	56.2
	8	93	102	66	99	12	28	3	16	16
Malaysia	29.6	4.4	2.0	9.1	2.9	58.5	18.6	98.1	28.0	89.0
	9	124	79	103	113	10	10	2	29	3
Panama	29.1	7.3	3.7	12.2	7.1	63.6	21.0	92.6	40.7	100.0
	10	109	47	93	74	7	6	4	15	2
Philippines	29.0	10.2	0.5	30.6	2.7	66.0	16.1	80.1	87.0	81.0
	11	82	121	45	116	3	15	7	4	5
New Zealand	28.6	6.7	10.8	2.9	5.0	61.2	N/A	59.7	N/A	62.6
	12	110	24	119	94	8	N/A	21	N/A	12
Canada	28.3	38.9	47.5	7.9	58.3	11.3	3.4	20.0	5.8	15.8
	13	4	7	105	3	85	68	95	83	60
Brazil	28.2	12.5	7.7	14.3	17.1	33.9	10.5	60.8	31.9	32.3
	14	67	31	88	27	28	30	18	24	37
Cambodia	27.9	16.3	2.2	38.4	13.1	36.0	28.8	66.2	14.3	34.5
	15	45	72	36	38	26	4	16	51	32
Australia	27.4	57.9	62.0	10.4	100.0	5.9	0.6	18.2	1.3	3.2
	16	1	3	98	1	106	107	99	106	105
Slovenia	26.5	6.1	1.7	14.1	3.8	50.0	17.0	39.6	96.6	46.8
	17	118	85	90	104	13	13	47	3	21
Peru	26.3	6.3	7.8	4.7	5.8	43.3	16.1	59.2	34.1	63.7
	18	114	28	114	86	16	14	23	19	10
Vietnam	26.2	11.9	0.6	35.5	3.5	46.8	29.5	65.9	33.1	58.5
	19	72	119	38	111	14	2	17	21	15
Mauritius	25.7	20.5	0.3	65.2	2.8	53.4	12.5	69.6	63.3	68.3
	20	29	131	11	114	11	25	11	7	9

Forest resources	Growing stock in forest and other wooded land	Proportion of land area covered by forest	Forest area per capita	**Energy resources**	Fossil energy	Energy production	Proportion of combustible renewables and waste to total energy consumption	Net energy imports of the energy consumption
40.2	54.3	56.4	4.5	19.4	0.0	0.5	80.6	20.5
25	32	21	40	18	62	86	10	27
61.2	63.8	76.8	37.7	28.0	1.5	4.3	55.4	100.0
5	10	6	7	5	29	21	22	1
87.1	56.9	100.0	100.0	14.9	6.5	9.6	26.1	29.2
1	24	1	1	31	16	12	35	18
20.3	50.2	13.0	0.1	7.7	0.0	0.2	30.1	10.5
100	95	93	126	53	63	115	31	55
28.4	51.4	29.6	3.6	10.8	0.0	0.3	48.4	6.9
73	64	70	50	42	64	101	26	82
35.8	53.0	39.0	14.3	29.1	3.2	42.5	5.5	81.2
39	41	50	17	3	21	4	78	4
39.5	50.8	57.9	3.8	0.0	0.0	0.5	18.3	6.5
27	76	18	47	125	64	82	45	84
50.4	84.4	60.6	2.7	9.8	0.4	1.6	27.9	23.4
13	6	17	57	45	43	47	32	25
49.4	62.8	72.6	4.9	4.5	0.6	3.1	5.0	15.0
14	13	9	35	77	36	31	82	39
37.9	52.0	51.0	6.3	3.2	0.0	0.2	13.7	2.7
32	50	29	29	93	64	110	55	110
28.5	53.9	30.3	0.6	4.8	0.0	0.3	18.3	7.3
72	37	68	102	74	64	109	46	78
36.9	60.9	36.7	13.1	5.0	1.8	3.9	6.9	11.7
35	14	56	18	70	28	26	70	47
64.8	100.0	39.9	62.7	13.8	18.8	11.8	5.1	20.1
3	1	48	2	33	8	10	81	29
64.2	100.0	71.6	18.3	8.9	0.5	1.3	32.8	11.8
4	1	10	15	47	38	54	30	46
43.8	52.9	66.1	4.9	16.9	0.0	0.3	77.2	9.1
20	43	11	36	26	64	107	12	67
32.8	N/A	22.6	46.4	25.0	47.7	14.2	4.5	31.8
54	N/A	79	3	6	2	8	87	16
45.9	51.3	73.0	4.3	3.6	0.0	1.8	10.0	6.4
16	67	8	42	85	64	39	62	86
52.1	74.7	62.1	16.1	5.7	0.1	0.7	17.4	12.7
11	7	13	16	65	56	73	47	43
37.2	52.6	52.7	1.1	7.8	0.2	0.8	26.6	14.1
34	45	25	82	52	52	70	33	40
23.1	50.0	20.2	0.2	3.1	3.1	N/A	N/A	N/A
87	118	81	117	98	22	N/A	N/A	N/A

(continued)

Table 8.1 (continued)

Indicator / Country	REC	Land resources	Land area per capita	Percentage of arable land to total land area	Arable land per capita	Water resources	Surface water	Annual precipitation	Groundwater	Total internal renewable water resources
Nepal	25.3	9.7	0.8	27.8	3.6	39.5	15.8	52.2	20.1	69.7
	21	87	114	51	107	23	17	33	39	8
Honduras	24.9	7.5	2.6	15.3	6.2	42.3	8.4	67.4	50.2	43.2
	22	106	62	85	81	19	41	14	10	24
Cameroon	24.7	12.7	4.2	22.1	14.5	30.2	6.4	54.7	30.4	29.1
	23	66	43	63	32	34	51	29	27	42
Russian Federation	24.3	23.9	20.6	12.4	39.8	9.8	2.8	16.3	6.9	13.3
	24	20	10	91	6	94	77	103	76	68
Venezuela, RB	23.9	4.9	5.4	4.8	4.2	33.2	14.8	55.2	31.5	31.3
	25	122	37	112	102	30	19	27	25	38
Colombia	23.1	3.2	4.2	2.9	2.1	41.2	19.1	60.8	34.1	50.9
	26	127	42	118	121	21	7	18	19	17
Angola	23.0	9.1	11.4	5.4	9.8	12.0	1.3	34.2	6.7	6.0
	27	89	21	110	63	77	98	60	78	91
Bolivia	22.8	14.8	19.3	5.8	17.8	19.2	5.9	39.4	17.3	14.1
	28	53	12	109	25	55	55	49	45	66
Zambia	22.8	9.8	9.9	7.6	11.8	12.8	1.5	35.0	9.1	5.4
	29	86	26	107	47	72	96	57	69	92
Ecuador	22.8	4.5	2.8	7.6	3.6	60.2	18.6	70.6	70.6	81.0
	30	123	54	106	106	9	9	9	5	4
Japan	22.5	6.6	0.5	19.7	1.6	35.3	12.4	58.6	10.6	59.5
	31	111	123	70	125	27	26	24	63	14
Sri Lanka	21.3	10.7	0.5	32.4	2.7	32.5	9.0	60.7	17.9	42.5
	32	78	122	42	115	31	39	20	44	27
Jamaica	21.2	6.5	0.7	18.7	2.1	42.9	5.5	70.6	51.7	43.8
	33	113	117	72	122	18	56	10	8	23
Guatemala	21.2	8.9	1.2	23.6	4.6	43.4	10.2	67.4	45.2	50.9
	34	91	105	60	97	15	31	13	11	17
Albania	21.1	14.9	1.5	38.4	9.1	37.5	14.9	52.8	32.6	49.5
	35	52	97	35	68	25	18	31	23	20
India	21.1	28.9	0.4	89.8	5.9	23.4	7.4	40.6	20.9	24.5
	36	13	128	5	85	45	45	46	38	43
Nigeria	20.9	23.6	1.0	67.1	10.4	17.2	3.3	39.5	13.7	12.2
	37	21	109	9	57	58	69	48	52	72
Sudan	20.8	15.9	12.5	14.3	22.2	4.2	0.7	15.0	0.4	0.6
	38	46	18	89	15	111	104	107	117	118
United States	20.4	18.2	5.3	29.6	24.1	16.7	3.4	26.1	21.7	15.5
	39	36	38	47	13	61	67	70	36	61
Ukraine	20.3	39.5	2.3	95.2	33.3	19.6	2.5	66.3	4.9	4.6
	40	3	71	3	8	52	83	15	88	98

Forest resources	Growing stock in forest and other wooded land	Proportion of land area covered by forest	Forest area per capita	**Energy resources**	Fossil energy	Energy production	Proportion of combustible renewables and waste to total energy consumption	Net energy imports of the energy consumption
27.7	52.0	29.7	0.8	20.0	0.0	0.3	91.2	11.1
75	52	69	93	13	64	100	3	52
38.2	51.9	53.1	4.6	10.2	0.0	0.3	46.1	6.1
31	54	24	39	43	64	103	27	89
42.2	68.6	48.8	6.9	15.8	0.0	0.4	66.7	15.0
23	8	32	25	29	64	92	17	38
65.0	100.0	57.9	39.5	12.0	16.8	9.2	1.1	23.5
2	1	19	4	38	10	14	106	24
39.6	N/A	61.1	11.0	16.9	31.6	6.8	1.3	32.0
26	N/A	15	22	25	6	16	103	15
40.5	58.3	51.3	8.4	6.5	2.0	2.1	10.6	20.5
24	20	26	23	60	25	34	60	27
45.2	56.9	54.8	20.7	28.3	1.8	5.2	60.2	92.7
18	24	23	13	4	27	19	20	3
55.3	62.9	61.5	39.3	10.2	0.0	1.7	26.1	29.2
9	12	14	5	44	61	41	35	17
56.2	58.3	77.7	25.5	19.2	0.0	0.6	86.0	11.7
8	20	5	10	19	64	75	7	48
19.1	N/A	44.3	4.6	0.0	1.2	1.8	5.7	27.7
104	N/A	39	38	125	31	38	75	20
51.4	62.9	80.3	1.4	0.9	0.0	0.8	1.5	2.3
12	11	4	75	115	64	69	101	113
29.0	50.1	34.5	0.6	12.1	0.0	0.3	54.9	7.0
69	100	62	99	37	64	106	23	80
29.9	50.2	36.4	0.9	3.5	0.0	0.2	15.7	1.8
67	97	59	92	88	64	116	50	117
31.7	51.8	39.0	1.7	0.0	0.0	0.5	60.3	9.3
58	57	49	68	125	64	81	18	64
28.8	50.2	33.1	1.7	3.8	0.0	0.5	10.6	9.9
70	93	65	70	83	64	83	61	59
30.9	66.6	27.0	0.4	7.0	0.7	0.4	26.3	9.5
62	9	71	107	57	34	93	34	63
20.6	53.5	11.1	0.4	23.1	0.6	1.6	89.9	29.2
98	39	99	108	9	35	44	4	18
52.9	52.9	N/A	N/A	19.4	0.5	1.1	73.6	27.6
10	42	N/A	N/A	17	39	60	14	22
47.6	100.0	39.0	6.8	7.5	10.7	5.6	4.4	9.8
15	1	51	26	54	12	17	89	61
25.2	56.4	19.7	1.5	5.0	10.1	1.7	1.2	7.3
83	28	82	71	72	13	42	105	77

(continued)

Table 8.1 (continued)

Indicator / Country	REC	Land resources	Land area per capita	Percentage of arable land to total land area	Arable land per capita	Water resources	Surface water	Annual precipitation	Groundwater	Total internal renewable water resources
Latvia	20.3	19.5	5.4	31.5	26.3	11.8	6.1	22.5	5.1	13.6
	41	32	36	43	11	79	53	82	87	67
Singapore	20.0	0.4	0.0	1.4	0.0	64.6	N/A	85.9	N/A	43.2
	42	133	133	127	133	5	N/A	6	N/A	25
Finland	20.0	13.6	10.1	12.4	19.5	10.7	3.9	20.2	1.0	17.8
	43	64	25	92	23	89	66	94	109	57
Mozambique	19.9	8.7	5.9	11.1	10.2	12.0	2.9	35.6	3.1	6.4
	44	92	33	96	61	78	75	56	94	89
Sweden	19.8	10.2	7.8	10.6	12.9	13.9	4.6	23.2	7.0	21.0
	45	83	29	97	41	68	60	77	75	50
Cote d'Ivoire	19.7	7.7	2.8	15.3	6.7	19.6	2.7	46.4	17.1	12.2
	46	103	55	84	77	53	80	40	46	73
Chile	19.7	5.0	7.7	2.8	3.6	38.2	13.4	52.5	27.1	60.0
	47	121	30	120	108	24	21	32	30	13
Thailand	19.7	19.4	1.3	52.3	10.6	24.6	9.0	55.2	11.8	22.2
	48	33	104	21	54	42	38	27	59	48
Tanzania	19.3	11.5	3.4	22.1	11.7	12.4	1.1	38.9	4.8	4.8
	49	74	51	65	48	74	99	51	89	96
Bosnia and Herzegovina	19.2	14.7	2.4	33.3	12.5	27.6	7.7	35.0	32.6	35.1
	50	54	67	40	44	36	43	58	22	31
Korea, Rep.	19.0	8.3	0.3	26.0	1.4	26.3	7.5	44.5	19.7	33.7
	51	94	130	56	126	38	44	41	40	34
Haiti	18.9	20.0	0.5	61.5	4.6	22.2	4.6	49.2	11.2	23.8
	52	30	126	14	98	47	59	37	62	44
Moldova	18.8	35.9	1.6	93.5	23.8	1.5	N/A	N/A	N/A	1.5
	53	7	88	4	14	122	N/A	N/A	N/A	113
Dominican Republic	18.6	9.8	0.8	28.0	3.7	27.4	4.7	48.2	34.9	21.9
	54	85	113	48	105	37	58	38	18	49
Austria	18.5	11.4	1.7	28.0	7.6	23.1	10.2	38.3	10.4	33.7
	55	76	86	49	73	46	32	53	64	35
Qatar	18.5	1.1	1.1	1.9	0.3	0.2	0.0	0.0	0.7	0.2
	56	130	108	124	130	133	127	131	111	121
Croatia	18.4	11.9	2.3	27.1	9.5	29.7	18.3	38.2	28.3	34.0
	57	73	70	53	66	35	11	54	28	33
Paraguay	18.4	17.6	10.9	16.5	27.8	18.8	9.1	39.2	14.8	11.9
	58	38	23	81	9	56	37	50	49	75
Mongolia	18.4	43.2	100.0	0.5	10.2	2.5	0.2	8.2	0.5	1.1
	59	2	1	132	60	119	117	115	115	117
Georgia	18.3	5.4	2.8	10.0	4.3	30.7	10.1	34.9	35.7	42.2
	60	120	56	101	101	33	33	59	17	28

Forest resources	Growing stock in forest and other wooded land	Proportion of land area covered by forest	Forest area per capita	**Energy resources**	Fossil energy	Energy production	Proportion of combustible renewables and waste to total energy consumption	Net energy imports of the energy consumption
44.3	51.9	63.4	11.4	13.3	0.0	1.0	60.2	6.0
19	53	12	20	35	64	63	20	93
2.2	N/A	3.8	0.0	0.3	0.0	0.1	1.3	0.0
128	N/A	114	131	123	64	122	104	126
59.8	56.6	85.4	28.7	6.9	0.0	3.3	24.2	5.9
6	26	2	8	58	64	30	38	95
42.8	54.3	57.8	11.3	20.0	0.0	0.5	87.4	15.6
22	34	20	21	14	64	78	6	34
56.5	60.2	80.5	20.8	7.5	0.0	3.6	24.9	8.2
7	16	3	12	56	64	28	37	74
33.8	58.0	38.3	3.6	18.5	0.0	0.5	81.1	13.9
49	22	53	51	20	64	79	9	41
29.9	59.1	25.6	6.6	4.1	0.0	0.5	17.0	3.7
66	17	75	27	78	64	77	48	105
33.7	52.4	43.5	1.9	5.7	0.3	1.0	20.6	7.6
50	46	42	64	64	47	61	41	75
35.1	53.7	43.7	5.0	20.9	0.0	0.4	94.7	11.8
41	38	41	34	11	64	94	2	45
36.6	51.1	50.2	4.1	2.1	0.0	1.2	N/A	8.6
36	73	30	45	106	64	55	N/A	70
45.8	51.8	75.0	0.9	0.9	0.0	0.9	1.5	2.1
17	56	7	91	113	59	64	102	114
16.7	50.0	4.3	0.1	16.4	0.0	0.2	74.8	8.9
112	112	113	125	27	64	117	13	69
20.8	50.1	13.9	0.8	23.2	0.0	64.2	3.5	0.3
95	98	90	95	8	64	2	93	121
34.6	50.4	47.8	1.4	5.1	0.0	0.2	22.9	2.8
45	89	33	74	69	64	114	40	109
39.1	53.4	55.3	3.2	5.0	0.0	1.4	19.1	4.3
29	40	22	54	71	64	51	44	102
0.0	N/A	0.0	0.0	60.5	35.6	100.0	0.0	99.1
133	N/A	131	132	1	3	1	120	2
32.4	51.2	40.3	3.0	2.3	0.0	1.0	5.0	6.2
55	69	47	55	104	64	62	84	87
26.1	0.0	51.3	18.5	13.5	0.0	1.1	51.5	18.9
78	121	26	14	34	64	58	24	30
27.6	54.3	8.2	26.9	11.7	0.0	5.5	4.8	58.5
76	33	106	9	39	64	18	85	7
35.2	51.4	46.2	4.3	3.4	0.0	0.3	12.3	5.2
40	63	38	43	92	64	102	58	97

(continued)

Table 8.1 (continued)

Indicator / Country	REC	Land resources	Land area per capita	Percentage of arable land to total land area	Arable land per capita	Water resources	Surface water	Annual precipitation	Groundwater	Total internal renewable water resources
El Salvador	18.3	18.1	0.6	54.4	5.0	39.6	13.1	59.4	42.7	43.2
	61	37	120	19	95	22	23	22	14	26
Guinea	18.2	11.5	4.3	19.6	13.0	33.6	9.9	56.0	22.2	46.4
	62	75	40	71	40	29	34	25	33	22
Switzerland	17.9	6.2	0.9	17.0	2.4	32.0	14.4	53.8	9.0	50.9
	63	117	110	78	118	32	20	30	70	19
Estonia	17.9	16.5	5.7	25.2	22.1	13.6	3.0	22.6	13.6	15.1
	64	44	34	58	16	70	74	80	54	64
France	17.8	21.6	1.5	56.9	13.1	20.9	4.1	29.5	31.5	18.4
	65	28	98	17	37	51	65	64	25	55
Benin	17.7	16.5	2.2	38.7	13.3	11.5	2.5	36.5	2.3	4.7
	66	43	74	33	36	83	82	55	102	97
Ghana	17.6	14.1	1.6	35.7	9.0	17.0	2.5	42.2	16.6	6.7
	67	58	90	37	69	60	84	43	47	88
Denmark	17.5	36.8	1.3	100.0	21.0	11.7	0.9	24.2	14.6	7.1
	68	5	101	1	18	80	100	73	50	86
Togo	17.5	29.8	1.6	78.3	19.1	17.5	2.8	41.4	15.1	10.7
	69	11	94	7	24	57	78	45	48	78
Kuwait	17.0	0.8	1.1	0.9	0.2	1.1	0.0	4.1	0.1	0.0
	70	132	107	128	132	126	127	123	123	133
Cuba	16.9	22.1	1.7	56.6	14.8	19.2	3.2	46.7	8.7	18.1
	71	27	87	18	31	54	71	39	71	56
Germany	16.9	19.7	0.7	57.8	6.8	15.8	4.7	24.3	18.8	15.5
	72	31	116	16	76	63	57	72	43	62
Lithuania	16.8	29.4	3.7	59.1	33.8	10.7	4.3	23.2	2.7	12.5
	73	12	48	15	7	90	63	78	97	71
Kazakhstan	16.7	36.6	29.4	15.0	68.0	3.0	0.5	8.6	1.8	1.2
	74	6	9	87	2	116	112	113	104	116
Zimbabwe	16.6	12.0	5.4	17.9	15.0	6.7	0.5	22.5	2.2	1.6
	75	70	35	75	30	102	111	84	103	112
Senegal	16.4	15.5	2.7	33.8	14.1	8.8	2.1	23.8	2.6	6.8
	76	49	57	39	33	100	90	75	99	87
Belarus	16.4	23.6	3.8	46.2	27.3	11.6	3.1	21.4	12.7	9.3
	77	22	45	25	10	82	73	88	57	82
Uruguay	16.4	16.5	9.3	17.4	25.1	21.9	8.6	43.2	18.9	17.0
	78	42	27	76	12	49	40	42	42	58
Romania	16.3	26.6	1.9	66.3	19.7	11.7	9.9	22.4	5.2	9.3
	79	14	82	10	22	81	35	85	85	81
Ethiopia	16.1	10.6	2.1	24.6	8.0	10.5	1.3	31.8	2.8	6.2
	80	79	77	59	70	91	97	62	96	90

Forest resources	Growing stock in forest and other wooded land	Proportion of land area covered by forest	Forest area per capita	**Energy resources**	Fossil energy	Energy production	Proportion of combustible renewables and waste to total energy consumption	Net energy imports of the energy consumption
6.5	N/A	16.0	0.3	5.1	0.0	0.4	19.7	6.8
126	N/A	85	110	68	64	99	43	83
29.2	51.5	31.0	4.4	0.0	0.0	N/A	N/A	N/A
68	61	67	41	125	64	N/A	N/A	N/A
30.3	51.3	36.4	1.1	3.4	0.0	1.6	9.6	6.0
64	66	58	83	91	64	45	64	91
43.3	51.4	61.1	11.5	6.1	0.0	3.7	15.8	11.2
21	65	16	19	61	64	27	49	51
31.5	57.8	34.2	1.7	3.0	0.0	2.1	6.4	6.5
59	23	63	67	100	64	35	73	85
34.9	50.5	46.9	3.5	13.2	0.0	0.2	60.3	7.1
43	85	35	52	36	64	111	19	79
25.6	50.9	24.8	1.3	15.1	0.0	0.3	68.4	9.1
82	75	77	76	30	64	105	16	66
21.3	50.3	15.1	0.7	7.9	0.4	4.2	19.9	15.4
90	91	87	97	50	44	23	42	35
2.4	0.0	5.8	0.3	19.4	0.0	0.4	88.6	10.5
127	121	111	111	16	64	98	5	56
0.2	0.0	0.4	0.0	55.0	100.0	49.4	0.0	51.3
131	121	126	128	2	1	3	120	8
28.6	50.8	32.0	1.8	3.6	0.0	0.5	12.4	6.0
71	78	66	65	86	64	87	57	92
33.3	60.6	37.2	0.9	5.3	6.8	1.6	9.6	5.0
52	15	54	90	67	15	46	63	99
33.1	51.4	40.5	5.0	3.6	0.0	0.5	15.4	2.7
53	62	45	32	84	64	88	51	111
16.3	51.1	1.4	1.4	17.3	32.8	9.7	0.1	26.7
114	71	120	73	23	5	11	114	23
36.6	51.8	46.3	8.4	16.1	0.5	0.7	69.8	11.3
37	57	37	24	28	37	72	15	50
37.2	51.0	51.3	4.6	10.9	0.0	0.1	49.6	6.0
33	74	28	37	41	64	119	25	94
38.4	54.8	50.0	6.4	1.8	0.0	0.4	6.7	1.8
30	30	31	28	110	64	91	71	118
21.0	50.4	12.0	3.7	7.8	0.0	0.6	33.1	6.1
93	88	97	49	51	64	74	29	88
30.4	54.2	33.6	2.2	4.6	0.3	1.3	12.7	9.9
63	35	64	62	75	46	53	56	58
21.2	50.8	14.2	1.0	21.9	0.0	0.4	100.0	12.0
91	77	88	89	10	64	96	1	44

(continued)

Table 8.1 (continued)

Indicator / Country	REC	Land resources	Land area per capita	Percentage of arable land to total land area	Arable land per capita	Water resources	Surface water	Annual precipitation	Groundwater	Total internal renewable water resources
Serbia	16.1	26.4	2.1	63.9	21.2	12.1	N/A	19.4	N/A	4.8
	81	15	76	12	17	76	N/A	97	N/A	95
Italy	16.1	13.7	0.8	39.1	5.2	21.9	6.6	28.9	21.0	31.3
	82	63	112	32	92	48	48	67	37	38
Hungary	16.0	31.6	1.6	82.4	20.6	11.4	12.4	20.5	9.5	3.3
	83	8	91	6	20	84	27	91	68	103
Netherlands	15.9	16.7	0.3	52.4	2.9	24.3	29.1	32.5	19.2	16.4
	84	40	129	20	112	43	3	61	41	59
Slovak Republic	15.8	19.0	1.6	49.0	12.1	14.5	11.2	28.5	5.1	13.2
	85	34	93	23	46	67	29	68	86	69
Bulgaria	15.6	22.5	2.6	50.7	20.7	10.3	2.0	21.1	8.5	9.8
	86	25	59	22	19	92	91	89	73	80
Czech Republic	15.6	25.6	1.3	69.5	14.1	9.1	1.8	23.4	2.6	8.6
	87	16	103	8	34	96	95	76	98	85
Poland	15.1	23.2	1.4	61.9	13.5	9.5	2.2	20.9	5.9	8.9
	88	23	100	13	35	95	89	90	82	83
China	14.8	7.7	1.2	20.2	3.9	13.4	3.2	22.5	12.8	15.2
	89	105	106	67	103	71	72	83	56	63
Ireland	14.7	12.1	2.7	26.0	10.9	26.3	8.0	38.7	22.5	35.9
	90	69	58	55	52	39	42	52	32	30
Madagascar	14.7	7.3	4.9	10.1	7.7	25.2	6.2	51.8	13.6	29.2
	91	108	39	100	72	40	52	35	53	41
Botswana	14.6	22.1	50.3	0.6	6.0	3.8	0.2	14.5	0.4	0.2
	92	26	5	130	82	113	118	108	116	124
Mexico	14.4	11.0	3.0	22.1	10.4	12.2	2.3	25.8	10.3	10.6
	93	77	53	64	56	75	88	71	65	79
Greece	14.4	13.8	2.0	32.8	10.4	15.7	6.0	22.6	11.5	22.7
	94	62	78	41	59	64	54	81	60	47
Portugal	14.3	8.1	1.5	20.2	4.8	16.4	9.1	29.2	6.3	21.0
	95	97	96	68	96	62	36	65	80	51
United Kingdom	14.3	14.4	0.7	42.4	4.5	21.0	6.5	41.7	5.8	30.2
	96	56	118	30	100	50	50	44	84	40
Spain	14.1	17.3	1.9	42.5	12.7	11.0	2.4	21.9	8.6	11.2
	97	39	81	29	43	87	86	86	72	76
Azerbaijan	14.0	15.1	1.6	38.6	9.6	9.1	4.2	15.9	11.3	5.0
	98	50	92	34	65	97	64	104	61	94
Libya	13.9	24.0	49.4	1.5	12.8	0.5	0.0	1.9	0.0	0.0
	99	19	6	125	42	132	126	129	127	131
Argentina	13.5	25.0	12.1	23.5	43.7	8.8	3.2	20.4	6.7	5.1
	100	17	19	62	4	99	70	93	77	93

Forest resources	Growing stock in forest and other wooded land	Proportion of land area covered by forest	Forest area per capita	**Energy resources**	Fossil energy	Energy production	Proportion of combustible renewables and waste to total energy consumption	Net energy imports of the energy consumption
31.0	51.3	37.0	2.7	3.2	0.0	1.5	7.1	8.6
61	68	55	58	94	64	49	69	71
31.3	54.2	36.7	1.1	1.6	0.1	0.5	5.5	2.1
60	36	57	87	111	58	85	77	115
26.3	51.1	26.4	1.4	3.4	2.3	1.1	7.8	5.4
77	72	72	72	90	23	57	67	96
20.2	50.2	12.7	0.2	4.0	0.0	4.2	4.5	10.6
101	95	95	121	82	60	24	88	54
35.1	51.6	47.1	2.5	2.2	0.0	1.2	5.8	4.3
42	60	34	59	105	64	56	74	101
33.9	52.0	43.0	3.8	4.0	4.3	1.4	5.5	7.4
47	51	44	48	81	19	50	79	76
32.4	52.3	40.3	1.8	4.1	1.4	3.0	6.4	9.0
56	47	46	66	79	30	32	72	68
31.8	56.2	36.1	1.7	4.1	2.0	1.8	8.0	8.4
57	29	60	69	80	26	40	66	72
39.2	94.5	26.3	1.1	4.5	1.2	1.7	9.1	11.6
28	5	73	84	76	32	43	65	49
20.5	50.2	12.7	1.1	0.9	0.0	0.4	2.7	1.6
99	94	94	80	114	64	89	96	119
28.2	56.5	25.2	4.1	0.0	0.0	N/A	N/A	N/A
74	27	76	44	125	64	N/A	N/A	N/A
36.5	52.3	23.2	38.6	5.7	0.0	0.6	23.1	6.1
38	48	78	6	63	64	76	39	90
34.4	58.7	38.9	3.9	5.5	0.4	N/A	5.0	16.2
46	19	52	46	66	41	N/A	83	32
30.2	50.6	35.7	2.4	2.9	3.7	0.8	4.2	4.2
65	82	61	60	102	20	65	90	103
33.6	50.6	44.3	2.3	3.5	0.0	0.5	14.5	2.9
51	81	40	61	87	64	80	53	108
21.0	51.1	14.0	0.3	2.9	0.2	2.4	3.1	9.3
92	70	89	109	101	50	33	95	65
33.9	52.8	43.1	2.8	1.9	0.2	0.8	5.7	3.3
48	44	43	56	108	53	71	76	106
20.6	50.4	13.3	0.7	13.8	2.2	7.3	0.0	70.8
97	87	92	96	32	24	15	120	5
15.1	50.0	0.1	0.2	19.6	18.8	14.1	1.0	59.2
123	109	128	115	15	9	9	107	6
24.2	58.9	12.5	5.0	3.5	0.1	2.0	3.6	13.4
84	18	96	33	89	54	36	92	42

(continued)

Table 8.1 (continued)

Indicator / Country	REC	Land resources	Land area per capita	Percentage of arable land to total land area	Arable land per capita	Water resources	Surface water	Annual precipitation	Groundwater	Total internal renewable water resources
Macedonia, FYR	13.4	12.0	2.2	27.7	9.4	10.8	N/A	N/A	N/A	10.8
	101	71	73	52	67	88	N/A	N/A	N/A	77
Luxembourg	13.4	14.2	0.9	40.5	5.6	17.1	12.9	31.7	4.4	19.5
	102	57	111	31	90	59	24	63	90	53
Belgium	13.3	15.1	0.5	46.2	3.5	14.9	6.5	29.0	4.2	20.0
	103	51	125	24	110	66	49	66	92	52
Namibia	13.1	30.8	63.8	1.5	16.1	2.7	0.6	9.7	0.3	0.4
	104	9	2	126	28	117	109	111	119	120
Lebanon	12.8	6.1	0.4	18.4	1.2	24.0	4.4	22.9	45.0	23.7
	105	119	127	73	128	44	62	79	13	45
Turkey	12.7	18.2	1.9	45.2	13.1	12.7	2.7	20.5	12.9	14.9
	106	35	84	27	39	73	79	92	55	65
Kenya	12.3	7.7	2.4	16.3	6.2	6.3	0.6	21.8	0.8	1.8
	107	104	66	82	80	105	108	87	110	110
Pakistan	11.7	15.6	0.8	45.5	5.5	8.9	4.4	17.3	10.2	3.6
	108	48	115	26	91	98	61	100	67	102
Saudi Arabia	11.0	7.7	13.8	2.3	5.2	0.5	0.0	2.0	0.1	0.1
	109	102	17	122	93	131	125	128	124	130
United Arab Emirates	11.0	1.1	1.9	0.9	0.3	0.7	0.0	2.6	0.2	0.1
	110	131	83	129	131	129	124	127	121	129
Armenia	10.3	10.3	1.6	25.5	6.5	13.9	1.8	19.9	21.8	12.1
	111	81	89	57	79	69	94	96	34	74
South Africa	9.8	10.1	4.3	16.7	11.1	4.9	0.4	16.8	0.5	1.9
	112	84	41	80	50	107	113	102	114	109
Turkmenistan	9.8	13.9	16.6	6.7	17.4	1.9	1.9	5.7	0.1	0.2
	113	61	13	108	26	120	92	119	125	126
Eritrea	9.7	6.6	3.3	11.4	6.0	4.5	0.7	15.2	0.7	1.4
	114	112	52	94	83	109	105	105	112	114
Tajikistan	9.4	6.2	3.6	10.2	5.7	15.0	7.3	23.9	6.1	22.9
	115	116	50	99	87	65	46	74	81	46
Iran, Islamic Rep.	9.1	10.3	3.9	18.1	11.0	4.3	0.7	8.3	4.3	4.0
	116	80	44	74	51	110	103	114	91	101
Kyrgyz Republic	9.0	9.1	6.2	11.1	10.8	11.2	2.6	18.8	10.2	12.9
	117	90	32	95	53	86	81	98	66	70
Tunisia	8.7	14.0	2.6	30.9	12.4	2.6	0.2	7.4	1.4	1.4
	118	59	60	44	45	118	116	116	105	115
Morocco	8.5	13.5	2.5	30.1	11.5	4.7	0.5	11.7	3.2	3.3
	119	65	65	46	49	108	110	109	93	104

Forest resources	Growing stock in forest and other wooded land	Proportion of land area covered by forest	Forest area per capita	**Energy resources**	Fossil energy	Energy production	Proportion of combustible renewables and waste to total energy consumption	Net energy imports of the energy consumption
34.7	50.2	46.6	3.4	2.9	0.0	0.8	7.6	7.0
44	92	36	53	103	64	67	68	81
25.6	50.1	N/A	1.2	0.9	0.0	0.3	3.9	0.2
81	102	N/A	79	116	64	108	91	125
25.8	50.5	26.3	0.4	2.1	0.0	1.5	5.5	3.2
79	84	74	105	107	64	48	80	107
25.8	50.5	10.3	21.7	3.2	0.0	0.1	13.9	2.4
80	83	102	11	96	64	118	54	112
21.3	50.0	15.7	0.2	0.5	0.0	0.0	2.0	0.3
89	114	86	116	122	64	123	98	124
23.7	54.6	17.4	1.1	1.8	0.4	0.4	4.6	3.8
86	31	84	85	109	40	90	86	104
18.6	51.9	7.1	0.6	17.3	0.0	0.4	77.9	10.2
107	54	109	101	24	64	95	11	57
16.2	50.5	2.5	0.1	8.9	0.2	0.4	36.5	9.6
115	86	117	127	48	51	97	28	62
15.3	50.0	0.5	0.2	20.8	26.0	19.8	0.0	40.7
121	109	125	114	12	7	7	118	12
16.9	50.0	4.5	0.3	23.9	33.8	23.7	0.0	36.3
111	105	112	113	7	4	6	116	13
19.4	50.1	10.6	0.6	0.8	0.0	0.3	0.0	4.4
103	101	100	100	118	64	104	115	100
19.6	52.0	8.9	1.3	8.1	8.3	3.3	11.2	15.1
102	49	104	77	49	14	29	59	37
20.8	50.0	10.3	5.6	7.5	0.4	9.3	0.0	27.7
96	106	101	30	55	42	13	120	21
7.7	0.0	17.7	2.0	18.2	0.0	0.1	83.6	9.9
125	121	83	63	21	64	120	8	60
16.5	50.0	3.4	0.4	1.3	0.0	0.2	0.0	8.2
113	114	115	106	112	64	112	120	73
19.0	51.6	8.0	1.0	6.6	5.6	4.8	0.2	21.4
105	59	107	88	59	17	20	109	26
17.8	50.1	5.9	1.2	0.9	0.0	0.2	0.1	5.0
110	99	110	78	117	64	113	110	98
18.3	50.1	7.7	0.7	4.9	0.2	0.8	15.0	10.6
109	102	108	98	73	49	68	52	53
20.9	50.6	13.5	1.1	0.7	0.0	0.0	3.1	0.5
94	80	91	81	119	64	125	94	120

(continued)

Table 8.1 (continued)

Indicator / Country	REC	**Land resources**	Land area per capita	Percentage of arable land to total land area	Arable land per capita	**Water resources**	Surface water	Annual precipitation	Groundwater	Total internal renewable water resources
Niger	8.5	24.7	14.2	19.9	43.5	1.4	0.3	5.1	0.2	0.1
	120	18	15	69	5	123	115	121	120	127
Mali	8.4	14.4	13.9	9.4	20.3	3.8	0.8	9.7	2.3	2.5
	121	55	16	102	21	112	102	110	101	106
Cyprus	8.3	6.2	1.5	15.2	3.5	7.0	0.7	16.9	6.4	4.3
	122	115	99	86	109	101	106	101	79	99
Algeria	7.9	9.3	11.9	5.2	9.8	0.8	0.0	3.0	0.0	0.2
	123	88	20	111	64	127	121	126	126	122
Mauritania	7.9	22.9	52.4	0.6	5.9	0.8	0.1	3.1	0.0	0.0
	124	24	4	131	84	128	120	125	128	132
Lesotho	7.7	8.1	2.5	17.1	6.6	9.9	1.9	26.7	2.3	8.7
	125	98	64	77	78	93	93	69	100	84
Uzbekistan	7.5	8.2	2.6	17.0	6.9	3.8	2.8	7.3	2.9	1.9
	126	96	61	79	75	114	76	117	95	108
Israel	7.3	7.8	0.5	23.6	1.8	6.3	0.3	15.0	8.1	1.7
	127	101	124	61	123	104	114	106	74	111
Oman	7.2	8.0	19.6	0.0	0.5	1.3	0.0	4.2	0.6	0.2
	128	100	11	133	129	125	123	122	113	123
Syrian Arab Republic	6.5	16.5	1.6	42.5	10.4	6.4	2.5	8.6	12.5	2.0
	129	41	95	28	58	103	85	112	58	107
Iraq	6.2	7.3	2.4	15.5	5.7	3.7	2.4	7.3	1.0	4.1
	130	107	69	83	88	115	87	118	108	100
Yemen, Rep.	6.0	3.3	3.8	3.6	2.2	1.6	0.0	5.7	0.4	0.2
	131	126	46	116	120	121	122	120	118	125
Egypt, Arab Rep.	4.7	2.8	2.1	4.7	1.6	0.7	0.9	1.7	0.1	0.1
	132	128	75	113	124	130	101	130	122	128
Jordan	4.0	2.4	2.6	3.2	1.3	1.4	0.1	3.8	1.1	0.4
	133	129	63	117	127	124	119	124	107	119
Highest score	**36.6**	**57.9**	**100.0**	**100.0**	**100.0**	**71.3**	**100.0**	**100.0**	**100.0**	**100.0**
Lowest score	**4.0**	**0.4**	**0.0**	**0.0**	**0.0**	**0.2**	**0.0**	**0.0**	**0.0**	**0.0**
Average score	**17.8**	**14.7**	**7.4**	**27.2**	**12.0**	**20.7**	**7.3**	**34.8**	**17.5**	**22.4**
Standard deviation	**6.8**	**9.6**	**14.2**	**23.3**	**13.2**	**17.9**	**10.6**	**23.5**	**20.9**	**23.7**

Note: Among the two lines of figures for the countries and regions, the first line is the scores and

Forest resources	Growing stock in forest and other wooded land	Proportion of land area covered by forest	Forest area per capita	**Energy resources**	Fossil energy	Energy production	Proportion of combustible renewables and waste to total energy consumption	Net energy imports of the energy consumption
15.6	50.0	1.1	0.5	0.0	0.0	N/A	N/A	N/A
117	107	123	103	125	64	N/A	N/A	N/A
21.6	50.7	11.9	5.5	0.0	0.0	N/A	N/A	N/A
88	79	98	31	125	64	N/A	N/A	N/A
24.1	50.0	22.0	1.1	0.5	0.0	0.1	2.0	0.3
85	108	80	86	121	64	121	99	123
15.5	50.3	0.7	0.3	8.9	0.8	4.3	0.2	47.7
120	90	124	112	46	33	22	108	9
15.3	50.0	0.3	0.5	0.0	0.0	0.0	N/A	N/A
122	114	127	104	125	64	126	N/A	N/A
15.7	50.0	1.7	0.1	0.0	0.0	N/A	N/A	N/A
116	118	119	122	125	64	N/A	N/A	N/A
18.9	50.1	9.0	0.8	3.1	0.1	2.0	0.0	16.0
106	102	103	94	97	57	37	119	33
18.4	50.0	8.3	0.1	0.5	0.0	0.5	0.1	2.0
108	113	105	123	120	64	84	111	116
0.0	0.0	0.0	0.0	17.6	4.9	26.2	0.0	46.2
132	121	130	130	22	18	5	120	10
1.9	N/A	3.2	0.2	3.0	0.3	1.4	0.0	16.2
129	N/A	116	119	99	45	52	117	31
0.9	0.0	2.2	0.2	11.4	11.9	4.0	0.1	42.7
130	121	118	118	40	11	25	113	11
15.5	50.0	1.2	0.2	6.0	0.2	0.8	1.6	35.3
119	114	122	120	62	48	66	100	14
15.0	50.0	0.1	0.0	3.2	0.1	1.1	2.3	15.3
124	109	129	129	95	55	59	97	36
15.6	50.0	1.3	0.1	0.1	0.0	0.0	0.1	0.3
118	118	121	124	124	64	124	112	122
87.1	**100.0**	**100.0**	**100.0**	**60.5**	**100.0**	**100.0**	**100.0**	**100.0**
0.0	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
30.0	**52.7**	**31.8**	**6.6**	**8.9**	**3.5**	**4.4**	**22.7**	**15.8**
14.7	**15.6**	**23.3**	**13.1**	**9.5**	**11.5**	**12.3**	**27.9**	**19.2**

the second line is the rankings of the indicators

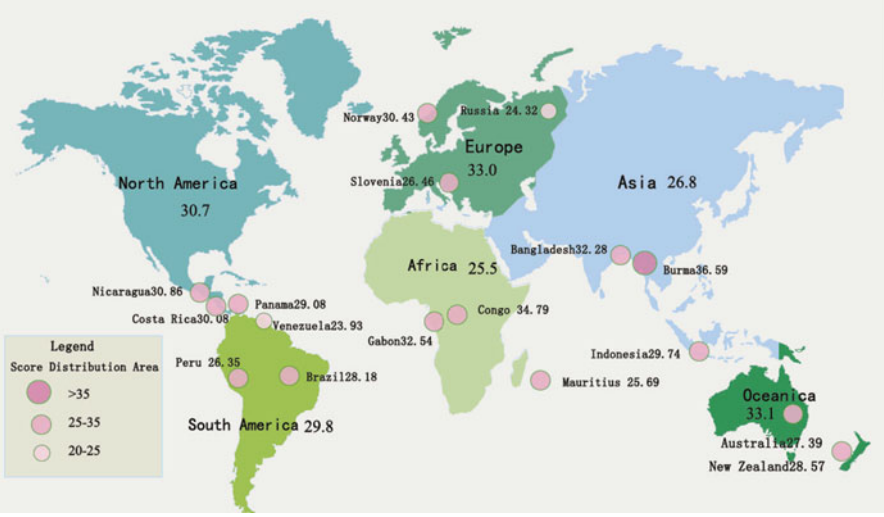

Fig. 8.1 REC scores of six continents & top three countries of each continent in 2012

To compare and analyze the REC levels of all the countries in a more visual way, the REC scores are displayed in Fig. 8.2. According to Fig. 8.2, the REC scores of the countries are concentrated, mostly in 10–30 points (up to 104 countries, accounting for 78.2 % of the total), showing little differences. Among the developed countries, Norway scores the highest, 30.4 points, and ranks 6th; among the developing countries, Myanmar scores the highest, 36.6 points. They have little difference.

8.2 Factor Scores and Contribution Rates of REC

Table 8.1 lists the evaluation results of the subordinate indicators of REC and displays the scores and rankings of 4 pillars and 14 individual indicators of REC in 2012 so as to analyze the influences of the pillars and individual indicators on REC of the countries.

On pillars, water resources enjoys the highest standard deviation, hitting 17.9, indicating that this indicator has the largest differences among the countries and is the most primary factor causing REC differences among the countries. The indicator of forest resources also has relatively high standard deviation, 14.7, contributing a lot to REC differences among the countries. Land resources and energy resources have small standard deviations, respectively 9.6 and 9.5, indicating they have small influence on REC differences among the countries. Overall, the countries have little differences on REC. Such differences are mainly caused by the differences of water resources and forest resources, which play the greatest part; two indicators, land resources and energy resources, also play a role, with less contribution. Hereafter, all the countries shall keep on great efforts in water resources and forest resources

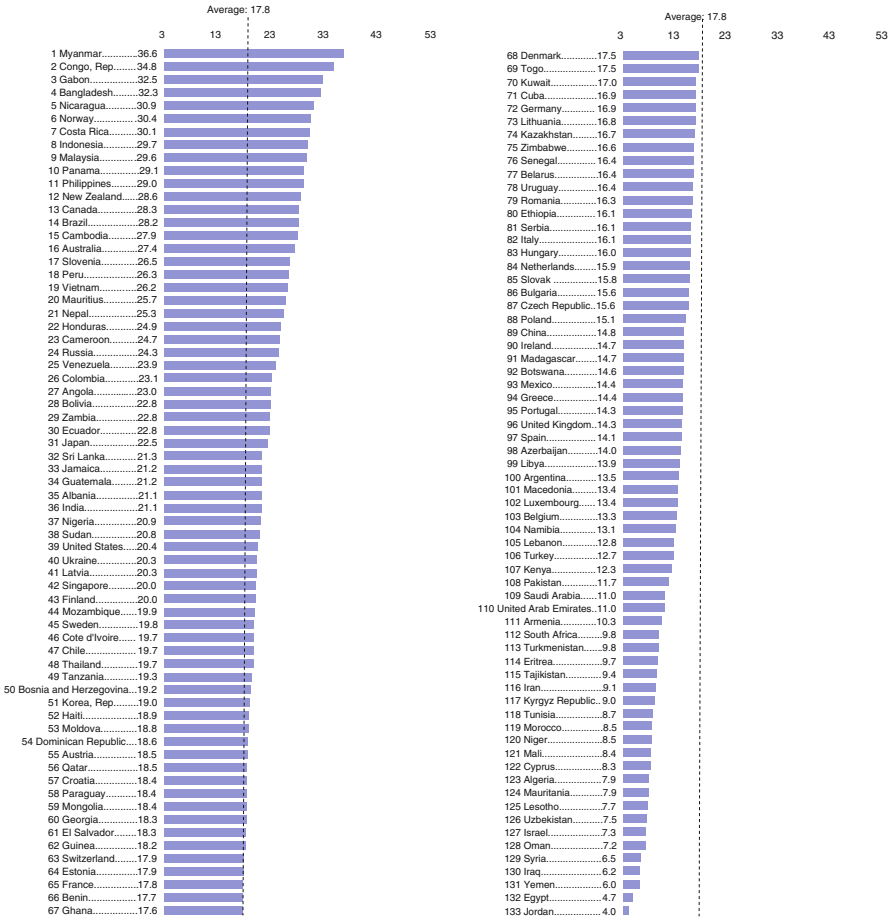

Fig. 8.2 Rankings and scores of REC 2012

to achieve the effective and rapid improvement of REC and narrow the gap with the other countries, and meanwhile, pay close attention to enhance the competitiveness of land resources and energy resources to accelerate the improvement of REC.

On individual indicators, proportion of combustible renewables and waste to total energy consumption enjoys the highest standard deviation, hitting 27.9, indicating that this indicator has very large differences among the countries and is the most primary factor causing REC differences among the countries. The indicators of total internal renewable water resources, annual precipitation, percentage of arable land to total land area and proportion of land area covered by forest also have high standard deviation, 23.7, 23.5, 23.3 and 23.3 respectively, contributing a lot to REC differences among the countries. The other indicators have relatively low standard deviation, indicating they have less influence on REC differences among the countries.

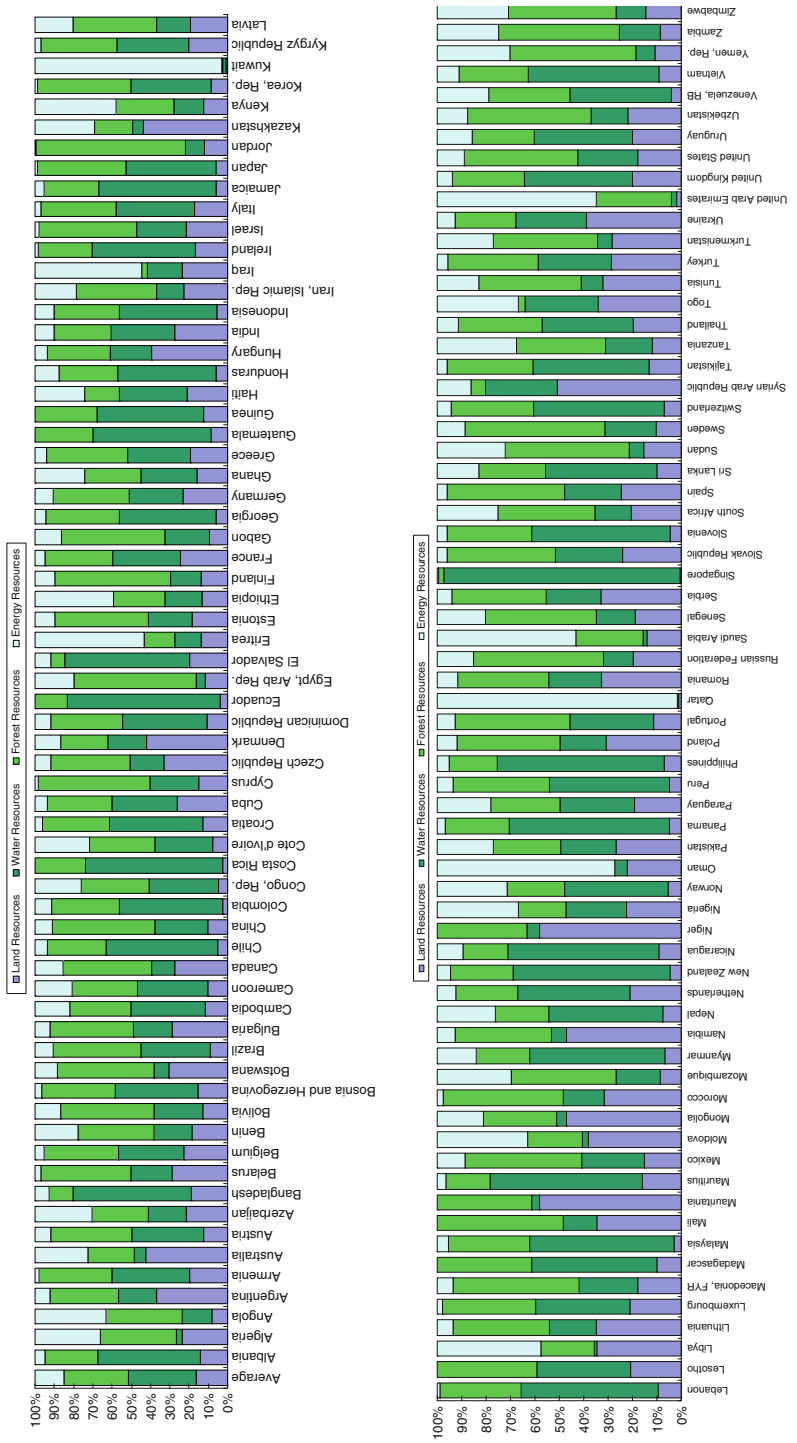

Fig. 8.3 Contribution rates of pillars of REC 2012

To analyze the contribution of the pillars to REC, firstly multiply the scores of the pillars by respective weights, then convert them into the scores at sub-index and finally divide them by the total score of sub-index to get the contribution rates of the pillars. Thus, we could find the contribution of each pillar to the sub-index more visually, as shown in Fig. 8.3.

According to Fig. 8.3, forest resources contributes the most to REC with the average contribution rate of 33.7 %; the contribution rate of water resources the next, 16.5 %; energy resources the least, 15.0 %. Some countries enjoy very high contribution rates of forest resources, even above 60 %, e.g. Egypt and Jordan. And some countries have very high contribution rates of water resources, above 60 %, e.g. Singapore, Ecuador, El Salvador and Philippines. Therefore, to enhance REC, the countries shall focus specially on the competitiveness of forest resources and water resources, while not ignoring the competitiveness of land resources and energy resources.

Chapter 9
Evaluation and Comparative Analysis on EEC

9.1 Evaluation Results of EEC

According to the evaluation indicator system and the mathematic model of EEC, the evaluation and analysis are made on EEC in 2012. Table 9.1 lists the rankings and scores of EEC in 2012 and Fig. 9.1 displays the EEC scores of the six continents as well as the top three countries of each continent in 2012.

According to Table 9.1, the countries with EEC ranking 1st–10th include Germany, Switzerland, Slovak Republic, Venezuela, RB, Austria, New Zealand, Zambia, Australia, Ecuador and United Kingdom; the 11th–20th rankings are Nicaragua, Botswana, Luxembourg, Brazil, Zimbabwe, Belgium, Poland, France, Japan and Saudi Arabia; the 21st–30th rankings are Lithuania, Netherlands, United States, Italy, Norway, Chile, Czech Republic, Sweden, Israel and Estonia; and the bottom ten countries are China, Iraq, Vietnam, Niger, Pakistan, Cameroon, Sudan, Mali, Bangladesh and India.

In 2012, the highest score of EEC is 73.0 points, the lowest score is 23.8, the average score is 49.1 and the standard deviation is 9.3. The highest score and the lowest score differ greatly with a margin of 49.2 points, the former being 3.1 times the latter. 63 countries score higher than the average point. It indicates that the overall level of EEC is rather high and the differences are rather large among the countries.

The scores of EEC show elliptical distribution. Germany and Switzerland score above 70 points; 16 countries score 60–70; 38 countries score 50–60; 54 countries score 40–50; 21 countries score 30–40; 2 countries 20–30; none scores below 20 points.

The countries with higher EEC are mainly developed countries. Among the 10 countries ranking ahead, 7 are developed countries; among the 20 countries ranking ahead, 12 are developed countries. And, the countries with lower EEC are developing countries.

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*,
Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_9,

Table 9.1 Scores and rankings of EEC as well as the tertiary and individual indicators in 2012

Indicators / Countries	EEC	Bio-diversity	Threatened fish species	Threatened mammal species	Threatened plant species	GEF benefits index for biodiversity	Ecological safeguard	Terrestrial protected areas	Marine protected areas	Air quality	Inhalable particles (PM10)	Particulate matter (PM2.5)	Index of Indoor air pollution	Nitrogen oxides emission	Sulfur dioxide emission
Germany	73.0	57.3	89.2	96.7	99.2	0.6	81.2	99.7	53.4	78.7	88.3	82.8	100.0	56.9	39.3
	1	80	62	30	67	95	3	2	2	34	23	78	1	125	103
Switzerland	70.3	59.0	95.8	98.9	99.9	0.2	67.4	67.4	NA	80.9	85.4	87.2	100.0	68.5	40.9
	2	33	24	6	30	109	7	15	NA	20	39	53	1	39	19
Slovak Republic	69.1	59.2	97.6	98.4	99.7	0.1	62.8	62.8	NA	81.2	90.5	83.8	100.0	68.3	40.7
	3	30	14	11	47	122	9	18	NA	18	12	73	1	48	57
Venezuela, RB	68.7	62.4	82.5	82.6	96.0	25.3	68.1	100.0	20.2	74.0	92.7	87.1	NA	65.8	39.9
	4	10	88	110	100	15	6	1	17	41	5	54	NA	95	91
Austria	67.9	58.7	94.8	98.4	99.5	0.3	62.0	62.0	NA	79.3	80.3	84.3	100.0	68.1	40.9
	5	45	28	11	60	105	10	19	NA	28	58	70	1	56	22
New Zealand	67.6	64.7	89.2	95.1	98.9	20.2	48.2	70.9	14.2	84.2	92.0	99.0	100.0	66.2	40.7
	6	6	62	49	78	18	17	12	21	2	7	8	1	91	59
Zambia	66.2	58.5	90.6	95.1	99.5	3.8	97.6	97.6	NA	48.4	80.3	80.9	2.3	63.6	39.6
	7	48	53	49	60	52	1	4	NA	102	58	84	116	107	95
Australia	65.7	79.1	51.4	70.1	98.4	87.7	32.1	28.5	37.5	80.8	90.5	97.3	100.0	55.5	32.8
	8	1	126	125	84	3	40	67	9	21	12	10	1	126	124
Ecuador	63.6	41.8	75.0	75.5	0.0	29.2	61.8	67.4	53.4	81.3	86.1	88.9	100.0	68.0	40.7
	9	133	106	120	133	13	11	14	1	17	36	39	1	58	61
United Kingdom	63.4	56.7	79.7	97.3	99.4	3.5	45.9	71.5	7.4	81.5	90.5	91.1	100.0	62.5	38.9
	10	90	96	22	65	55	20	10	31	15	12	29	1	116	106
Nicaragua	62.8	57.4	85.8	96.7	97.7	3.3	79.4	99.5	49.3	54.4	84.7	92.6	8.4	68.3	40.9
	11	79	76	30	94	59	4	3	3	81	42	25	97	47	23
Botswana	62.2	59.6	99.1	96.2	100.0	1.4	83.7	83.7	NA	48.1	53.3	87.6	11.9	68.4	40.7
	12	21	6	37	1	76	2	6	NA	104	114	49	88	45	60

Luxembourg	61.6	59.9	99.5	100.0	100.0	0.0	32.4	54.1	NA	84.7	91.2	100.0	100.0	68.9	41.0
	13	18	3	1	1	128	38	28	NA	1	9	1	1	8	5
Brazil	61.4	78.7	60.4	56.0	77.3	100.0	51.4	71.2	21.8	55.9	86.9	93.8	38.3	18.5	36.5
	14	2	122	130	131	1	14	11	15	78	30	19	56	130	116
Zimbabwe	60.7	59.3	98.6	95.1	99.2	1.9	75.8	75.8	NA	50.5	75.2	88.5	4.9	67.7	40.8
	15	28	9	49	70	70	5	8	NA	94	76	43	106	70	55
Belgium	60.5	58.6	94.8	98.4	100.0	0.0	37.2	37.2	NA	79.4	84.7	80.9	100.0	67.6	40.7
	16	46	28	11	1	128	27	52	NA	27	42	85	1	74	64
Poland	60.1	58.9	96.7	97.3	99.5	0.5	38.5	60.6	5.3	77.1	75.9	84.9	100.0	62.5	37.3
	17	36	20	22	56	99	25	21	39	37	75	66	1	114	113
France	60.0	56.7	79.2	95.1	98.4	5.3	38.0	44.6	28.2	78.9	91.2	79.9	100.0	58.5	39.3
	18	89	97	49	84	44	26	40	12	32	9	87	1	122	99
Japan	59.8	65.2	69.8	84.8	99.6	36.0	29.6	44.6	7.2	78.3	82.5	83.2	100.0	62.6	38.5
	19	5	113	106	51	9	46	40	32	35	53	76	1	113	107
Saudi Arabia	59.4	58.1	89.2	95.1	99.8	3.2	52.6	84.8	4.4	65.4	29.9	69.0	100.0	67.6	36.3
	20	65	62	49	40	61	12	5	44	54	127	108	1	73	117
Lithuania	59.1	59.1	97.2	98.4	100.0	0.0	29.1	39.1	14.1	81.5	88.3	87.2	100.0	68.5	40.9
	21	31	17	11	1	128	47	50	23	16	23	52	1	40	40
Netherlands	58.8	58.4	93.9	97.8	100.0	0.2	31.7	33.4	29.2	79.4	78.1	88.8	100.0	65.9	40.8
	22	54	36	17	1	109	41	58	11	26	69	41	1	94	49
United States	58.7	73.8	13.7	79.9	87.2	94.2	35.2	33.4	37.8	64.9	86.9	86.7	100.0	1.1	0.1
	23	3	132	115	122	2	32	58	8	55	30	57	1	131	130
Italy	58.3	55.6	77.8	96.2	96.4	3.8	33.6	40.8	23.0	78.8	84.7	82.5	100.0	62.9	39.7
	24	103	103	37	98	52	34	44	13	33	42	81	1	112	94
Norway	58.1	57.9	91.0	96.2	99.9	1.3	24.9	39.4	3.1	83.0	88.3	95.2	100.0	68.0	40.9
	25	68	47	37	30	78	57	49	55	8	23	13	1	60	21
Chile	57.7	61.7	90.6	89.1	98.0	15.3	28.8	44.8	4.8	76.4	66.4	87.3	100.0	67.3	37.4
	26	14	53	99	89	21	50	38	42	39	94	51	1	82	112

(continued)

Table 9.1 (continued)

Indicators / Countries	EEC	Bio-diversity	Threatened fish species	Threatened mammal species	Threatened plant species	GEF benefits index for biodiversity	Ecological safeguard	Terrestrial protected areas	Marine protected areas	Air quality	Inhalable particles (PM10)	Particulate matter (PM2.5)	Index of Indoor air pollution	Nitrogen oxides emission	Sulfur dioxide emission
Czech Republic	57.6	59.5	99.1	98.9	99.5	0.1	24.5	40.8	NA	81.0	88.3	86.3	100.0	67.1	40.3
	27	22	6	6	56	122	59	44	NA	19	23	61	1	83	83
Sweden	57.3	58.8	94.3	99.5	99.8	0.3	20.4	29.3	6.9	83.8	92.7	94.7	100.0	67.8	40.9
	28	37	35	2	43	105	67	64	33	5	5	15	1	67	42
Israel	56.9	55.3	83.0	91.8	100.0	0.8	29.0	48.1	0.4	78.9	84.7	78.9	100.0	68.6	39.5
	29	107	85	84	1	88	49	36	79	29	42	90	1	34	96
Estonia	56.6	59.5	97.6	99.5	100.0	0.1	47.1	55.2	35.1	61.5	93.4	92.9	26.1	68.8	40.6
	30	23	14	2	1	122	18	26	10	60	4	21	73	18	67
Belarus	56.6	59.4	99.1	97.8	100.0	0.0	19.3	19.3	NA	82.4	95.6	86.0	100.0	66.5	40.7
	31	25	6	17	1	128	70	79	NA	13	2	64	1	90	66
Finland	56.5	59.4	97.2	99.5	99.9	0.2	17.1	24.2	6.5	83.9	89.1	99.3	100.0	67.5	40.8
	32	24	17	2	22	109	79	74	34	4	16	7	1	77	51
Greece	55.9	52.4	64.6	94.6	97.0	2.8	27.6	43.8	3.3	79.9	80.3	88.8	100.0	67.7	39.3
	33	123	121	59	96	66	53	42	52	25	58	42	1	69	97
Cyprus	55.5	57.7	91.0	97.3	99.1	0.5	17.2	28.3	0.7	82.5	80.3	100.0	100.0	69.0	40.9
	34	73	47	22	74	99	77	68	77	12	58	1	1	7	35
Canada	55.0	64.0	83.5	93.5	99.9	21.5	12.6	20.1	1.5	80.0	89.1	89.8	100.0	60.4	34.6
	35	7	82	72	22	16	89	78	70	24	16	36	1	120	121
Colombia	54.7	62.3	74.1	70.7	87.2	39.9	42.0	56.5	20.2	58.5	86.1	86.0	27.6	64.4	40.6
	36	11	108	122	121	7	23	24	16	64	36	63	67	100	70
Malaysia	53.9	44.0	69.8	62.0	60.7	13.9	30.4	48.9	2.5	78.9	86.9	78.4	100.0	65.8	40.0
	37	130	113	128	132	23	44	34	57	31	30	92	1	96	89
Portugal	53.9	55.2	75.0	94.0	96.0	5.5	15.0	22.3	4.0	82.1	86.9	92.4	100.0	67.7	40.4
	38	108	107	64	100	43	84	76	49	14	30	26	1	68	80

Benin	53.8	56.2	87.3	94.0	99.2	0.2	64.4	64.4	NA	44.0	65.0	71.5	1.0	68.4	41.0
	39	96	71	64	67	109	8	17	NA	115	96	106	120	44	7
Jordan	53.8	57.5	93.9	92.9	99.9	0.4	18.8	4.9	39.7	77.2	78.1	75.5	100.0	68.9	40.7
	40	75	36	78	22	103	74	113	7	36	69	97	1	15	62
Bolivia	53.6	62.0	100.0	89.1	95.8	12.5	50.0	50.0	NA	50.1	58.4	85.2	17.9	65.8	40.9
	41	13	1	99	103	24	15	31	NA	96	106	65	81	97	24
Denmark	53.4	58.4	92.9	98.9	99.9	0.2	9.5	13.0	4.1	82.6	89.1	92.7	100.0	67.7	40.9
	42	51	44	6	22	109	100	100	47	11	16	24	1	71	20
Mauritius	53.4	58.4	93.9	96.7	94.9	3.3	7.3	12.0	0.3	84.1	88.3	100.0	100.0	69.0	40.9
	43	55	36	30	105	59	108	102	83	3	23	1	1	3	29
Dominican Republic	52.9	57.4	90.1	96.7	98.4	0.9	36.0	60.1	0.0	62.1	85.4	93.3	33.2	68.5	40.6
	44	78	58	30	84	84	30	22	90	57	39	20	60	37	68
Singapore	52.8	55.8	88.2	94.0	96.7	0.1	9.3	14.4	1.7	83.0	83.2	100.0	100.0	68.8	40.3
	45	102	69	64	97	122	102	95	66	9	50	1	1	20	82
Latvia	52.7	59.3	97.2	99.5	100.0	0.0	32.7	48.6	8.8	62.7	91.2	90.9	32.8	68.7	41.0
	46	29	17	2	1	128	37	35	29	56	9	31	62	26	4
Costa Rica	52.5	56.5	76.4	95.1	93.2	8.8	38.8	55.2	14.2	59.7	80.3	94.7	27.6	68.7	40.9
	47	93	105	48	108	30	24	25	20	62	57	14	66	28	16
Hungary	52.3	58.9	95.8	98.9	99.5	0.2	8.2	13.6	NA	80.5	89.1	82.4	100.0	67.5	40.6
	48	35	24	6	56	109	104	97	NA	23	16	82	1	75	73
Guatemala	52.3	58.3	88.2	91.3	95.8	8.0	52.0	75.8	16.3	48.0	62.0	86.3	6.9	67.8	40.8
	49	61	68	89	102	34	13	7	18	105	98	59	102	63	48
Qatar	52.2	58.7	94.8	98.4	100.0	0.1	4.0	6.5	0.3	83.5	85.4	100.0	100.0	69.0	40.7
	50	42	28	11	1	122	114	109	83	6	39	1	1	4	58
Spain	51.8	51.9	66.5	91.3	88.0	6.8	15.7	23.1	4.5	78.9	82.5	86.9	100.0	63.3	37.0
	51	126	119	90	118	40	82	75	43	30	53	56	1	109	115
Ireland	51.6	57.8	90.6	97.3	99.9	0.6	2.8	4.6	0.1	83.4	90.5	95.4	100.0	67.4	40.8
	52	70	53	22	22	95	119	115	88	7	12	12	1	79	54

(continued)

Table 9.1 (continued)

Indicators / Countries	EEC	Bio-diversity	Threatened fish species	Threatened mammal species	Threatened plant species	GEF benefits index for biodiversity	Ecological safeguard	Terrestrial protected areas	Marine protected areas	Air quality	Inhalable particles (PM10)	Particulate matter (PM2.5)	Index of Indoor air pollution	Nitrogen oxides emission	Sulfur dioxide emission
Turkmenistan	50.7	58.7	94.8	95.1	99.8	1.8	7.9	7.9	NA	76.8	73.7	78.6	100.0	68.1	40.6
	53	43	28	49	40	72	107	108	NA	38	82	91	1	55	74
Lebanon	50.4	56.9	89.6	94.6	99.9	0.2	0.7	1.1	0.0	82.8	81.8	100.0	100.0	68.9	40.7
	54	82	61	59	22	109	127	124	90	10	55	1	1	16	65
Argentina	50.3	59.1	82.5	79.3	98.0	17.7	9.3	14.7	1.3	74.5	58.4	90.0	100.0	58.3	40.6
	55	32	88	117	91	20	101	94	72	40	106	34	1	124	72
Jamaica	50.3	56.8	90.1	97.3	88.0	4.4	32.8	51.1	5.4	58.4	80.3	90.1	26.4	68.9	40.8
	56	84	58	22	119	50	36	29	38	65	58	33	70	13	52
Korea, Rep.	49.7	57.5	91.0	95.1	99.8	0.7	11.5	15.8	5.0	72.6	62.0	71.6	100.0	66.1	39.8
	57	77	47	49	40	92	92	91	41	44	99	105	1	93	93
Tunisia	49.6	55.4	83.5	92.9	99.6	0.5	2.5	3.3	1.5	80.5	83.2	87.7	100.0	68.5	40.4
	58	105	82	78	51	99	121	120	70	22	50	48	1	38	78
Oman	49.5	58.0	87.7	95.1	99.6	3.7	17.9	28.8	1.6	66.8	30.7	71.1	100.0	68.9	40.5
	59	67	70	49	51	54	75	66	67	51	126	107	1	10	75
Panama	49.4	56.6	80.7	91.8	88.8	10.9	32.4	50.5	5.2	56.7	67.2	94.6	26.4	68.8	40.9
	60	91	94	84	117	28	39	30	40	74	92	16	70	25	31
Russian Federation	49.4	66.8	83.5	82.6	99.5	34.1	20.4	24.5	14.2	58.1	89.1	86.9	38.3	52.7	23.4
	61	4	82	110	56	10	68	73	21	66	16	55	56	127	128
Cuba	49.1	58.5	84.0	92.4	91.0	12.5	12.6	17.1	5.7	69.6	89.1	94.0	55.9	67.7	40.3
	62	50	79	81	113	24	90	87	36	46	16	18	52	72	85
Bulgaria	49.1	57.7	91.0	96.2	99.7	0.8	16.5	24.7	4.1	67.2	70.8	84.5	NA	68.1	38.2
	63	71	47	37	47	88	80	71	47	50	87	68	NA	54	109
Iran, Islamic Rep.	48.9	58.4	86.3	91.3	99.9	7.3	12.3	19.0	2.1	69.3	59.1	62.9	100.0	63.3	35.9
	64	52	74	90	22	37	91	80	62	47	105	119	1	110	120

Romania	48.9	57.7	91.0	96.2	99.8	0.7	29.0	19.0	44.1	57.1	92.0	82.5	21.3	66.5	38.9
	65	72	47	37	43	92	48	80	4	70	7	79	77	89	105
Egypt, Arab Rep.	48.1	55.6	81.6	90.8	99.9	2.9	14.3	15.8	12.2	67.7	43.1	67.3	100.0	64.9	39.3
	66	104	90	96	30	64	87	91	26	49	121	114	1	99	98
Tanzania	48.0	42.3	17.9	81.0	83.1	14.8	49.9	74.5	13.1	50.8	86.1	88.2	0.4	64.4	40.9
	67	132	131	114	126	22	16	9	25	93	38	46	124	103	38
Slovenia	48.0	56.8	86.3	97.8	99.6	0.2	21.7	35.6	0.8	61.0	81.0	88.4	35.6	68.8	40.9
	68	85	74	17	54	109	64	55	75	61	56	45	59	21	44
Mexico	47.6	60.0	28.3	45.7	88.9	68.7	26.8	29.9	22.0	53.9	78.1	79.5	27.4	59.9	34.2
	69	17	130	132	116	5	56	63	14	83	69	88	69	121	122
Honduras	47.5	58.3	87.3	96.2	93.8	7.2	30.5	49.2	2.4	52.2	75.2	91.7	8.1	68.4	40.9
	70	58	71	37	107	38	42	33	59	85	76	28	98	43	43
Nepal	47.4	56.8	96.7	83.2	99.9	2.1	45.9	45.9	NA	41.5	80.3	41.3	2.9	68.0	40.9
	71	87	20	109	30	69	19	37	NA	122	58	129	113	57	41
Gabon	47.3	52.5	71.2	92.4	93.0	3.0	28.3	40.8	9.6	57.6	94.9	82.5	18.9	68.9	41.0
	72	122	112	81	111	63	52	44	28	69	3	80	80	9	15
United Arab Emirates	47.1	58.1	93.9	96.2	100.0	0.2	10.3	14.9	3.3	66.4	35.0	65.4	100.0	68.8	40.1
	73	66	36	37	1	109	98	93	52	53	123	116	1	22	88
Cambodia	46.7	53.1	80.2	79.9	98.3	3.5	42.1	69.8	0.4	45.3	69.3	73.6	1.4	67.8	41.0
	74	119	95	115	88	55	22	13	79	111	89	102	118	65	13
Croatia	46.6	53.8	71.7	96.2	99.7	0.6	22.8	35.1	4.4	59.2	83.9	84.8	30.2	68.4	40.8
	75	115	111	37	47	95	63	56	44	63	47	67	65	42	50
Libya	46.6	57.0	88.7	93.5	99.9	1.6	0.0	0.0	0.0	73.7	52.6	84.0	100.0	68.7	40.8
	76	81	66	72	30	73	132	130	90	43	116	72	1	27	56
Algeria	46.5	56.1	83.0	92.4	99.3	2.9	0.3	NA	0.3	73.9	49.6	88.4	100.0	68.0	40.7
	77	97	85	81	66	64	131	NA	83	42	119	44	1	61	63
Azerbaijan	46.5	58.6	95.3	96.2	100.0	0.8	19.0	19.0	NA	58.0	80.3	77.9	33.2	68.5	40.6
	78	47	27	37	1	88	71	80	NA	67	58	94	60	41	71

(continued)

Table 9.1 (continued)

Indicators / Countries	EEC	Bio-diversity	Threatened fish species	Threatened mammal species	Threatened plant species	GEF benefits index for biodiversity	Ecological safeguard	Terrestrial protected areas	Marine protected areas	Air quality	Inhalable particles (PM10)	Particulate matter (PM2.5)	Index of Indoor air pollution	Nitrogen oxides emission	Sulfur dioxide emission
Peru	46.2	62.5	90.6	70.7	84.4	33.4	23.4	36.7	3.6	51.2	69.3	86.3	14.4	67.4	37.5
	79	9	53	123	123	11	62	53	51	90	89	60	85	80	111
Mozambique	45.6	55.9	74.1	93.5	97.7	7.2	27.3	42.7	4.2	51.7	83.9	92.8	0.4	67.0	40.9
	80	99	109	72	94	38	55	43	46	88	47	23	124	86	36
Philippines	45.6	59.6	66.5	79.3	87.7	32.3	18.9	29.3	3.2	55.2	87.6	92.9	10.9	66.2	39.2
	81	20	119	117	120	12	73	64	54	79	28	22	89	92	104
Namibia	45.5	57.9	87.3	93.5	98.5	5.2	28.4	40.2	10.8	49.0	69.3	82.0	8.1	68.2	40.4
	82	69	71	72	82	45	51	47	27	100	89	83	98	52	79
Mongolia	45.5	60.4	99.5	94.0	100.0	4.2	36.1	36.1	NA	41.3	29.9	89.3	3.8	68.3	40.8
	83	15	3	64	1	51	29	54	NA	124	127	38	110	50	53
Senegal	45.4	54.3	78.8	91.3	99.5	1.0	45.7	65.2	16.3	38.4	43.8	52.0	9.7	68.1	40.9
	84	113	100	90	60	83	21	16	19	126	120	127	93	53	32
Syrian Arab Republic	45.3	55.4	84.0	91.3	99.9	0.9	1.1	1.4	0.7	70.9	60.6	63.0	100.0	67.8	40.1
	85	106	79	90	30	84	126	122	77	45	102	118	1	64	87
Cote d'Ivoire	45.3	53.4	78.8	87.5	93.8	3.4	36.7	61.1	0.0	45.7	78.1	76.1	2.2	67.4	27.1
	86	118	100	102	106	58	28	20	90	110	69	96	117	78	127
Togo	45.0	56.6	88.7	94.0	99.5	0.3	30.4	30.4	NA	47.3	80.3	73.4	0.3	68.6	41.0
	87	92	66	64	60	105	43	62	NA	107	58	103	126	33	3
Serbia	45.0	58.4	94.8	96.7	99.9	0.2	16.0	16.0	NA	56.6	100.0	80.1	15.6	68.0	38.1
	88	56	28	30	30	109	81	90	NA	75	1	86	82	59	110
Mauritania	44.9	55.9	84.9	91.8	100.0	1.3	17.7	1.1	42.5	57.0	50.4	74.5	6.9	100.0	100.0
	89	101	78	84	1	78	76	124	6	71	118	98	103	1	1
Kuwait	44.9	58.4	94.8	96.7	100.0	0.1	2.4	4.1	NA	66.5	33.6	68.0	100.0	68.9	39.3
	90	57	28	30	1	122	122	117	NA	52	124	112	1	14	102

Sri Lanka	44.8	52.6	79.2	84.2	83.5	7.9	35.4	58.2	1.3	46.1	52.6	90.9	3.6	68.6	40.5
	91	121	97	108	125	36	31	23	72	109	116	30	111	36	76
Congo, Rep.	44.8	62.0	78.3	94.0	97.8	19.9	33.5	26.9	43.4	40.4	58.4	58.0	2.5	68.3	40.8
	92	12	102	64	92	19	35	70	5	125	106	125	115	51	46
Albania	44.7	56.1	81.6	98.4	100.0	0.2	2.0	NA	2.0	68.3	72.3	84.4	NA	68.8	41.0
	93	98	90	11	1	109	123	NA	65	48	84	69	NA	19	10
Ukraine	44.1	56.8	90.1	94.0	99.1	0.5	8.1	9.2	6.4	61.6	89.1	86.2	38.3	63.4	37.1
	94	83	58	64	74	99	105	106	35	59	16	62	56	108	114
Armenia	43.9	58.8	98.6	95.1	99.9	0.2	21.5	21.5	NA	49.6	67.2	69.0	19.5	68.9	40.9
	95	38	9	49	22	109	65	77	NA	98	92	110	79	11	28
South Africa	43.9	56.7	59.0	87.0	96.2	20.7	14.5	18.5	8.5	56.3	86.9	83.4	25.6	63.9	33.2
	96	88	124	104	99	17	85	84	30	76	30	74	74	106	123
Ethiopia	43.9	58.2	93.4	82.1	98.6	8.4	29.8	49.7	NA	43.6	65.7	73.9	0.7	62.5	40.9
	97	64	41	112	80	32	45	32	NA	117	95	99	122	115	37
Macedonia, FYR	43.8	58.3	93.9	97.3	100.0	0.2	13.0	13.0	NA	55.9	87.6	87.9	14.5	68.9	41.0
	98	59	36	22	1	109	88	100	NA	77	28	47	84	12	9
Kenya	43.6	52.6	67.9	84.8	92.6	8.8	24.6	31.8	13.8	51.0	78.1	90.0	4.2	66.8	40.8
	99	120	116	106	112	31	58	61	24	91	69	35	108	88	45
Thailand	43.0	46.8	54.2	69.0	95.0	8.0	34.9	54.3	5.7	46.3	61.3	62.3	20.0	64.2	39.3
	130	53	47	84	74	47	93	103	NA	128	133	109	107	123	39
Ghana	42.5	53.5	79.2	91.3	93.2	1.9	23.8	39.7	NA	48.3	83.9	71.9	2.7	68.0	40.9
	101	116	97	90	109	70	61	48	NA	103	47	104	114	62	27
Morocco	42.0	54.7	77.8	90.2	98.4	3.5	2.9	3.8	1.6	61.9	83.2	87.3	38.7	67.8	40.0
	102	112	103	98	87	55	118	118	67	58	50	50	55	66	90
Kazakhstan	42.0	58.8	93.4	91.3	99.1	5.1	3.9	6.5	NA	57.9	86.9	83.4	30.6	65.2	32.7
	103	39	41	90	74	47	115	109	NA	68	30	75	64	98	125
Paraguay	41.9	60.1	100.0	95.7	99.5	2.8	14.4	14.4	NA	49.0	53.3	94.5	10.6	67.1	41.0
	104	16	1	46	60	66	86	95	NA	101	114	17	90	84	12

(continued)

Table 9.1 (continued)

Indicators / Countries	EEC	Bio-diversity	Threatened fish species	Threatened mammal species	Threatened plant species	GEF benefits index for biodiversity	Ecological safeguard	Terrestrial protected areas	Marine protected areas	Air quality	Inhalable particles (PM10)	Particulate matter (PM2.5)	Index of Indoor air pollution	Nitrogen oxides emission	Sulfur dioxide emission
Tajikistan	41.5	58.8	97.6	95.7	99.2	0.7	10.9	10.9	NA	51.5	78.8	62.5	22.5	68.7	40.9
	105	41	14	46	67	92	96	104	NA	89	68	120	75	30	30
Moldova	41.4	58.8	96.2	97.8	99.9	0.0	3.5	3.5	NA	56.8	73.7	86.5	27.6	68.8	41.0
	106	40	23	17	30	128	116	119	NA	73	82	58	68	17	14
Kyrgyz Republic	41.3	59.3	98.6	96.7	99.2	1.1	11.1	18.5	NA	50.4	74.5	73.9	14.2	68.7	40.9
	107	27	9	30	70	81	94	84	NA	95	79	101	86	32	26
Angola	41.2	57.6	81.6	91.8	98.0	8.3	20.1	33.4	0.0	44.7	57.7	76.1	8.9	60.7	40.9
	108	74	90	84	89	33	69	58	90	112	109	95	95	119	17
El Salvador	41.0	58.2	93.4	97.3	98.6	0.9	2.7	1.9	4.0	56.8	79.6	89.4	21.9	68.7	40.9
	109	62	41	22	80	84	120	121	49	72	66	37	76	29	25
Indonesia	40.6	54.7	34.0	0.0	77.5	81.0	23.8	38.0	2.5	42.5	56.2	84.2	8.6	42.6	36.2
	110	111	129	133	130	4	60	51	57	120	112	71	96	128	119
Uzbekistan	39.7	58.5	96.7	94.6	99.1	1.1	6.0	6.0	NA	50.9	77.4	57.4	26.3	66.9	40.3
	111	49	20	59	72	81	111	112	NA	92	74	126	72	87	84
Turkey	39.5	54.0	67.0	90.8	99.7	6.2	4.2	4.9	3.1	55.1	74.5	79.5	31.8	62.0	36.3
	112	114	118	96	47	41	113	113	55	80	79	89	63	118	118
Georgia	39.1	58.3	95.8	94.6	100.0	0.6	6.0	9.8	0.4	49.5	64.2	82.9	12.3	68.6	41.0
	113	60	24	59	1	95	110	105	79	99	97	77	87	35	11
Nigeria	39.1	52.0	72.2	85.9	90.0	6.0	20.8	34.5	0.1	43.2	72.3	58.8	4.2	64.4	40.4
	114	125	110	105	115	42	66	57	88	118	84	122	108	102	77
Bosnia and Herzegovina	39.0	56.8	85.4	97.8	100.0	0.4	1.1	1.4	0.8	54.2	84.7	88.9	10.3	68.8	40.3
	115	86	77	17	1	103	125	122	75	82	42	40	92	24	81
Lesotho	39.0	59.8	99.5	98.9	99.8	0.3	0.7	1.1	NA	52.1	72.3	90.1	5.0	69.0	NA
	116	19	3	6	43	105	127	124	NA	86	84	32	105	2	NA

Madagascar	38.2	53.4	59.9	64.7	84.1	29.2	4.9	8.2	0.0	51.9	79.6	97.3	0.1	69.0	40.8
	117	117	123	127	124	14	112	107	90	87	66	9	129	6	47
Uruguay	38.2	55.9	83.0	94.0	100.0	1.2	0.4	0.5	0.3	53.2	18.2	97.2	46.2	67.5	40.9
	118	100	85	64	1	80	129	128	83	84	131	11	53	76	18
Haiti	37.9	59.3	90.6	97.3	98.5	5.2	0.3	0.5	NA	50.0	74.5	91.7	1.0	68.7	41.0
	119	26	53	22	83	45	130	128	NA	97	79	27	120	31	8
Eritrea	37.4	57.5	91.5	94.6	99.8	0.8	8.0	13.3	NA	44.3	55.5	73.9	6.7	68.8	41.0
	120	76	45	59	43	88	106	98	NA	114	113	100	104	23	6
Myanmar	36.8	55.0	81.6	75.5	97.8	10.0	10.2	16.8	0.3	43.1	70.8	66.0	0.7	62.4	40.9
	121	109	90	121	92	29	99	88	83	119	87	115	122	117	34
Guinea	36.5	52.1	69.3	88.0	98.7	2.3	10.9	18.2	NA	44.0	59.9	78.2	0.3	67.3	41.0
	122	124	115	101	79	68	95	86	NA	116	104	93	126	81	2
Yemen, Rep.	36.3	56.3	89.2	95.1	90.8	3.2	1.6	1.1	2.3	47.5	75.2	58.4	14.8	68.3	40.3
	123	94	62	49	114	61	124	124	60	106	76	124	83	46	86
China	36.1	63.5	46.7	59.2	78.2	66.6	27.5	44.8	1.6	22.0	56.9	37.0	10.6	0.0	0.0
	124	8	128	129	128	6	54	38	67	132	110	130	90	132	131
Iraq	35.2	58.2	94.8	92.9	100.0	1.6	0.0	0.0	NA	44.5	35.8	43.0	41.9	68.3	39.3
	125	63	28	78	1	73	132	130	NA	113	122	128	54	49	101
Vietnam	35.2	51.2	67.9	70.7	93.1	12.1	10.8	16.6	2.1	41.6	60.6	58.6	7.1	64.1	39.9
	126	127	116	123	110	27	97	89	62	121	102	123	101	105	92
Niger	34.9	58.7	98.1	93.5	99.9	0.9	19.0	19.0	NA	29.0	29.9	69.0	0.1	NA	32.0
	127	44	13	72	30	84	71	80	NA	129	127	111	129	NA	126
Pakistan	34.9	56.2	84.0	87.5	99.9	4.9	17.2	27.2	2.3	32.1	33.6	36.6	9.2	63.3	38.5
	128	95	79	102	30	49	78	69	60	127	124	131	94	111	108
Cameroon	34.8	45.9	47.2	79.3	77.9	12.5	15.0	24.7	0.4	41.4	56.9	64.4	3.1	67.1	40.9
	129	129	127	117	129	24	83	71	79	123	110	117	112	85	33
Sudan	32.9	58.4	91.0	91.8	99.1	5.1	11.1	11.1	NA	30.1	0.0	69.0	4.7	58.4	40.9
	130	53	47	84	74	47	93	103	NA	128	133	109	107	123	39

(continued)

Table 9.1 (continued)

Indicators / Countries	EEC	Bio-diversity	Threatened fish species	Threatened mammal species	Threatened plant species	GEF benefits index for biodiversity	Ecological safeguard	Terrestrial protected areas	Marine protected areas	Air quality	Inhalable particles (PM10)	Particulate matter (PM2.5)	Index of Indoor air pollution	Nitrogen oxides emission	Sulfur dioxide emission
Mali	30.7	58.9	98.6	93.5	99.6	1.5	6.3	6.3	NA	27.8	19.0	68.0	0.3	69.0	NA
	131	34	9	72	54	75	109	111	NA	130	130	113	126	4	NA
Bangladesh	27.9	55.0	91.5	81.5	99.1	1.4	3.1	4.6	0.9	26.2	16.1	34.1	1.4	64.4	40.6
	132	110	45	113	72	76	117	115	74	131	132	132	118	101	69
India	23.8	42.3	0.0	48.9	83.0	39.9	8.8	13.3	2.1	21.2	62.0	0.0	7.5	23.4	20.1
	133	131	133	131	127	8	103	98	62	133	99	133	100	129	129
Highest score	**73.0**	**79.1**	**100.0**	**100.0**	**100.0**	**100.0**	**97.6**	**100.0**	**53.4**	**84.7**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Lowest score	**23.8**	**41.8**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**21.2**	**0.0**	**0.0**	**0.1**	**0.0**	**0.0**
Average score	**49.1**	**57.5**	**83.1**	**89.8**	**95.8**	**9.4**	**24.9**	**32.9**	**9.8**	**60.9**	**72.5**	**80.7**	**48.4**	**64.9**	**39.3**
Standard deviation	**9.3**	**4.9**	**17.3**	**12.9**	**10.4**	**18.5**	**20.1**	**24.9**	**13.4**	**16.1**	**19.3**	**15.4**	**42.7**	**10.8**	**7.8**

Fig. 9.1 EEC scores of six continents & top three countries of each continent in 2012

To compare and analyze the EEC levels of all the countries in a more visual way, the EEC scores are displayed in Fig. 9.2. According to Fig. 9.2, the EEC scores of the countries are concentrated, mostly in 40–70 points (up to 108 countries, accounting for 81.20 % of the total). Among the developed countries, Germany scores the highest, 73.0 points; among the developing countries, Venezuela scores the highest, 68.7 points. They has little difference. However, among the developed countries, United Arab Emirates scores the lowest, 47.1 points; among the developing countries, India scores the lowest, 23.8 points. They have large difference.

9.2 Factor Scores and Contribution Rates of EEC

Table 9.1 lists the evaluation results of the subordinate indicators of EEC and displays the scores and rankings of 3 pillars and 11 individual indicators of EEC in 2012 so as to analyze the influences of the pillars and individual indicators on EEC of the countries.

On pillars, ecological safeguard enjoys very high standard deviation, hitting 20.1, indicating that this indicator has a large difference among the countries and is the most primary factor causing EEC differences among the countries. The indicator of air quality also has relatively high standard deviation. The indicator of biodiversity has a low standard deviation, only 4.9, contributing little to EEC differences among the countries. Overall, the countries have large differences on the overall levels of EEC. Such differences are mainly caused by the differences of ecological safeguard and air quality, while biodiversity has very little influence. Hereafter, all

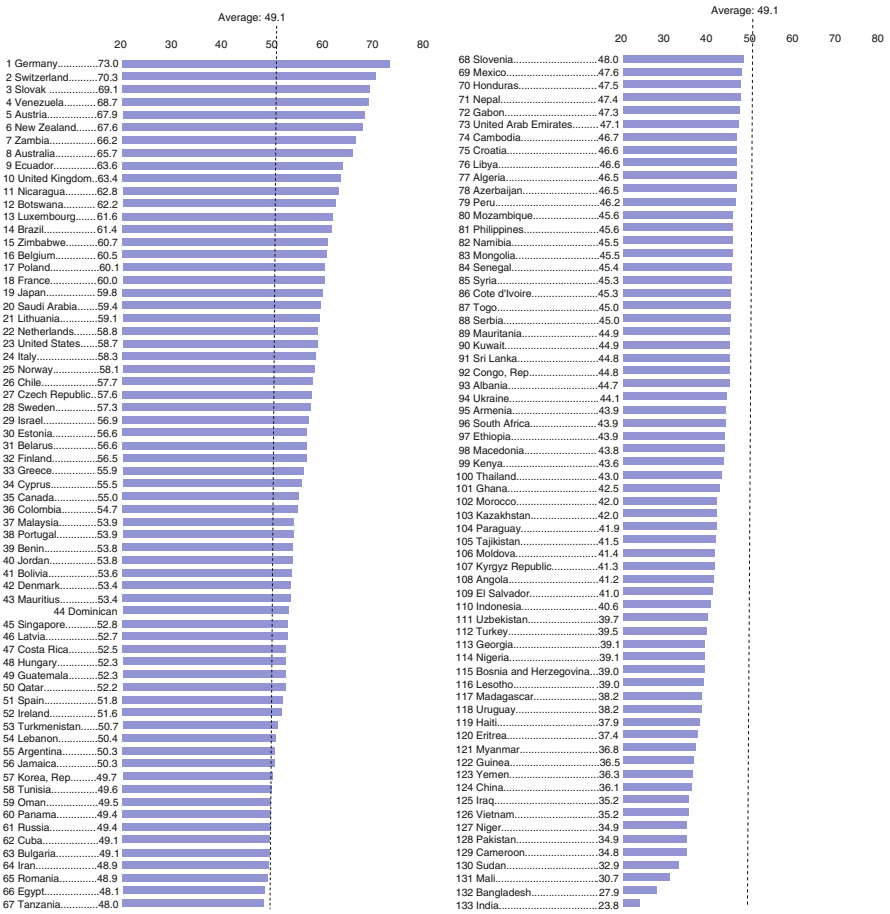

Fig. 9.2 Rankings and scores of EEC 2012

the countries shall keep on great efforts in ecological safeguard and air quality, to achieve the effective and rapid improvement of EEC and narrow the gap with the other countries, and meanwhile, pay close attention to enhance the competitiveness of biodiversity to accelerate the improvement of EEC.

On individual indicators, index of indoor air pollution enjoys the highest standard deviation, hitting 42.7, indicating that this indicator has the largest difference among the countries and is the most primary factor causing EEC differences among the countries. Terrestrial protected areas and inhalable particles (PM10) also have high standard deviation, 24.9 and 19.3 respectively, also contributing a lot to EEC differences among the countries. The other indicators have low standard deviation, indicating they have little influence on EEC differences among the countries.

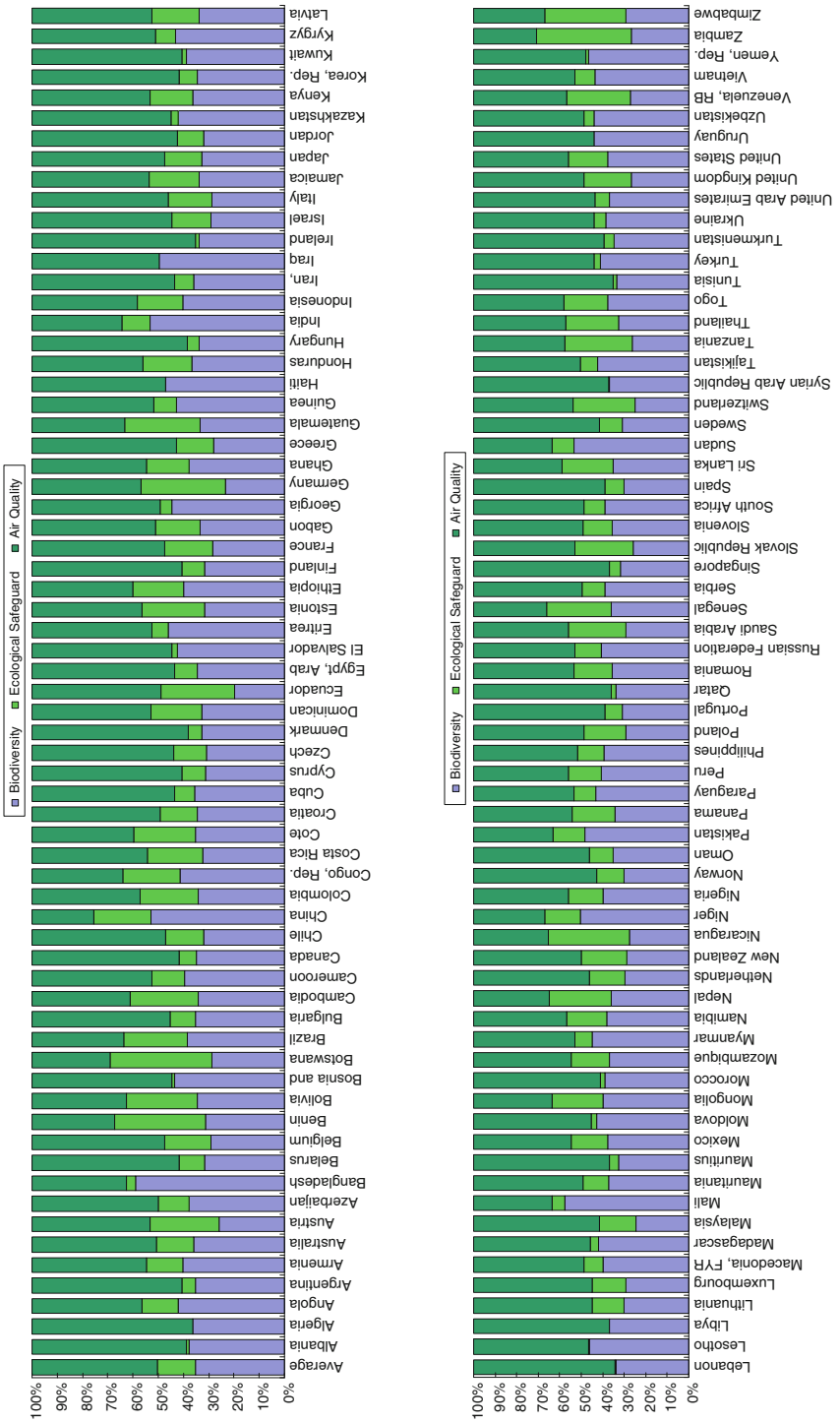

Fig. 9.3 Contribution rates of pillars of EEC 2012

To analyze the contribution of the pillars to EEC, firstly multiply the scores of the pillars by respective weights, then convert them into the scores at sub-index and finally divide them by the total score of sub-index to get the contribution rates of the pillars. Thus, we could find the contribution of each pillar to the sub-index more visually, as shown in Fig. 9.3.

According to the figure, air quality and biodiversity have high contribution rates to EEC: the former of 49.6 % and the latter of 35.2 %. The contribution rate of ecological safeguard is relatively lower, 15.2 %. Therefore, to enhance EEC, the countries shall focus specially on air quality and biodiversity, while not ignoring ecological safeguard.

Chapter 10
Evaluation and Comparative Analysis on ECC

10.1 Evaluation Results of ECC

According to the evaluation indicator system and the mathematic model of ECC, the evaluation and analysis are made on ECC in 2012. Table 10.1 lists the rankings and scores of ECC in 2012 and Fig. 10.1 displays the ECC scores of the six continents as well as the top three countries of each continent in 2012.

According to Table 10.1, the countries with ECC ranking 1st–10th include Madagascar, France, Guinea, Mauritius, Mali, Germany, Switzerland, Mauritania, Uruguay and Slovak Republic; the 11th–20th rankings are United States, Belgium, Morocco, United Kingdom, Sweden, El Salvador, Haiti, Argentina, Croatia and Slovenia; the 21st–30th rankings are Norway, Netherlands, Denmark, Greece, Ethiopia, Spain, Italy, Austria, Romania and South Africa; and the bottom ten countries are Kazakhstan, Kuwait, Jordan, Moldova, Mongolia, Niger, Estonia, Qatar, United Arab Emirates and Singapore.

In 2012, the highest score of ECC is 82.4 points, the lowest score is 43.1, the average score is 67.0 and the standard deviation is 5.3 The highest score and the lowest score differ largely with the margin of 39.3 points. 68 countries score higher than the average point. It indicates that the overall level of ECC is rather high and the differences are very little among the countries except for individual countries.

The scores of ECC show even distribution with little differences among the countries. Only one country scores above 80 points, namely Madagascar; 36 countries score 70–80; 84 countries score 60–70; 10 countries score 50–60; 2 countries score 40–50; and no country scores below 40 points.

The countries with higher ECC are almost equally divided between developed and developing countries. Among the 30 countries ranking ahead, there are 16 developed country and 14 developing countries. However, some developed countries' scores are very low on ECC. Among the 10 countries ranking behind (No. 124–133), 4 are developed countries, of which, they also rank in the last 4 places (No. 130–133), namely Estonia, Qatar, United Arab Emirates and Singapore.

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*,
Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_10,

Table 10.1 Scores and rankings of ECC as well as the tertiary and individual indicators in 2012

Indicators / Countries	ECC	Agri-cultural carrying	Cereal yield per unit of arable land	Fertilizer consum-ption per unit of arable land	Annual freshwater withdrawals for agriculture per unit of arable land	Indus-trial carrying	Net exports of goods as a percentage of GDP	Electric power consum-ption per unit of value added of industry	SO_2 emissions per unit of value added of industry
Madagascar	82.4	69.9	29.5	99.8	93.8	93.6	90.6	N/A	99.0
	1	46	65	10	100	39	19	N/A	119
France	77.6	86.7	75.9	88.0	99.7	92.5	86.8	90.1	100.0
	2	4	6	93	40	52	35	84	26
Guinea	77.6	64.4	11.7	100.0	99.3	93.2	79.6	96.6	100.0
	3	92	107	3	54	47	72	21	8
Mauritius	76.0	54.9	7.1	83.1	90.4	95.3	87.4	N/A	99.6
	4	125	119	106	110	14	31	N/A	93
Mali	75.7	65.1	14.0	99.7	98.7	90.4	84.2	N/A	N/A
	5	80	101	12	67	80	51	N/A	N/A
Germany	75.2	84.2	71.6	85.3	100.0	91.6	74.0	95.7	100.0
	6	5	10	98	2	66	91	27	13
Switzerland	74.7	81.1	64.5	84.6	99.8	93.3	77.5	96.9	100.0
	7	8	13	102	30	44	84	18	4
Mauritania	74.5	61.0	6.5	99.7	94.9	87.7	64.9	N/A	100.0
	8	111	121	15	94	97	110	N/A	1
Uruguay	74.5	73.5	43.8	89.4	97.3	93.2	82.9	91.3	99.9
	9	28	34	88	79	46	56	69	31
Slovak Republic	73.6	72.9	38.2	92.3	100.0	85.1	48.2	93.5	99.9
	10	30	47	76	8	111	129	49	32
United States	73.4	86.7	74.7	91.2	98.2	93.7	93.8	89.9	99.9
	11	3	7	84	72	36	7	86	48
Belgium	73.1	90.9	100.0	69.7	99.9	81.7	41.0	92.7	100.0
	12	2	1	118	18	122	132	59	21
Morocco	72.9	64.8	13.3	98.3	100.0	92.4	78.2	92.4	99.6
	13	85	105	37	12	54	82	60	95
United Kingdom	72.5	83.8	74.3	80.7	99.7	95.1	87.7	93.8	100.0
	14	6	8	110	39	18	30	43	27
Sweden	72.4	77.0	46.8	94.4	99.9	91.8	78.0	90.8	100.0
	15	18	32	68	16	61	83	73	9
El Salvador	72.2	67.9	27.5	91.3	98.3	93.5	85.5	93.4	99.9
	16	57	68	82	71	43	41	51	50
Haiti	72.0	62.0	6.9	98.8	98.6	95.6	90.6	98.0	99.8
	17	103	120	33	68	12	18	9	74
Argentina	72.0	79.7	51.5	97.9	99.1	94.2	88.2	92.2	100.0
	18	11	25	41	58	28	29	62	25
Croatia	71.7	77.1	57.7	80.0	100.0	94.0	86.5	90.5	99.9
	19	17	20	113	6	31	37	77	57

Annual freshwater withdrawals for industry per value added of industry	**Energy consumption**	Energy consumption per unit of land area	Ratio of clean energy consumption	Elasticity of energy consumption	Elasticity of electric power consumption	**Greenhouse gas**	Growth rate of CO_2 emissions	Growth rate of Methane emissions	CO_2 emissions per unit of land area	CO_2 emissions per unit of energy consumption
91.2	N/A	N/A	0.0	N/A	N/A	84.4	76.7	N/A	100.0	N/A
111	N/A	N/A	116	N/A	N/A	2	7	N/A	5	N/A
93.2	51.6	99.0	75.0	15.5	17.1	67.5	56.7	59.6	99.3	65.3
102	4	110	2	17	15	31	47	59	106	28
96.5	0.0	N/A	0.0	N/A	N/A	73.7	60.6	N/A	100.0	N/A
77	127	N/A	116	N/A	N/A	13	36	N/A	10	N/A
99.0	N/A	N/A	0.0	N/A	N/A	78.8	69.2	N/A	98.0	N/A
38	N/A	N/A	116	N/A	N/A	5	18	N/A	119	N/A
96.5	N/A	N/A	0.0	N/A	N/A	69.5	54.2	N/A	100.0	N/A
78	N/A	N/A	116	N/A	N/A	23	55	N/A	1	N/A
96.9	50.0	98.0	22.3	22.2	57.7	62.0	56.4	62.1	97.6	37.5
72	5	117	29	5	3	63	48	37	123	79
98.9	47.7	98.6	66.9	14.6	10.7	64.1	52.7	59.8	98.8	56.4
42	7	114	4	27	65	49	61	56	115	39
98.1	N/A	N/A	0.0	N/A	N/A	75.1	62.7	N/A	100.0	N/A
57	N/A	N/A	116	N/A	N/A	10	30	N/A	3	N/A
98.8	36.0	100.0	19.0	14.2	11.0	86.2	100.0	70.9	100.0	60.0
47	38	24	35	41	51	1	1	10	33	33
98.8	70.0	99.2	41.9	51.4	87.4	61.1	48.0	62.2	99.2	47.9
45	2	107	16	2	2	72	79	36	108	52
91.2	35.4	99.5	20.2	13.5	8.5	61.2	52.6	66.5	99.3	34.7
113	42	98	32	96	111	71	62	18	105	88
93.2	45.7	95.7	37.1	21.0	28.9	61.0	47.6	59.4	96.1	54.2
101	9	123	18	6	6	74	80	66	126	43
99.5	75.7	99.9	2.9	100.0	100.0	53.0	43.1	54.5	99.9	24.3
22	1	37	82	1	1	121	97	90	52	111
98.8	34.8	98.2	16.8	13.3	10.8	59.5	51.9	60.3	97.8	35.7
44	48	116	38	103	56	85	66	54	122	86
98.5	49.0	99.7	73.2	13.1	10.2	59.5	26.0	68.0	99.9	77.9
49	6	75	3	107	86	84	127	15	55	15
95.2	43.1	99.6	48.1	14.4	10.4	76.1	74.6	67.3	99.7	64.2
91	17	90	10	32	78	8	11	17	80	29
94.0	41.9	99.8	1.2	19.3	47.5	81.8	85.0	61.0	99.9	77.8
95	19	57	97	8	4	3	2	49	47	16
96.3	34.1	99.9	11.6	14.2	10.6	65.0	54.6	77.2	99.9	38.8
81	60	27	49	44	76	43	52	4	44	76
99.2	34.6	99.7	11.6	13.8	13.2	67.1	69.8	55.8	99.6	40.3
29	52	84	48	77	24	34	16	86	88	70

(continued)

Table 10.1 (continued)

Indicators / Countries	ECC	**Agri-cultural carrying**	Cereal yield per unit of arable land	Fertilizer consum-ption per unit of arable land	Annual freshwater withdrawals for agriculture per unit of arable land	**Indus-trial carrying**	Net exports of goods as a percentage of GDP	Electric power consum-ption per unit of value added of industry	SO_2 emissions per unit of value added of industry
Slovenia	71.6	79.4	63.2	80.4	100.0	87.1	63.5	92.0	99.9
	20	13	14	112	5	102	113	65	41
Norway	71.5	70.4	38.7	84.5	98.4	93.2	79.2	94.5	100.0
	21	43	45	103	69	45	76	40	3
Netherlands	71.5	91.2	92.6	80.5	99.9	87.2	59.8	95.1	100.0
	22	1	3	111	20	100	117	33	11
Denmark	71.3	82.4	62.3	91.7	99.9	93.6	78.5	95.9	100.0
	23	7	15	79	25	40	81	26	10
Greece	71.2	76.9	51.2	93.2	94.8	95.7	93.3	90.4	99.7
	24	19	26	73	95	10	9	78	84
Ethiopia	70.8	65.5	14.7	99.4	99.5	93.6	94.6	81.5	99.4
	25	78	100	25	47	41	6	111	106
Spain	70.8	69.8	32.3	92.2	97.6	94.1	87.3	92.1	99.9
	26	48	59	78	75	30	34	63	56
Italy	70.8	78.2	57.2	89.0	95.5	93.9	84.9	94.8	100.0
	27	14	21	90	90	33	45	37	17
Austria	70.8	80.5	56.3	93.3	99.9	91.5	74.3	94.8	100.0
	28	9	22	72	22	70	90	36	5
Romania	70.7	72.1	33.4	96.1	99.8	90.9	79.1	93.1	99.6
	29	34	55	58	32	74	77	52	90
South Africa	70.6	75.6	42.8	96.0	99.0	91.9	85.6	83.6	99.3
	30	24	36	59	62	59	40	107	109
Dominican Republic	70.3	75.5	43.6	97.8	95.7	96.5	93.1	93.5	99.8
	31	25	35	42	89	5	11	48	71
Canada	70.2	72.9	35.2	96.2	99.8	91.7	83.6	91.4	99.9
	32	32	51	55	31	65	53	67	51
Myanmar	70.2	74.9	40.8	99.6	95.8	98.3	100.0	96.3	99.9
	33	26	40	17	87	1	1	24	37
Ireland	70.2	80.2	79.4	61.4	99.9	90.0	63.6	97.4	100.0
	34	10	4	121	23	82	112	12	20
Japan	70.2	72.9	61.9	81.0	79.6	96.2	91.2	95.0	100.0
	35	31	16	108	124	6	15	35	12
Armenia	70.1	65.0	19.2	97.6	93.4	90.8	91.8	79.4	99.5
	36	82	88	46	102	76	13	112	103
Portugal	70.0	67.5	34.9	87.1	91.4	92.6	84.3	90.9	99.9
	37	60	52	94	107	51	48	70	54
Guatemala	69.9	65.6	21.7	91.3	98.3	95.2	86.1	98.1	98.7
	38	77	84	81	70	16	38	8	121

Annual freshwater withdrawals for industry per value added of industry	**Energy consumption**	Energy consumption per unit of land area	Ratio of clean energy consumption	Elasticity of energy consumption	Elasticity of electric power consumption	**Greenhouse gas**	Growth rate of CO_2 emissions	Growth rate of Methane emissions	CO_2 emissions per unit of land area	CO_2 emissions per unit of energy consumption
93.0	44.1	99.2	46.6	14.6	15.9	64.2	58.4	61.7	99.2	43.3
103	14	106	11	25	16	45	41	41	110	63
99.2	47.1	99.8	66.1	12.6	10.0	65.2	47.4	61.4	99.9	69.8
32	8	66	5	114	95	41	81	43	59	23
93.8	32.0	94.7	3.4	16.7	13.1	57.8	46.5	62.5	93.8	39.9
98	85	124	78	11	26	100	84	35	129	71
99.9	29.7	99.0	5.6	8.4	5.8	63.0	59.4	63.0	98.8	34.1
7	123	109	67	124	118	59	38	34	116	91
99.6	32.0	99.5	5.2	13.5	9.6	65.2	76.3	57.4	99.3	16.5
17	87	92	69	94	101	42	8	76	107	121
98.9	34.3	99.9	1.7	14.6	20.9	81.2	75.9	54.1	100.0	100.0
43	57	35	90	26	10	4	9	93	11	1
97.0	38.3	99.5	26.9	14.2	12.8	69.7	72.6	59.8	99.4	44.0
70	30	99	26	42	28	20	14	58	100	61
95.7	34.3	98.8	10.1	15.2	13.3	61.4	55.5	60.4	98.5	37.1
86	56	112	55	19	22	67	50	53	117	80
96.7	39.3	99.1	20.4	18.0	19.6	56.6	39.6	59.5	99.1	45.5
74	27	108	31	9	12	107	109	64	113	58
91.8	39.3	99.7	21.9	14.5	21.1	69.6	70.5	64.8	99.6	42.3
109	26	83	30	29	8	21	15	24	87	65
99.2	32.4	99.8	4.2	14.4	11.0	69.2	74.8	65.1	99.7	31.5
31	73	69	72	31	49	24	10	23	81	99
99.6	31.4	99.6	2.7	13.8	9.6	62.1	54.6	61.2	99.6	40.4
16	96	87	87	75	102	62	51	44	90	68
92.1	40.6	99.9	37.1	14.1	11.3	63.7	55.9	63.4	99.9	43.1
107	23	28	19	46	41	52	49	31	43	64
97.1	31.8	100.0	4.1	14.3	8.8	59.6	26.7	56.3	100.0	88.2
68	91	22	73	38	110	82	124	84	19	9
99.0	32.2	99.6	4.0	14.2	11.2	63.7	62.9	66.3	99.4	27.1
40	78	91	75	43	45	51	28	19	103	107
98.8	37.4	97.1	30.0	13.5	9.1	60.0	50.8	63.6	96.5	38.2
48	34	119	22	95	108	79	74	29	124	78
92.6	44.7	99.8	54.0	15.0	10.1	72.0	73.0	57.0	99.8	57.0
105	11	58	7	21	89	15	12	78	64	38
95.5	34.4	99.5	11.3	13.3	13.7	75.3	82.9	65.8	99.4	45.6
90	54	100	50	100	18	9	3	21	98	57
98.0	31.5	99.8	3.0	12.9	10.3	76.9	76.7	52.3	99.9	75.3
58	95	63	79	110	82	7	6	103	50	19

(continued)

Table 10.1 (continued)

Indicators / Countries	ECC	Agri-cultural carrying	Cereal yield per unit of arable land	Fertilizer consum-ption per unit of arable land	Annual freshwater withdrawals for agriculture per unit of arable land	Indus-trial carrying	Net exports of goods as a percentage of GDP	Electric power consum-ption per unit of value added of industry	SO_2 emissions per unit of value added of industry
Albania	69.8	76.9	49.5	92.8	97.4	86.1	90.6	72.2	99.8
	39	20	29	74	78	105	20	117	68
Cameroon	69.8	65.8	15.1	99.4	99.8	97.0	94.9	94.4	99.9
	40	73	97	21	29	4	5	41	55
Togo	69.6	63.6	9.2	99.7	100.0	93.7	85.2	90.6	99.8
	41	98	114	13	13	35	44	75	59
Gabon	69.5	66.1	15.9	99.5	99.8	95.7	83.3	99.7	100.0
	42	71	94	19	37	11	55	5	18
Brazil	69.2	73.4	41.6	89.9	99.3	96.2	93.5	93.6	99.9
	43	29	38	86	53	7	8	45	35
Indonesia	69.2	74.1	50.8	85.3	94.0	94.8	84.8	96.9	99.9
	44	27	27	97	98	21	46	17	53
Benin	69.1	64.6	11.6	100.0	100.0	94.4	90.8	91.4	99.8
	45	86	108	2	10	26	17	68	70
Finland	68.8	69.8	31.2	91.3	100.0	91.7	81.1	88.4	100.0
	46	47	61	83	9	63	66	90	24
Paraguay	68.7	72.3	34.8	94.6	99.9	91.6	84.8	82.8	99.9
	47	33	53	67	24	67	47	108	43
Nepal	68.7	66.8	21.7	99.9	93.8	95.3	97.0	87.1	99.3
	48	64	85	6	99	15	3	95	111
Oman	68.5	76.4	97.2	80.9	44.2	89.1	58.9	97.6	99.9
	49	22	2	109	128	89	118	10	42
Mexico	68.3	71.8	35.3	95.8	96.3	93.5	80.9	95.6	99.8
	50	39	50	60	84	42	68	28	65
Hungary	68.3	77.8	49.5	93.5	99.9	81.8	49.2	92.3	99.9
	51	15	30	71	21	121	127	61	46
Sudan	68.2	59.3	0.9	99.4	97.3	98.1	97.5	96.8	99.9
	52	121	131	23	80	2	2	20	36
Venezuela, RB	68.2	71.0	41.4	83.8	97.7	94.5	81.7	96.9	100.0
	53	41	39	105	74	25	65	19	28
Cambodia	68.1	71.9	30.9	99.4	99.2	89.7	66.9	93.4	99.8
	54	36	63	20	55	85	106	50	64
New Zealand	68.0	58.3	79.2	0.4	88.5	93.8	85.4	90.4	99.9
	55	123	5	129	114	34	43	80	33
Colombia	68.0	62.4	39.3	59.3	96.3	97.3	89.0	100.0	100.0
	56	101	43	123	83	3	26	2	2
Chile	67.9	71.9	72.8	51.8	90.8	92.7	79.3	95.1	99.6
	57	37	9	125	109	50	75	34	99

Annual freshwater withdrawals for industry per value added of industry	**Energy consumption**	Energy consumption per unit of land area	Ratio of clean energy consumption	Elasticity of energy consumption	Elasticity of electric power consumption	**Greenhouse gas**	Growth rate of CO_2 emissions	Growth rate of Methane emissions	CO_2 emissions per unit of land area	CO_2 emissions per unit of energy consumption
81.7	44.3	99.8	45.0	14.0	18.2	60.2	46.0	56.8	99.8	52.3
123	12	53	12	59	13	76	86	80	62	44
98.9	33.3	100.0	8.5	11.3	13.4	71.3	49.2	73.8	100.0	84.2
41	66	15	58	121	21	17	78	7	17	12
99.2	37.3	99.9	0.5	11.5	N/A	75.0	53.2	76.4	100.0	92.1
33	35	45	106	120	N/A	11	60	5	26	7
99.9	33.2	100.0	7.2	14.0	11.7	71.5	44.5	100.0	100.0	68.8
8	67	8	61	63	35	16	92	1	16	26
97.9	37.7	99.9	26.6	13.7	10.6	53.9	26.6	53.7	99.9	62.5
62	32	33	27	79	72	119	125	95	39	32
97.7	34.7	99.8	14.3	14.0	10.7	57.7	42.8	55.7	99.7	47.6
63	50	71	42	62	67	101	98	87	75	53
95.7	43.4	99.9	0.0	30.4	N/A	63.4	40.9	66.0	100.0	69.1
87	16	34	116	3	N/A	55	106	20	35	25
97.6	45.5	99.7	37.3	19.9	25.1	55.8	27.2	70.3	99.8	54.7
65	10	73	17	7	7	110	123	11	68	42
98.8	41.5	100.0	N/A	13.8	10.6	56.3	28.9	47.3	100.0	76.4
46	22	12	N/A	71	75	109	122	121	18	18
97.9	32.3	99.9	4.6	14.0	10.8	68.0	43.7	58.4	100.0	94.3
60	76	51	70	55	60	28	95	69	28	5
100.0	30.7	99.9	0.0	12.3	10.6	63.5	59.1	52.8	99.9	46.5
5	112	48	116	117	73	53	39	102	61	54
97.9	33.9	99.8	10.8	14.0	10.9	59.7	50.8	60.2	99.8	37.1
61	61	62	54	54	53	81	73	55	74	81
85.9	36.6	99.4	28.7	12.0	6.3	65.3	57.1	63.2	99.4	49.6
121	37	104	25	119	117	40	46	33	101	48
98.2	31.9	100.0	3.0	14.1	10.6	73.0	57.3	70.1	100.0	80.2
56	88	6	81	50	71	14	45	12	12	14
99.4	35.8	99.8	19.7	13.5	10.2	57.0	40.5	68.2	99.8	36.0
25	40	60	33	92	85	106	107	14	70	85
98.5	30.1	99.9	0.1	13.8	6.6	68.0	53.4	50.0	100.0	83.1
52	120	30	110	72	116	29	58	113	25	13
99.3	43.9	99.9	50.8	13.9	11.1	67.8	62.7	58.2	99.9	55.7
27	15	49	8	67	48	30	29	70	56	40
100.0	34.1	99.9	10.9	13.9	11.7	66.2	58.4	52.8	99.9	50.1
2	59	31	51	68	34	39	42	101	42	46
96.8	34.5	99.9	12.9	13.9	11.3	58.3	45.5	61.1	99.9	39.6
73	53	40	43	66	43	95	89	46	49	74

(continued)

Table 10.1 (continued)

Indicators / Countries	ECC	**Agri-cultural carrying**	Cereal yield per unit of arable land	Fertilizer consum-ption per unit of arable land	Annual freshwater withdrawals for agriculture per unit of arable land	**Indus-trial carrying**	Net exports of goods as a percentage of GDP	Electric power consum-ption per unit of value added of industry	SO_2 emissions per unit of value added of industry
Tanzania	67.6	63.9	10.8	99.3	99.4	95.5	87.3	N/A	99.7
	58	94	110	26	50	13	33	N/A	76
Kenya	67.4	64.6	14.0	97.4	99.4	92.4	81.8	90.5	99.7
	59	87	102	48	49	55	64	76	82
Peru	67.3	71.3	39.8	91.5	93.1	93.9	84.0	95.6	99.3
	60	40	42	80	104	32	52	29	108
Ghana	67.3	66.2	16.3	99.0	99.8	88.8	70.3	86.7	99.8
	61	70	93	28	33	90	100	97	69
Czech Republic	67.2	76.5	48.8	90.0	100.0	85.9	52.6	92.9	99.9
	62	21	31	85	4	106	123	55	38
Georgia	67.2	61.8	10.1	96.5	96.1	85.9	90.4	71.6	99.8
	63	104	111	52	86	107	21	118	60
Saudi Arabia	67.1	79.6	59.2	96.5	89.8	89.1	61.3	95.5	99.9
	64	12	17	53	111	88	114	30	49
Cote d'Ivoire	67.1	65.6	15.2	98.7	99.7	84.2	71.0	94.8	76.4
	65	76	96	35	38	114	96	38	130
Turkey	67.1	67.6	26.6	92.2	97.8	94.7	89.0	92.8	99.8
	66	59	70	77	73	23	27	57	75
Cuba	67.0	66.0	17.7	98.9	97.6	91.5	87.4	88.6	99.3
	67	72	91	32	76	68	32	89	112
Nicaragua	66.9	66.9	19.3	98.2	99.1	91.8	80.2	88.9	99.6
	68	63	87	39	59	62	70	87	97
Pakistan	66.9	60.9	25.1	82.4	87.3	94.2	92.4	87.9	99.5
	69	112	78	107	115	27	12	92	102
Luxembourg	66.9	76.3	58.9	75.6	100.0	91.9	82.5	85.8	100.0
	70	23	18	117	1	60	58	101	16
Nigeria	66.9	64.6	11.7	99.8	99.8	91.2	67.5	98.9	100.0
	71	89	106	8	36	72	105	6	29
Philippines	66.8	63.8	32.3	88.6	81.0	91.5	86.5	93.6	99.7
	72	96	58	91	122	69	36	47	78
Australia	66.7	65.2	15.2	97.7	99.5	95.9	89.8	94.7	99.7
	73	79	95	45	46	9	24	39	77
Bangladesh	66.6	68.3	42.6	77.2	93.7	92.3	85.4	87.5	99.8
	74	56	37	116	101	56	42	93	58
Egypt, Arab Rep.	66.6	66.2	69.6	59.3	68.6	93.7	91.4	88.8	99.8
	75	67	11	124	127	38	14	88	67
Korea, Rep.	66.6	72.0	65.7	68.5	83.8	89.6	68.5	90.8	100.0
	76	35	12	119	117	86	104	72	19

Annual freshwater withdrawals for industry per value added of industry	**Energy consumption**	Energy consumption per unit of land area	Ratio of clean energy consumption	Elasticity of energy consumption	Elasticity of electric power consumption	**Greenhouse gas**	Growth rate of CO_2 emissions	Growth rate of Methane emissions	CO_2 emissions per unit of land area	CO_2 emissions per unit of energy consumption
99.3	31.4	100.0	2.1	13.6	9.8	67.3	45.5	49.4	100.0	96.1
28	98	23	88	87	98	33	90	115	13	4
97.4	33.4	99.9	12.2	13.3	8.1	68.3	45.9	61.0	100.0	88.6
66	65	36	45	102	113	27	88	48	22	8
96.7	35.6	100.0	19.0	12.8	10.6	53.0	38.3	46.1	100.0	42.2
75	41	16	36	113	74	122	113	123	31	66
98.5	33.8	99.9	10.9	13.8	10.4	70.0	51.1	72.8	100.0	75.3
51	63	39	53	70	80	19	72	8	38	20
98.4	34.2	98.8	29.9	8.2	0.0	58.1	51.7	58.9	98.4	29.7
53	58	111	23	125	124	98	67	68	118	102
81.9	39.6	99.9	36.5	14.1	7.8	74.6	78.9	56.4	99.9	58.9
122	25	42	20	51	114	12	5	83	46	34
99.8	31.0	99.8	0.0	13.7	10.3	51.7	41.2	47.8	99.8	28.6
11	108	54	116	81	83	125	103	119	69	105
94.4	32.7	99.9	3.0	16.7	11.3	78.2	78.9	46.8	100.0	86.3
94	71	32	80	10	42	6	4	122	23	10
97.3	33.2	99.7	9.2	13.7	10.2	58.7	52.2	58.0	99.6	31.6
67	68	80	57	84	87	92	65	71	89	98
90.9	32.3	99.8	0.2	16.0	13.2	66.5	72.8	61.5	99.7	25.7
114	77	65	109	13	23	38	13	42	79	109
98.4	35.4	99.9	16.1	13.4	12.1	61.2	42.5	57.4	100.0	63.6
54	44	26	39	97	31	70	99	75	34	31
97.0	32.8	99.8	6.3	14.1	10.8	69.0	64.9	56.8	99.8	58.7
71	70	67	64	47	58	25	26	81	65	35
99.5	27.8	96.5	0.7	12.6	1.5	54.3	46.9	50.1	95.4	32.2
20	124	120	101	115	122	116	82	112	127	97
98.2	31.2	99.7	0.6	14.0	10.3	69.5	41.0	72.7	99.9	92.9
55	103	74	103	56	84	22	105	9	41	6
86.3	41.6	99.7	42.7	13.8	10.0	59.3	42.2	62.0	99.7	50.1
120	21	79	13	78	92	88	100	38	78	47
99.2	32.0	100.0	2.1	14.2	11.6	59.8	61.3	60.7	99.9	15.9
34	86	18	89	40	36	80	35	52	40	122
96.4	30.7	99.5	0.8	13.6	8.8	61.7	49.9	53.5	99.5	55.4
80	114	97	99	85	109	65	75	96	93	41
94.7	31.8	99.8	2.9	14.0	10.6	61.3	54.2	63.6	99.8	34.7
93	89	52	84	61	70	68	53	30	66	89
99.1	36.8	94.5	29.0	13.6	10.1	53.7	39.3	56.9	93.6	39.6
35	36	125	24	86	90	120	111	79	131	72

(continued)

Table 10.1 (continued)

Indicators / Countries	ECC	Agri-cultural carrying	Cereal yield per unit of arable land	Fertilizer consum-ption per unit of arable land	Annual freshwater withdrawals for agriculture per unit of arable land	Indus-trial carrying	Net exports of goods as a percentage of GDP	Electric power consum-ption per unit of value added of industry	SO_2 emissions per unit of value added of industry
Eritrea	66.5	60.3	1.8	99.7	98.8	95.0	90.9	90.2	99.2
	77	117	129	14	65	20	16	83	114
Iran, Islamic Rep.	66.5	65.0	22.4	94.4	92.5	94.1	84.2	93.0	99.8
	78	81	82	70	105	29	50	54	73
Zambia	66.4	69.0	24.5	97.8	99.4	85.9	70.3	81.6	95.9
	79	52	79	43	48	108	99	110	128
Sri Lanka	66.3	65.7	40.7	79.1	85.6	94.5	89.3	95.3	99.6
	80	74	41	114	116	24	25	32	86
Senegal	66.2	63.4	9.3	99.6	99.2	95.0	88.9	93.7	99.6
	81	99	113	16	57	19	28	44	85
Algeria	66.2	65.0	13.5	99.4	99.2	93.2	76.6	97.1	100.0
	82	83	104	22	56	48	86	14	22
Serbia	65.9	77.5	51.8	89.2	100.0	78.1	81.9	73.6	96.9
	83	16	24	89	11	124	63	115	127
Azerbaijan	65.8	64.8	18.6	98.9	92.4	91.0	73.6	97.3	99.9
	84	84	89	31	106	73	93	13	44
Russian Federation	65.7	66.2	16.6	98.7	99.8	89.9	82.4	85.4	99.6
	85	68	92	34	28	84	59	104	88
Uzbekistan	65.7	68.7	46.8	84.4	82.1	84.3	79.4	71.6	99.5
	86	54	33	104	118	113	74	119	105
China	65.6	69.9	58.1	60.5	95.1	92.3	83.3	90.4	99.7
	87	45	19	122	92	57	54	79	81
Jamaica	65.6	61.4	9.0	95.3	97.5	90.2	80.7	87.9	99.0
	88	109	115	63	77	81	69	91	120
Latvia	65.5	68.8	25.9	94.8	99.9	89.9	73.3	90.2	100.0
	89	53	75	65	17	83	94	82	14
Lithuania	65.5	69.2	25.9	96.3	99.9	82.2	58.5	92.0	99.9
	90	51	74	54	15	118	119	64	47
Cyprus	65.5	60.2	13.8	85.3	97.1	94.7	95.1	84.4	99.6
	91	118	103	99	81	22	4	106	92
Israel	65.5	65.6	29.8	84.7	94.3	93.0	82.4	90.3	99.6
	92	75	64	101	97	49	60	81	87
India	65.2	63.7	24.4	86.4	93.3	92.5	90.0	85.5	99.5
	93	97	80	96	103	53	23	102	104
Bolivia	65.2	68.6	22.1	99.5	99.5	91.2	75.9	93.6	99.9
	94	55	83	18	42	71	87	46	45
Panama	65.1	66.6	19.9	96.2	99.4	88.4	69.9	84.6	99.7
	95	65	86	56	52	92	102	105	80

Annual freshwater withdrawals for industry per value added of industry	**Energy consumption**	Energy consumption per unit of land area	Ratio of clean energy consumption	Elasticity of energy consumption	Elasticity of electric power consumption	**Greenhouse gas**	Growth rate of CO_2 emissions	Growth rate of Methane emissions	CO_2 emissions per unit of land area	CO_2 emissions per unit of energy consumption
99.5	31.3	100.0	0.0	13.9	11.0	68.6	49.8	57.9	100.0	85.6
18	101	7	112	64	50	26	76	72	9	11
99.4	31.3	99.7	0.5	14.3	10.7	62.5	63.2	52.3	99.7	34.1
24	100	77	105	37	62	61	27	104	83	92
95.8	36.0	100.0	19.2	14.0	10.8	63.9	33.8	54.1	100.0	97.8
84	39	10	34	58	61	50	117	94	4	2
93.8	32.3	99.7	6.2	13.6	9.9	58.9	35.7	57.7	99.8	65.6
97	74	85	66	91	97	91	116	73	72	27
97.6	30.7	100.0	1.2	8.6	13.0	62.9	52.4	51.8	100.0	57.9
64	113	21	96	123	27	60	64	105	29	37
99.1	30.6	100.0	0.1	14.2	8.3	63.1	62.2	57.0	100.0	34.2
37	116	20	111	39	112	57	32	77	37	90
60.0	34.7	99.6	10.9	14.7	13.5	61.6	62.5	64.1	99.4	19.5
130	49	88	51	24	19	66	31	26	99	115
93.3	32.0	99.7	2.8	14.1	11.5	63.1	61.3	48.9	99.7	44.5
99	83	82	85	48	39	56	34	118	82	60
92.0	34.9	99.9	15.4	13.7	10.7	59.4	51.5	54.7	99.9	39.6
108	47	41	40	83	64	86	70	88	51	73
86.8	32.0	99.8	2.8	14.3	11.3	67.0	68.5	59.5	99.7	38.6
119	82	64	86	34	44	35	20	63	76	77
95.7	32.2	99.5	6.2	13.7	9.5	52.4	46.8	51.4	99.1	17.9
85	79	101	65	82	104	123	83	106	111	118
93.3	33.8	99.4	0.7	14.8	20.3	66.6	69.6	65.5	99.2	29.4
100	62	103	100	23	11	37	17	22	109	103
96.0	35.1	99.9	12.2	14.8	13.5	54.6	30.9	59.6	99.9	51.8
83	46	50	46	22	20	114	119	60	60	45
78.2	40.4	99.8	59.6	0.0	2.1	60.2	44.0	64.0	99.8	49.0
124	24	68	6	126	121	77	94	27	73	51
99.7	32.2	99.4	4.2	12.0	13.1	63.0	68.5	59.5	99.1	19.3
12	80	102	71	118	25	58	21	65	112	116
99.7	32.5	97.7	8.3	13.5	10.4	57.1	44.2	81.7	96.5	18.9
13	72	118	59	93	79	105	93	3	125	117
94.9	32.1	99.5	4.0	14.0	10.8	59.4	51.7	57.6	99.4	36.9
92	81	96	74	57	59	87	68	74	102	82
95.5	31.8	100.0	5.4	12.5	9.1	54.3	36.6	49.1	100.0	49.2
89	92	5	68	116	107	115	115	117	20	50
99.5	35.4	99.9	18.5	13.1	10.1	57.7	42.2	63.9	99.9	40.4
19	43	46	37	106	88	102	101	28	54	69

(continued)

Table 10.1 (continued)

Indicators / Countries	ECC	Agri-cultural carrying	Cereal yield per unit of arable land	Fertilizer consum-ption per unit of arable land	Annual freshwater withdrawals for agriculture per unit of arable land	Indus-trial carrying	Net exports of goods as a percentage of GDP	Electric power consum-ption per unit of value added of industry	SO_2 emissions per unit of value added of industry
Lesotho	65.0	46.3	6.1	N/A	100.0	83.7	70.3	N/A	N/A
	96	129	122	N/A	14	115	98	N/A	N/A
Namibia	64.9	59.8	0.0	99.9	99.6	90.7	70.4	94.2	98.6
	97	119	132	7	41	78	97	42	123
Honduras	64.9	61.4	8.1	95.0	99.0	87.8	69.9	90.0	99.7
	98	108	116	64	63	95	103	85	83
Yemen, Rep.	64.9	61.7	8.1	99.0	95.7	95.2	86.1	96.0	99.3
	99	106	117	29	88	17	39	25	110
Poland	64.9	69.3	32.1	88.3	99.8	90.5	76.8	91.7	99.7
	100	50	60	92	26	79	85	66	79
Bulgaria	64.9	70.7	37.2	86.5	99.5	76.8	66.7	78.2	97.7
	101	42	49	95	44	128	108	113	126
Bosnia and Herzegovina	64.7	64.5	39.3	98.0	N/A	88.2	79.5	76.4	98.3
	102	91	44	40	N/A	93	73	114	125
Kyrgyz Republic	64.6	66.2	25.2	98.3	88.7	77.1	78.8	54.7	99.4
	103	69	77	38	113	127	78	124	107
Macedonia, FYR	64.5	71.8	33.4	95.4	99.5	77.4	72.2	73.4	99.9
	104	38	56	62	43	125	95	116	52
Tunisia	64.3	64.6	15.0	96.6	98.8	91.7	75.6	92.7	99.6
	105	88	98	51	64	64	88	58	94
Mozambique	64.2	62.7	7.1	99.8	99.8	85.6	82.2	61.7	99.5
	106	100	118	11	27	109	61	123	101
Costa Rica	64.1	47.0	37.2	16.4	90.8	96.0	84.2	99.9	100.0
	107	128	48	127	108	8	49	3	6
Syrian Arab Republic	63.8	60.8	9.7	94.7	95.1	90.8	81.0	86.0	99.6
	108	113	112	66	91	77	67	100	96
Thailand	63.7	67.0	29.0	89.9	95.0	87.9	60.8	93.1	99.9
	109	61	66	87	93	94	115	53	40
Ukraine	63.6	69.6	26.6	97.6	99.1	77.3	73.8	70.2	99.1
	110	49	71	47	61	126	92	121	118
Botswana	63.6	60.3	1.9	99.0	99.5	93.7	78.5	97.1	99.6
	111	116	128	30	45	37	80	16	89
Turkmenistan	63.4	64.6	32.9	92.5	78.8	86.5	64.8	90.6	99.6
	112	90	57	75	125	104	111	74	100
Ecuador	63.4	62.1	30.9	84.7	81.2	86.9	78.5	81.8	91.3
	113	102	62	100	120	103	79	109	129
Congo, Rep.	63.3	61.8	4.7	99.9	100.0	87.1	48.7	100.0	99.8
	114	105	124	5	3	101	128	1	62
Lebanon	63.2	67.0	26.7	98.4	89.4	82.5	93.1	46.0	98.6
	115	62	69	36	112	116	10	125	124

Annual freshwater withdrawals for industry per value added of industry	**Energy consumption**	Energy consumption per unit of land area	Ratio of clean energy consumption	Elasticity of energy consumption	Elasticity of electric power consumption	**Greenhouse gas**	Growth rate of CO_2 emissions	Growth rate of Methane emissions	CO_2 emissions per unit of land area	CO_2 emissions per unit of energy consumption
97.1	N/A	N/A	0.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A
69	N/A	N/A	116	N/A	N/A	N/A	N/A	N/A	N/A	N/A
99.6	34.6	100.0	12.2	14.1	12.1	64.2	58.2	59.8	100.0	44.8
15	51	1	44	49	32	46	43	57	7	59
91.8	33.7	99.9	9.3	13.8	11.6	67.0	61.7	52.9	99.9	58.5
110	64	38	56	74	37	36	33	100	45	36
99.4	31.0	100.0	0.0	14.3	9.7	58.1	60.1	53.0	100.0	17.4
26	107	14	116	35	99	97	37	99	36	120
93.9	30.7	99.3	0.6	13.2	9.6	54.0	46.1	61.0	98.9	17.8
96	115	105	104	104	100	118	85	47	114	119
64.6	43.0	99.7	42.5	15.4	14.2	60.2	51.6	64.3	99.6	33.8
127	18	86	15	18	17	78	69	25	92	93
98.5	38.2	99.7	15.4	16.7	21.0	56.5	54.2	59.6	99.6	14.9
50	31	76	41	12	9	108	54	62	91	124
75.4	44.1	100.0	48.3	15.7	12.4	64.1	67.8	49.3	100.0	35.6
125	13	17	9	15	30	48	22	116	32	87
64.2	35.2	99.8	7.3	15.7	18.0	63.4	66.6	61.9	99.6	22.6
128	45	70	60	14	14	54	25	39	86	112
99.1	27.7	99.9	0.3	9.4	1.1	59.1	53.4	49.9	99.8	38.8
36	125	47	108	122	123	89	59	114	63	75
99.0	37.6	100.0	25.5	15.1	10.1	61.0	33.6	40.1	100.0	97.6
39	33	13	28	20	91	73	118	125	6	3
100.0	41.9	99.8	42.7	14.1	11.1	64.2	51.1	54.1	99.9	63.6
4	20	61	13	52	47	47	71	92	58	30
96.6	30.1	99.8	1.2	13.9	5.7	61.2	58.8	60.8	99.7	27.9
76	119	72	95	69	119	69	40	51	84	106
98.0	31.0	99.5	1.0	13.6	10.0	55.0	40.5	51.0	99.5	43.6
59	106	95	98	90	93	113	108	109	97	62
66.0	38.9	99.5	33.5	13.0	9.6	58.7	43.7	60.9	99.5	45.7
126	29	94	21	109	103	93	96	50	96	56
99.5	31.1	100.0	0.0	13.6	10.8	55.8	44.9	43.3	100.0	46.0
21	105	3	114	88	57	111	91	124	15	55
91.2	30.9	99.9	0.0	12.9	10.9	59.6	38.1	88.5	99.9	33.3
112	110	43	115	111	55	83	114	2	53	94
96.0	34.4	99.9	11.6	13.6	12.4	58.9	53.8	54.1	99.9	32.2
82	55	44	47	89	29	90	56	91	57	96
99.9	32.3	100.0	3.5	14.0	11.9	60.7	39.2	53.3	100.0	72.0
9	75	4	77	60	33	75	112	98	8	21
92.3	30.0	98.7	1.4	14.5	5.6	61.9	66.8	56.5	98.0	21.3
106	121	113	94	30	120	64	24	82	120	114

(continued)

Table 10.1 (continued)

Indicators / Countries	ECC	Agri-cultural carrying	Cereal yield per unit of arable land	Fertilizer consum-ption per unit of arable land	Annual freshwater withdrawals for agriculture per unit of arable land	Indus-trial carrying	Net exports of goods as a percentage of GDP	Electric power consum-ption per unit of value added of industry	SO_2 emissions per unit of value added of industry
Libya	63.0	59.4	3.3	96.7	96.9	90.8	66.7	97.4	100.0
	116	120	126	50	82	75	107	11	23
Tajikistan	62.5	63.8	26.5	96.2	81.2	59.8	82.2	0.0	99.1
	117	95	72	57	121	133	62	126	117
Zimbabwe	62.3	60.7	4.3	97.7	98.8	82.3	74.9	65.7	99.2
	118	114	125	44	66	117	89	122	115
Angola	61.7	61.2	3.1	99.9	99.9	88.7	55.3	99.8	100.0
	119	110	127	4	19	91	121	4	7
Belarus	61.3	64.2	27.7	77.3	99.8	81.5	52.4	86.9	99.8
	120	93	67	115	35	123	124	96	61
Vietnam	60.8	66.4	54.1	67.5	81.7	82.1	50.3	85.4	99.8
	121	66	23	120	119	120	125	103	72
Iraq	59.7	59.1	14.8	97.0	80.1	87.6	66.4	97.1	99.8
	122	122	99	49	123	98	109	15	66
Malaysia	59.4	55.6	38.7	37.7	96.2	84.6	50.0	92.9	99.9
	123	124	46	126	85	112	126	56	34
Kazakhstan	59.2	61.6	4.9	99.8	99.1	87.3	70.1	90.9	98.7
	124	107	123	9	60	99	101	71	122
Kuwait	58.7	51.9	34.3	95.6	31.7	87.8	54.9	96.3	99.8
	125	126	54	61	129	96	122	22	63
Jordan	58.1	35.6	17.9	0.1	94.7	92.0	82.5	86.5	99.6
	126	131	90	130	96	58	57	98	91
Moldova	57.5	70.1	26.2	99.2	99.4	62.7	80.0	71.1	99.6
	127	44	73	27	51	131	71	120	98
Mongolia	57.3	49.0	11.3	99.4	N/A	82.1	59.8	87.5	99.1
	128	127	109	24	N/A	119	116	94	116
Niger	57.1	60.5	1.3	100.0	99.8	62.3	90.4	N/A	0.0
	129	115	130	1	34	132	22	N/A	131
Estonia	57.0	67.7	23.4	94.4	100.0	74.2	48.1	86.4	99.3
	130	58	81	69	7	129	130	99	113
Qatar	51.9	41.4	49.9	0.0	71.4	89.2	58.2	98.5	100.0
	131	130	28	131	126	87	120	7	15
United Arab Emirates	47.9	15.3	25.9	16.4	0.0	85.3	44.9	96.3	99.9
	132	132	76	128	130	110	131	23	30
Singapore	43.1	N/A	N/A	N/A	N/A	73.8	0.0	95.4	99.9
	133	N/A	N/A	N/A	N/A	130	133	31	39
Highest score	**82.4**	**91.2**	**100.0**	**100.0**	**100.0**	**98.3**	**100.0**	**100.0**	**100.0**
Lowest score	**43.1**	**15.3**	**0.0**	**0.0**	**0.0**	**59.8**	**0.0**	**0.0**	**0.0**
Average score	**67.0**	**67.3**	**32.4**	**87.8**	**94.2**	**89.6**	**77.3**	**89.0**	**98.6**
Standard deviation	**5.3**	**9.8**	**22.2**	**19.5**	**12.6**	**6.6**	**14.5**	**12.0**	**8.9**

Annual freshwater withdrawals for industry per value added of industry	**Energy consumption**	Energy consumption per unit of land area	Ratio of clean energy consumption	Elasticity of energy consumption	Elasticity of electric power consumption	**Greenhouse gas**	Growth rate of CO_2 emissions	Growth rate of Methane emissions	CO_2 emissions per unit of land area	CO_2 emissions per unit of energy consumption
99.2	31.6	100.0	0.0	15.7	10.9	58.2	52.5	59.2	100.0	26.8
30	94	9	116	16	54	96	63	67	30	108
57.9	56.3	100.0	100.0	14.3	11.1	70.7	67.8	47.4	100.0	70.5
131	3	19	1	36	46	18	23	120	24	22
89.5	33.0	100.0	6.5	14.1	11.4	64.3	41.1	61.7	100.0	77.4
116	69	25	63	53	40	44	104	40	27	17
99.7	32.0	100.0	3.9	13.7	10.4	51.8	19.6	50.4	100.0	69.6
14	84	11	76	80	81	124	130	110	21	24
87.1	30.7	99.7	0.0	13.8	9.4	57.3	49.6	51.0	99.6	36.6
118	111	81	113	76	105	104	77	108	85	84
92.9	31.7	99.6	6.9	12.9	7.4	49.7	26.6	54.6	99.5	41.1
104	93	89	62	112	115	126	126	89	94	67
87.2	31.2	99.8	1.5	13.3	10.0	47.2	28.9	53.4	99.7	24.8
117	104	59	92	99	94	127	121	97	77	110
95.6	31.4	99.5	1.5	13.9	10.7	55.3	39.4	67.3	99.4	31.1
88	97	93	93	65	68	112	110	16	104	100
89.7	31.4	99.9	1.5	13.3	10.7	41.2	20.2	50.4	99.9	15.3
115	99	29	91	101	63	129	129	111	48	123
100.0	30.0	96.0	0.0	13.4	10.7	54.0	41.5	63.3	94.5	29.1
3	122	121	116	98	66	117	102	32	128	104
99.4	31.8	99.8	2.9	14.5	9.9	67.4	68.8	69.7	99.8	30.0
23	90	56	83	28	96	32	19	13	71	101
0.0	30.6	99.8	0.3	13.1	9.1	57.6	45.9	59.6	99.8	36.8
132	117	55	107	105	106	103	87	61	67	83
N/A	31.2	100.0	0.0	14.1	10.7	58.4	57.9	76.4	100.0	0.0
N/A	102	2	116	45	69	94	44	6	14	126
96.5	N/A	N/A	0.0	N/A	N/A	44.1	16.2	N/A	100.0	N/A
79	N/A	N/A	116	N/A	N/A	128	131	N/A	2	N/A
63.1	39.1	99.7	0.7	26.9	29.0	32.9	0.0	56.3	99.5	8.8
129	28	78	102	4	5	132	132	85	95	125
100.0	30.3	95.9	0.0	14.3	11.0	33.3	25.7	0.0	93.8	21.4
1	118	122	116	33	52	131	128	126	130	113
100.0	30.9	98.4	0.0	13.8	11.5	58.0	53.8	51.2	98.0	33.1
6	109	115	116	73	38	99	57	107	121	95
99.8	5.9	0.0	0.0	13.0	10.4	34.2	30.4	61.2	0.0	49.2
10	126	126	116	108	77	130	120	45	132	49
100.0	**75.7**	**100.0**	**100.0**	**100.0**	**100.0**	**86.2**	**100.0**	**100.0**	**100.0**	**100.0**
0.0	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**32.9**	**0.0**	**0.0**	**0.0**	**0.0**
93.8	**35.4**	**98.7**	**14.2**	**15.1**	**13.3**	**62.2**	**51.8**	**59.1**	**98.6**	**47.8**
11.6	**8.2**	**8.9**	**19.1**	**8.8**	**12.3**	**8.7**	**15.4**	**10.0**	**8.7**	**22.0**

Fig. 10.1 ECC scores of six continents & top three countries of each continent in 2012

To compare and analyze the ECC levels of all the countries in a more visual way, the ECC scores are displayed in Fig. 10.2. According to Fig. 10.2, the ECC scores show little differences among the adjacent ranking countries. Among the developed countries, France scores the highest, 77.6 points; among the developing countries, Madagascar scores the highest, 82.4 points. They have big difference.

10.2 Factor Scores and Contribution Rates of ECC

Table 10.1 lists the evaluation results of the subordinate indicators of ECC and displays the scores and rankings of 4 pillars and 15 individual indicators of ECC in 2012 so as to analyze the influences of the pillars and individual indicators on ECC of the countries.

On pillars, agricultural carrying enjoys the highest standard deviation, hitting 9.8, indicating that this indicator has the largest differences among the countries and is the most primary factor causing ECC differences among the countries. The indicator of industrial carrying, energy consumption and green house gas have relatively low standard deviation, in particular, the standard deviation of industrial carrying is the lowest, 6.6, indicating that it has the least influence on ECC differences among the countries. Overall, the countries have little differences on the overall levels of ECC.

On individual indicators, cereal yield per unit of arable land enjoys the highest standard deviation, hitting 22.2, indicating that this indicator has the largest

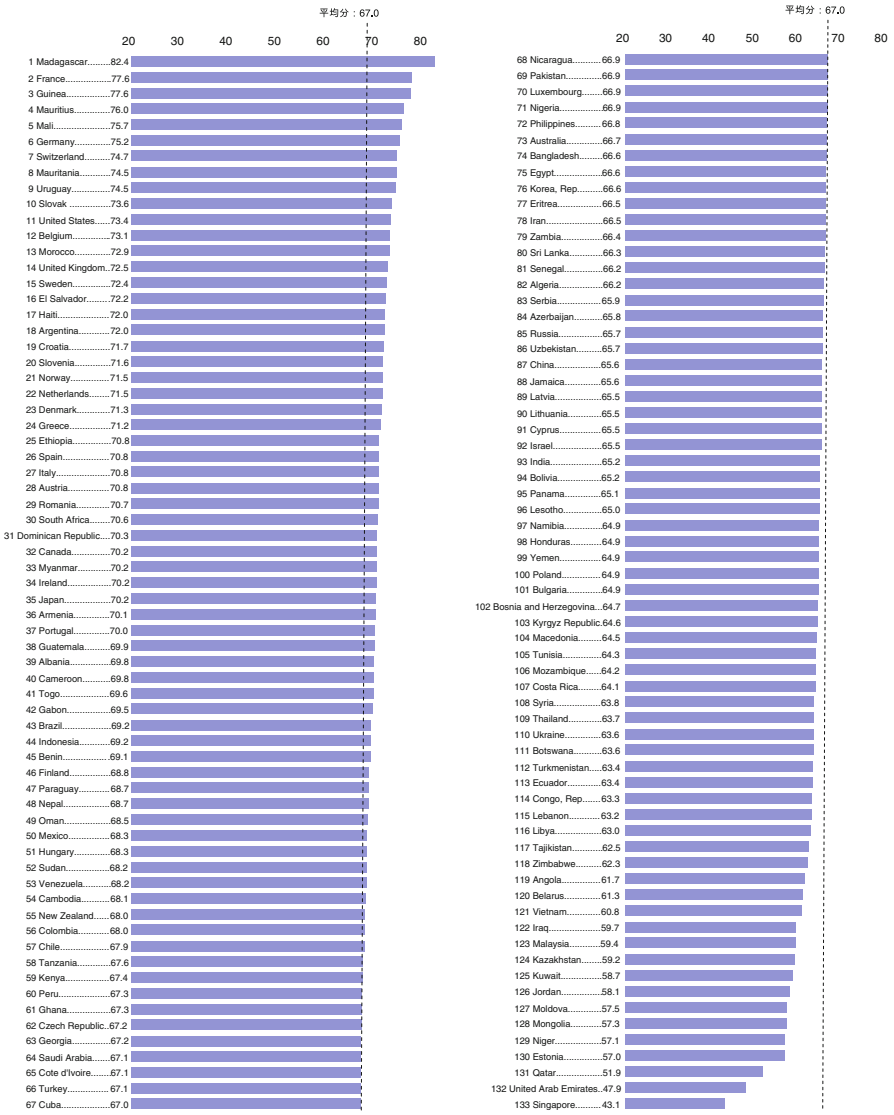

Fig. 10.2 Rankings and scores of ECC 2012

differences among the countries and is the most primary factor causing ECC differences among the countries. The standard deviations of CO_2 emissions per unit of energy consumption, fertilizer consumption per unit of arable land and ratio of clean energy consumption are also very high, about 20. The other individual indicators have lower standard deviation, indicating they have less influence on ECC differences among the countries.

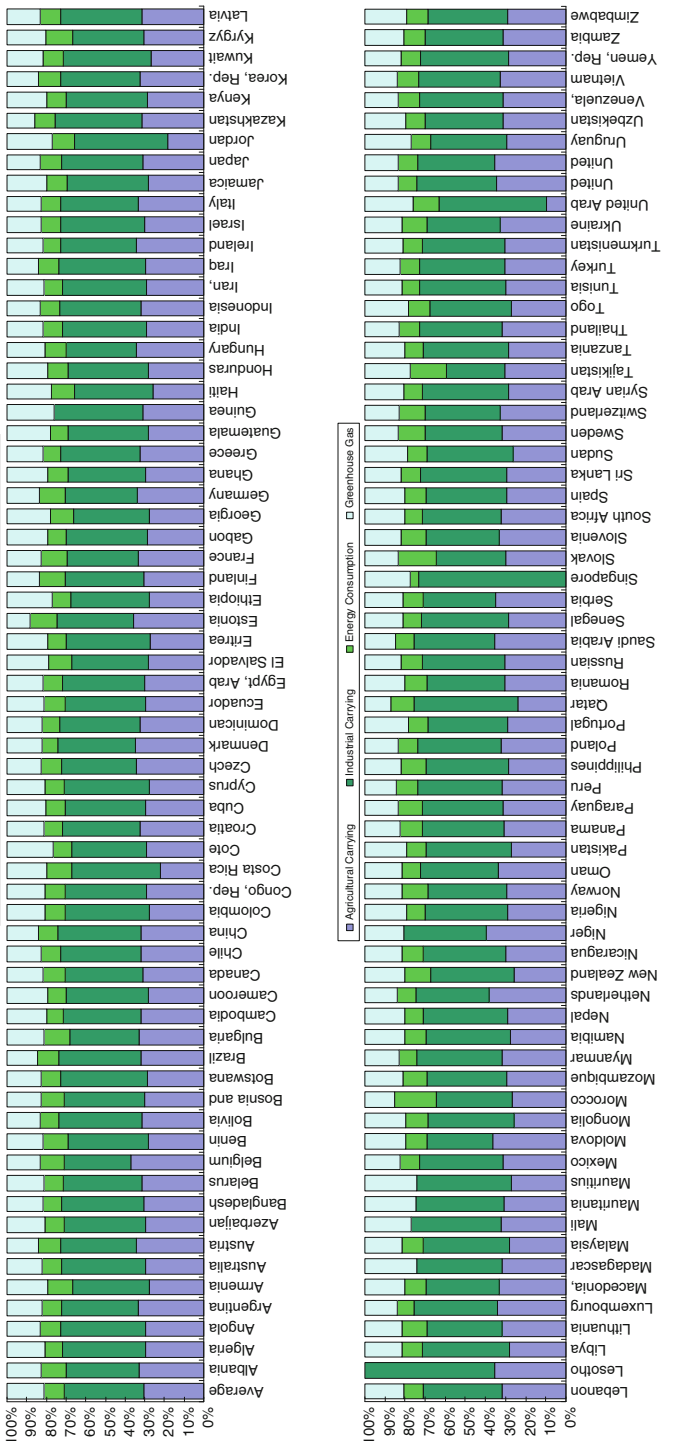

Fig. 10.3 Contribution rates of pillars of ECC 2012

To analyze the contribution of the pillars to ECC, firstly multiply the scores of the pillars by respective weights, then convert them into the scores at sub-index and finally divide them by the total score of sub-index to get the contribution rates of the pillars. Thus, we could find the contribution of each pillar to the sub-index more visually, as shown in Fig. 10.3.

According to Fig. 10.3, industrial carrying contributes the most to ECC with the average contribution rate of 40.1 %; the contribution rate of agricultural carrying the next, 30.1 %; energy consumption the least, 10.6 %. Therefore, to enhance ECC, the countries shall focus specially on industrial production carrying and agricultural carrying, while not ignoring green house gas and energy consumption.

Chapter 11
Evaluation and Comparative Analysis on EMC

11.1 Evaluation Results of EMC

According to the evaluation indicator system and the mathematic model of EMC, the evaluation and analysis are made on EMC in 2012. Table 11.1 lists the rankings and scores of EMC in 2012 and Fig. 11.1 displays the EMC scores of the six continents as well as the top three countries of each continent in 2012.

According to Table 11.1, the countries with EMC ranking 1st–10th include Honduras, Bolivia, Saudi Arabia, Japan, United Kingdom, China, Namibia, Mongolia, Costa Rica and Poland; the 11th–20th rankings are Germany, Switzerland, Guatemala, Estonia, Jamaica, Bulgaria, United States, United Arab Emirates, Ukraine and France; the 21st–30th rankings are Austria, Latvia, Norway, Italy, Sweden, Belgium, Colombia, Sri Lanka, New Zealand and Slovenia; and the bottom ten countries are Singapore, Yemen, Rep., Jordan, Kazakhstan, Kyrgyz Republic, Niger, Iraq, Mali, Mauritania and Libya.

In 2012, the highest score of EMC is 68.0 points, the lowest score is 11.7, the average score is 49.1 and the standard deviation is 9.1. The highest score and the lowest score differ greatly with the margin of 56.3 points, the former being 5.8 times the latter. 72 countries score higher than the average point. It indicates that the overall level of EMC is rather high and the overall differences are not very large among the countries except for individual countries.

The scores of EMC show olive-shaped distribution. None scores above 70 points; 11countries score 60–70; 55 countries score 50–60; 48 countries score 40–50; 15 countries score 30–40; 3 countries score 20–30; only 1 country scores below 20 points, of 11.7.

The countries with higher EMC are almost equally divided between developed and developing countries. The countries with higher EMC are mainly developing countries. Among the 20 countries ranking ahead, only 69 are developed countries and the rest 11 are all developing countries. And, among the 30 countries ranking ahead, 16 are developed countries and 14 are developing countries. Most developed countries have higher level of EMC, because there are 24 countries among the top

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Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_11,

Table 11.1 Scores and rankings of EMC as well as the tertiary and individual indicators in 2012

Indicators / Countries	EMC	Environmental governance	Agricultural chemicals regulation	Percentage of the rural population with access to an improved water source	Percentage of the urban population with access to an improved water source	Ecological protection
Honduras	68.0	87.0	N/A	79.0	95.0	74.4
	1	75	N/A	79	93	3
Bolivia	67.9	83.5	N/A	71.0	96.0	86.2
	2	79	N/A	89	89	1
Saudi Arabia	66.3	69.1	100.0	0.0	97.0	78.5
	3	107	1	122	80	2
Japan	65.4	98.1	95.2	100.0	100.0	65.0
	4	24	20	1	1	7
United Kingdom	63.7	92.4	81.0	100.0	100.0	54.1
	5	54	53	1	1	10
China	63.6	73.9	47.6	85.0	98.0	73.5
	6	95	79	72	70	4
Namibia	63.6	94.5	N/A	90.0	99.0	68.7
	7	46	N/A	60	51	6
Mongolia	63.4	72.6	66.7	53.0	100.0	69.5
	8	100	65	103	1	5
Costa Rica	62.4	87.8	76.2	91.0	100.0	53.4
	9	72	61	58	1	12
Poland	60.8	100.0	100.0	N/A	100.0	49.6
	10	1	1	N/A	1	15
Germany	60.3	94.3	85.7	100.0	100.0	54.5
	11	47	46	1	1	9
Switzerland	59.6	100.0	100.0	100.0	100.0	42.2
	12	1	1	1	1	34
Guatemala	59.4	92.0	N/A	86.0	98.0	45.4
	13	58	N/A	70	69	22
Estonia	59.1	98.8	100.0	97.0	99.0	51.1
	14	23	1	43	51	13
Jamaica	58.6	93.9	95.2	88.0	98.0	45.0
	15	49	20	67	70	23
Bulgaria	57.8	98.1	95.2	100.0	100.0	40.4
	16	24	20	1	1	44
United States	57.8	96.3	95.2	94.0	100.0	46.7
	17	35	20	49	1	19
United Arab Emirates	57.6	100.0	N/A	100.0	100.0	41.7
	18	1	N/A	1	1	37
Ukraine	57.6	85.5	66.7	98.0	98.0	53.5
	19	78	65	40	70	11

Area of plantation and afforesta-tion	Biome protect	Overfishing of fishing resources	**Resource utilization**	Utilization rate of water resources	Percentage of total internal renewable water resources to total water resources	Percentage of agricultural land to total land area	Percentage of fossil fuel energy consumption to total energy consumption
N/A	82.2	66.7	40.5	0.0	76.2	33.7	51.9
N/A	42	22	50	110	47	104	32
N/A	86.2	N/A	27.8	0.0	41.8	40.3	29.2
N/A	32	N/A	106	129	96	88	55
N/A	100.0	56.9	47.3	38.3	54.5	95.4	1.1
N/A	1	43	21	3	82	4	121
N/A	87.8	42.1	33.2	0.8	96.2	14.9	20.6
N/A	29	68	82	40	6	121	75
2.9	100.0	76.5	47.8	0.4	92.9	84.6	13.3
20	1	10	18	65	9	12	88
100.0	64.4	47.3	40.1	0.8	78.8	66.4	14.2
1	60	60	53	42	43	39	84
N/A	82.8	54.5	25.9	0.1	13.5	55.7	34.4
N/A	40	49	115	98	119	57	48
N/A	69.5	N/A	46.1	0.1	89.7	88.1	6.4
N/A	56	N/A	27	108	15	10	105
0.3	91.9	85.6	49.0	0.1	100.0	41.4	54.4
64	21	4	15	93	1	85	28
11.5	100.0	50.0	36.4	0.8	72.8	62.6	9.2
6	1	55	70	43	56	45	100
6.8	100.0	72.5	34.0	0.8	53.8	57.3	24.0
10	1	14	77	39	84	53	68
0.2	98.1	N/A	42.3	0.2	72.1	45.1	51.7
73	19	N/A	39	76	57	83	33
0.2	78.9	72.0	45.4	0.1	79.6	47.6	54.4
72	45	15	28	90	39	73	28
0.2	100.0	70.0	30.1	0.6	80.4	26.0	13.3
74	1	17	100	54	38	110	89
0.0	100.0	50.0	41.6	0.2	100.0	49.0	17.0
113	1	55	45	70	2	72	79
1.1	53.2	80.0	40.8	1.2	78.4	54.8	29.1
40	71	6	48	31	44	59	56
32.9	49.4	62.6	34.0	0.6	65.6	52.1	17.7
2	73	31	76	51	64	63	78
0.4	86.9	51.5	36.5	82.4	55.6	8.0	0.0
61	31	53	68	2	81	128	126
N/A	20.4	86.7	35.2	1.1	33.9	84.2	21.7
N/A	107	3	72	33	106	13	73

(continued)

Table 11.1 (continued)

Indicators / Countries	EMC	Environmental governance	Agricultural chemicals regulation	Percentage of the rural population with access to an improved water source	Percentage of the urban population with access to an improved water source	Ecological protection
France	57.4	100.0	100.0	100.0	100.0	35.0
	20	1	1	1	1	64
Austria	57.3	98.1	95.2	100.0	100.0	42.9
	21	24	20	1	1	29
Latvia	57.3	95.0	90.5	96.0	100.0	49.4
	22	45	37	46	1	16
Norway	57.1	100.0	100.0	100.0	100.0	44.1
	23	1	1	1	1	27
Italy	57.0	98.1	95.2	100.0	100.0	39.9
	24	24	20	1	1	47
Sweden	56.8	100.0	100.0	100.0	100.0	35.5
	25	1	1	1	1	60
Belgium	56.4	98.1	95.2	100.0	100.0	40.2
	26	24	20	1	1	46
Colombia	56.2	89.1	95.2	71.0	99.0	46.1
	27	64	19	88	50	21
Sri Lanka	56.1	83.4	66.7	90.0	99.0	40.7
	28	81	65	60	51	42
New Zealand	56.1	100.0	100.0	100.0	100.0	41.9
	29	1	1	1	1	35
Slovenia	56.1	95.9	90.5	99.0	100.0	48.8
	30	38	37	30	1	17
Greece	55.6	94.0	85.7	99.0	100.0	39.0
	31	48	46	30	1	48
Mauritius	55.6	95.9	90.5	99.0	100.0	31.4
	32	38	37	30	1	77
Zimbabwe	55.5	83.5	N/A	69.0	98.0	42.9
	33	79	N/A	91	70	32
Georgia	55.4	98.0	N/A	96.0	100.0	36.5
	34	31	N/A	46	1	56
Finland	55.3	100.0	100.0	100.0	100.0	33.6
	35	1	1	1	1	67
Australia	55.0	100.0	N/A	100.0	100.0	31.5
	36	1	N/A	1	1	76
Luxembourg	55.0	100.0	N/A	100.0	100.0	42.9
	37	1	N/A	1	1	29
Panama	54.9	96.0	95.2	N/A	97.0	37.3
	38	37	20	N/A	80	51
Senegal	54.7	74.5	N/A	56.0	93.0	48.5
	39	92	N/A	100	98	18

Area of plantation and afforesta-tion	Biome protect	Overfishing of fishing resources	**Resource utilization**	Utilization rate of water resources	Percentage of total internal renewable water resources to total water resources	Percentage of agricultural land to total land area	Percentage of fossil fuel energy consumption to total energy consumption
2.1	76.9	37.0	44.5	0.6	60.8	63.2	53.4
27	49	79	33	52	73	43	31
N/A	87.0	N/A	35.8	0.2	65.7	45.4	31.7
N/A	30	N/A	71	78	63	81	51
0.8	100.0	63.6	30.1	0.0	44.7	34.8	40.8
44	1	29	99	112	92	103	41
1.9	74.5	69.9	31.6	0.0	80.9	3.9	41.5
29	52	19	86	116	34	132	39
0.8	88.8	43.2	38.5	1.0	82.1	55.9	15.1
45	28	65	60	37	32	56	81
4.7	46.2	65.9	41.9	0.1	88.6	8.9	69.9
12	78	23	42	104	17	126	19
0.5	81.1	52.4	36.4	1.4	62.5	53.2	28.4
56	43	51	69	27	69	61	57
0.5	88.8	64.2	36.8	0.0	79.6	45.1	22.5
54	27	26	67	122	40	82	70
0.2	85.2	50.0	49.6	1.0	88.3	49.2	59.7
69	35	55	14	36	18	71	25
2.3	83.9	52.5	31.2	0.1	N/A	51.6	42.0
24	39	50	89	107	N/A	66	38
0.0	76.9	85.6	26.1	0.1	41.3	27.5	35.7
99	49	5	113	87	97	108	45
0.2	95.8	33.9	39.4	0.5	70.7	75.2	11.2
77	20	84	56	57	59	23	95
0.0	28.3	76.2	47.6	1.1	84.6	57.1	N/A
108	102	11	19	34	27	54	N/A
0.1	99.8	N/A	44.5	0.8	49.0	50.1	77.9
79	15	N/A	32	38	88	69	13
0.2	21.4	100.0	37.8	0.1	70.5	42.7	38.0
70	106	1	63	92	60	84	43
7.7	49.3	52.4	39.7	0.1	95.5	8.9	54.4
9	74	52	54	105	8	125	30
2.5	61.2	40.4	41.5	0.2	96.1	62.9	7.0
21	65	72	46	79	7	44	103
0.0	100.0	N/A	26.3	0.1	31.4	59.8	14.0
102	1	N/A	112	95	107	50	85
0.1	90.8	33.3	37.2	0.0	89.0	35.5	24.5
85	24	85	66	130	16	98	66
0.6	99.5	61.3	43.3	0.2	64.0	58.4	50.6
51	17	34	35	71	67	52	35

(continued)

Table 11.1 (continued)

Indicators / Countries	EMC	Environmental governance	Agricultural chemicals regulation	Percentage of the rural population with access to an improved water source	Percentage of the urban population with access to an improved water source	Ecological protection
Ecuador	54.4	87.9	81.0	89.0	96.0	46.7
	40	70	52	64	88	20
Albania	54.4	95.0	N/A	94.0	96.0	36.0
	41	44	N/A	49	89	58
Denmark	54.2	98.1	95.2	100.0	100.0	29.6
	42	24	20	1	1	83
Brazil	54.2	91.7	90.5	85.0	100.0	40.4
	43	60	37	72	1	43
Tanzania	54.1	61.5	N/A	44.0	79.0	49.7
	44	118	N/A	112	123	14
Czech Republic	54.0	100.0	100.0	100.0	100.0	26.6
	45	1	1	1	1	90
Canada	54.0	99.7	100.0	99.0	100.0	36.9
	46	15	1	30	1	53
Botswana	54.0	95.5	N/A	92.0	99.0	42.9
	47	42	N/A	53	51	31
Serbia	53.3	87.7	71.4	98.0	99.0	36.3
	48	73	63	40	51	57
Portugal	53.2	97.8	95.2	100.0	99.0	36.7
	49	32	20	1	51	55
Mexico	52.9	88.8	81.0	91.0	97.0	37.6
	50	66	53	59	80	50
Cote d'Ivoire	52.6	79.5	N/A	68.0	91.0	30.0
	51	87	N/A	92	106	80
Chile	52.3	92.2	100.0	75.0	99.0	36.8
	52	57	1	85	51	54
Cuba	52.2	82.2	66.7	89.0	96.0	33.7
	53	84	65	65	89	66
Cyprus	52.0	92.4	81.0	100.0	100.0	41.4
	54	54	53	1	1	38
Ghana	51.9	78.0	66.7	80.0	91.0	35.2
	55	89	65	77	106	63
Philippines	51.6	87.9	81.0	92.0	93.0	31.8
	56	71	53	53	98	75
Slovak Republic	51.5	96.2	90.5	100.0	100.0	36.9
	57	36	37	1	1	52
Ireland	51.4	100.0	100.0	100.0	100.0	23.0
	58	1	1	1	1	98
South Africa	51.2	74.4	52.4	79.0	99.0	35.8
	59	93	78	79	51	59

Area of plantation and afforesta-tion	Biome protect	Overfishing of fishing resources	**Resource utilization**	Utilization rate of water resources	Percentage of total internal renewable water resources to total water resources	Percentage of agricultural land to total land area	Percentage of fossil fuel energy consumption to total energy consumption
0.2	91.1	64.2	31.3	0.1	76.2	35.5	13.3
75	22	26	88	85	46	97	86
0.1	42.5	77.2	38.4	0.2	61.1	51.9	40.4
81	80	9	61	81	72	65	42
0.5	30.1	67.7	43.2	0.4	75.0	73.4	23.8
53	95	21	36	60	49	29	69
9.6	82.7	39.1	35.1	0.0	53.6	37.0	49.6
7	41	74	74	119	85	95	36
0.3	99.8	65.4	52.7	0.2	68.7	47.4	94.6
65	15	24	11	74	61	78	4
3.4	84.1	N/A	44.5	0.6	90.2	64.9	22.5
18	38	N/A	31	53	14	42	71
11.6	44.5	63.0	31.0	0.1	87.4	8.8	27.9
5	79	30	90	102	21	127	60
0.0	100.0	N/A	27.2	0.1	19.4	53.9	35.5
116	1	N/A	110	101	115	60	46
0.2	84.5	N/A	41.7	N/A	N/A	68.3	15.0
71	36	N/A	44	N/A	N/A	35	82
1.1	49.0	72.0	30.5	0.5	46.7	47.6	27.1
38	75	16	95	58	91	74	63
4.2	63.0	56.9	37.5	0.7	74.6	62.5	12.2
16	62	42	65	46	51	46	92
N/A	100.0	N/A	55.7	0.1	66.2	75.5	81.3
N/A	1	N/A	6	97	62	22	11
3.1	59.9	58.7	33.2	0.0	83.2	25.0	24.4
19	66	38	81	111	29	111	67
0.6	37.2	74.3	47.0	0.8	100.0	73.9	13.3
50	88	12	23	41	3	27	87
0.0	100.0	37.9	25.8	0.8	80.4	16.0	6.0
100	1	78	116	44	37	119	107
0.3	78.1	38.6	48.2	0.1	38.7	80.5	73.6
63	47	76	17	96	100	17	16
0.5	64.0	41.3	41.9	0.7	76.8	47.4	42.7
59	61	71	41	47	45	77	37
1.2	84.5	N/A	26.1	0.1	24.3	47.4	32.6
36	36	N/A	114	109	111	76	49
0.9	10.4	65.1	40.7	0.1	79.0	71.9	12.0
42	116	25	49	103	42	31	93
2.3	38.2	78.0	48.7	1.0	82.4	96.6	15.0
26	87	8	16	35	31	3	83

(continued)

Table 11.1 (continued)

Indicators / Countries	EMC	Environmental governance	Agricultural chemicals regulation	Percentage of the rural population with access to an improved water source	Percentage of the urban population with access to an improved water source	Ecological protection
Indonesia	51.0	87.9	95.2	74.0	92.0	32.5
	60	69	20	86	104	73
Peru	50.6	83.0	90.5	65.0	91.0	41.7
	61	82	37	96	106	36
Kenya	50.6	67.0	N/A	52.0	82.0	37.9
	62	112	N/A	104	122	49
Korea, Rep.	50.2	96.4	100.0	88.0	100.0	30.0
	63	34	1	67	1	81
Netherlands	50.0	90.5	76.2	100.0	100.0	41.0
	64	61	62	1	1	40
Cambodia	50.0	72.5	N/A	58.0	87.0	44.3
	65	101	N/A	99	114	26
Zambia	50.0	62.8	57.1	46.0	87.0	42.9
	66	117	74	111	114	28
Israel	49.9	100.0	N/A	100.0	100.0	34.8
	67	1	N/A	1	1	65
Armenia	49.8	93.1	85.7	97.0	99.0	20.2
	68	52	46	43	51	103
Tunisia	49.8	99.0	N/A	N/A	99.0	17.0
	69	21	N/A	N/A	51	111
Croatia	49.3	99.1	100.0	97.0	100.0	33.3
	70	20	1	43	1	68
Bosnia and Herzegovina	49.1	99.0	N/A	98.0	100.0	23.5
	71	21	N/A	40	1	96
India	49.1	93.5	N/A	90.0	97.0	22.3
	72	51	N/A	60	80	99
Nigeria	48.7	58.5	N/A	43.0	74.0	31.8
	73	122	N/A	113	125	74
Thailand	48.7	91.9	85.7	95.0	97.0	31.1
	74	59	46	48	80	79
Togo	48.7	63.5	61.9	40.0	89.0	32.6
	75	116	72	115	112	72
Turkey	48.6	99.7	100.0	99.0	100.0	16.7
	76	15	1	30	1	112
Benin	48.6	72.3	66.7	68.0	84.0	42.2
	77	102	65	92	121	33
Lithuania	48.6	67.5	95.2	0.0	98.0	44.8
	78	111	20	122	70	25

Area of plantation and afforesta-tion	Biome protect	Overfishing of fishing resources	**Resource utilization**	Utilization rate of water resources	Percentage of total internal renewable water resources to total water resources	Percentage of agricultural land to total land area	Percentage of fossil fuel energy consumption to total energy consumption
4.6	81.1	21.1	38.8	0.2	83.1	35.0	37.1
13	43	96	58	72	30	102	44
1.3	78.9	58.5	30.0	0.0	72.9	19.8	27.4
33	46	39	101	114	54	118	61
0.3	67.2	58.8	51.0	0.4	61.4	56.8	85.4
68	57	35	12	64	71	55	8
2.4	34.2	62.5	30.9	1.5	80.7	22.6	19.0
23	92	32	91	24	35	115	77
0.5	71.9	64.2	21.7	0.5	11.5	67.2	7.6
58	53	28	124	59	121	38	102
0.1	100.0	47.4	35.2	0.0	24.7	37.2	78.8
89	1	59	73	125	110	93	12
0.1	100.0	N/A	46.7	0.1	52.7	37.2	96.8
90	1	N/A	24	100	86	94	3
0.1	70.7	45.2	19.9	4.1	42.1	28.5	4.8
83	55	63	126	9	94	106	110
0.0	47.1	N/A	46.1	1.5	74.8	72.8	35.4
104	77	N/A	26	25	50	30	47
0.9	7.4	48.2	44.2	2.5	84.0	74.5	15.9
41	121	58	34	18	28	24	80
0.1	70.8	40.0	20.8	0.0	35.6	27.5	20.1
87	54	73	125	121	105	109	76
1.3	2.9	73.8	33.4	0.0	74.1	49.3	10.0
32	126	13	80	115	52	70	98
13.2	29.8	27.0	40.3	1.6	58.5	71.5	29.7
4	98	91	51	23	78	32	54
0.5	75.9	29.4	61.6	0.1	60.3	96.7	89.2
57	51	89	2	84	74	2	7
5.2	77.6	19.3	29.1	0.5	47.8	45.8	22.1
11	48	97	102	56	90	79	72
0.1	66.4	42.1	55.5	0.0	58.4	73.5	90.2
97	58	68	7	113	79	28	6
4.4	11.1	38.8	40.1	0.8	87.4	59.8	12.6
15	114	75	52	45	20	51	90
0.0	98.9	41.7	33.6	0.0	36.9	35.3	62.2
107	18	70	79	124	101	99	21
0.7	85.8	62.5	34.8	0.4	60.1	50.7	28.2
48	33	32	75	61	75	67	58

(continued)

Table 11.1 (continued)

Indicators / Countries	EMC	Environmental governance	Agricultural chemicals regulation	Percentage of the rural population with access to an improved water source	Percentage of the urban population with access to an improved water source	Ecological protection
Pakistan	48.5	92.5	N/A	89.0	96.0	33.2
	79	53	N/A	65	89	69
Gabon	48.4	68.0	N/A	41.0	95.0	40.7
	80	108	N/A	114	93	41
Nepal	48.2	71.4	42.9	88.0	93.0	26.7
	81	105	80	67	98	89
Macedonia, FYR	48.0	99.5	N/A	99.0	100.0	28.2
	82	17	N/A	30	1	86
El Salvador	47.3	77.7	66.7	76.0	94.0	22.1
	83	90	65	84	97	100
Malaysia	47.1	95.9	90.5	99.0	100.0	22.0
	84	38	37	30	1	101
Vietnam	47.0	90.0	81.0	93.0	99.0	29.3
	85	62	53	51	51	84
Venezuela, RB	46.6	0.0	N/A	N/A	N/A	64.7
	86	131	N/A	N/A	N/A	8
Belarus	46.1	99.5	N/A	99.0	100.0	19.6
	87	17	N/A	30	1	105
Sudan	46.1	73.8	95.2	52.0	67.0	29.0
	88	96	20	104	128	85
Qatar	45.3	100.0	N/A	100.0	100.0	15.3
	89	1	N/A	1	1	115
Cameroon	45.3	73.5	N/A	52.0	95.0	26.9
	90	98	N/A	104	93	88
Oman	45.2	85.5	N/A	78.0	93.0	35.5
	91	76	N/A	82	98	61
Romania	45.2	67.8	95.2	0.0	99.0	40.4
	92	110	20	122	51	45
Kuwait	44.4	99.4	100.0	99.0	99.0	15.7
	93	19	1	30	51	114
Spain	44.1	60.0	0.0	100.0	100.0	32.9
	94	121	86	1	1	71
Iran, Islamic Rep.	43.9	89.1	81.0	92.0	97.0	20.2
	95	65	53	53	80	102
Guinea	43.9	63.6	42.9	65.0	90.0	33.0
	96	114	80	96	111	70
Morocco	43.7	82.0	85.7	61.0	98.0	13.8
	97	86	46	98	70	117

Area of plantation and afforesta-tion	Biome protect	Overfishing of fishing resources	**Resource utilization**	Utilization rate of water resources	Percentage of total internal renewable water resources to total water resources	Percentage of agricultural land to total land area	Percentage of fossil fuel energy consumption to total energy consumption
0.4	58.9	51.0	24.9	3.2	15.0	40.3	41.2
60	67	54	118	15	117	89	40
0.0	89.4	46.3	39.1	0.0	73.2	23.6	59.8
101	26	61	57	132	53	113	24
0.1	62.2	N/A	53.7	0.2	86.1	35.0	93.4
96	63	N/A	8	77	24	101	5
N/A	28.2	N/A	23.0	0.6	N/A	47.5	21.0
N/A	103	N/A	121	50	N/A	75	74
0.0	4.9	68.8	50.7	0.2	56.8	88.1	57.6
108	122	20	13	73	80	11	27
2.3	48.4	21.8	31.8	0.1	92.1	28.3	6.8
25	76	95	85	94	11	107	104
4.6	36.6	55.1	27.6	0.4	39.1	39.2	31.9
14	90	46	108	62	99	92	50
N/A	100.0	29.4	22.6	0.0	50.2	28.7	11.3
N/A	1	89	122	117	87	105	94
2.4	42.5	N/A	28.0	0.3	48.9	52.0	10.9
22	80	N/A	105	67	89	64	96
7.9	28.9	57.1	41.2	2.3	19.5	68.0	75.0
8	100	40	47	19	114	37	14
N/A	13.9	16.7	30.7	18.5	96.6	6.6	1.1
N/A	112	98	92	5	4	130	123
0.1	53.9	35.5	41.7	0.0	71.7	23.4	71.6
84	69	81	43	127	58	114	17
0.0	62.2	56.1	17.8	3.5	59.6	7.0	1.1
115	63	44	127	14	77	129	124
1.9	40.2	91.9	29.0	0.1	19.2	69.5	27.1
30	84	2	103	86	116	33	62
0.0	9.4	42.9	27.8	100.0	0.0	10.0	1.1
114	117	66	107	1	128	124	122
3.5	50.4	54.8	43.2	1.2	79.6	65.6	26.2
17	72	47	37	29	41	40	64
1.1	40.3	25.6	30.4	2.7	82.0	35.2	1.5
39	83	92	96	17	33	100	119
0.1	39.9	70.0	38.5	0.0	85.6	68.5	N/A
82	86	17	59	118	26	34	N/A
0.8	9.1	35.8	45.1	1.8	90.6	79.6	8.6
45	118	80	29	22	13	18	101

(continued)

Table 11.1 (continued)

Indicators / Countries	EMC	Environmental governance	Agricultural chemicals regulation	Percentage of the rural population with access to an improved water source	Percentage of the urban population with access to an improved water source	Ecological protection
Paraguay	43.7	87.6	95.2	66.0	99.0	13.7
	98	74	20	95	51	118
Mozambique	43.6	31.8	0.0	29.0	77.0	44.9
	99	129	86	121	124	24
Argentina	43.5	88.3	81.0	N/A	98.0	23.3
	100	67	53	N/A	70	97
Lebanon	43.3	92.4	81.0	100.0	100.0	10.5
	101	54	53	1	1	122
Hungary	43.3	98.1	95.2	100.0	100.0	14.1
	102	24	20	1	1	116
Lesotho	43.1	82.0	N/A	73.0	91.0	0.6
	103	85	N/A	87	106	132
Nicaragua	43.0	55.5	14.3	68.0	98.0	31.3
	104	124	84	92	70	78
Turkmenistan	42.9	97.0	N/A	N/A	97.0	17.9
	105	33	N/A	N/A	80	109
Myanmar	42.7	74.2	57.1	78.0	93.0	19.7
	106	94	74	82	98	104
Russian Federation	42.1	57.3	0.0	92.0	99.0	41.2
	107	123	86	53	51	39
Syrian Arab Republic	42.1	88.0	85.7	86.0	93.0	18.9
	108	68	46	71	98	106
Madagascar	41.8	61.0	71.4	34.0	74.0	16.2
	109	119	63	118	125	113
Uruguay	41.7	75.2	38.1	100.0	100.0	12.5
	110	91	82	1	1	119
Moldova	41.3	93.8	90.5	93.0	99.0	8.2
	111	50	37	51	51	124
Egypt, Arab Rep.	41.0	95.9	90.5	99.0	100.0	27.6
	112	38	37	30	1	87
Angola	40.9	49.0	N/A	38.0	60.0	29.7
	113	126	N/A	117	129	82
Algeria	40.5	72.1	57.1	79.0	85.0	24.7
	114	103	74	79	118	93
Ethiopia	39.9	41.2	4.8	34.0	97.0	25.9
	115	128	85	118	80	91
Haiti	39.2	68.0	N/A	51.0	85.0	0.7
	116	108	N/A	107	118	131

Area of plantation and afforesta-tion	Biome protect	Overfishing of fishing resources	**Resource utilization**	Utilization rate of water resources	Percentage of total internal renewable water resources to total water resources	Percentage of agricultural land to total land area	Percentage of fossil fuel energy consumption to total energy consumption
0.1	31.9	N/A	39.6	0.0	24.9	62.2	71.4
94	94	N/A	55	131	109	47	18
0.1	90.8	58.8	53.6	0.0	43.4	74.1	96.8
90	24	35	9	127	93	25	2
1.8	29.1	46.2	25.6	0.2	29.3	60.7	12.3
31	99	62	117	83	108	48	91
0.0	2.8	32.3	38.1	1.1	65.4	79.5	6.2
111	127	87	62	32	65	19	106
2.1	30.1	N/A	27.3	0.2	5.5	75.5	28.0
28	95	N/A	109	75	124	21	59
0.0	1.4	N/A	60.8	0.1	91.3	91.1	N/A
112	130	N/A	3	99	12	6	N/A
0.1	91.1	13.0	46.2	0.0	75.4	50.5	58.8
86	23	101	25	120	48	68	26
N/A	17.9	N/A	22.0	4.1	1.7	82.0	0.1
N/A	109	N/A	123	10	127	16	125
1.3	34.1	29.8	42.0	0.1	62.3	22.5	83.0
34	93	88	40	89	70	116	9
22.0	53.4	54.6	28.1	0.1	85.9	15.6	10.8
3	70	48	104	106	25	120	97
0.4	3.8	58.8	27.0	4.0	12.3	89.5	2.1
62	123	35	111	11	120	7	117
0.5	18.0	35.3	56.8	0.2	87.1	83.0	N/A
52	108	82	5	82	23	15	N/A
1.3	1.5	38.5	47.0	0.1	36.4	100.0	51.6
35	129	77	22	91	102	1	34
N/A	8.2	N/A	33.1	0.7	N/A	88.8	9.8
N/A	120	N/A	83	49	N/A	9	99
0.1	34.7	57.1	4.1	4.8	2.1	4.4	5.0
87	91	40	132	7	126	131	109
0.2	65.6	33.3	47.6	0.0	72.9	55.3	62.1
78	59	85	20	126	55	58	22
0.5	37.1	44.4	30.1	2.1	96.4	20.5	1.3
55	89	64	98	20	5	117	120
0.7	85.4	N/A	57.2	0.2	87.1	41.4	100.0
49	34	N/A	4	80	22	86	1
0.0	1.7	N/A	61.7	0.3	92.7	78.9	74.8
102	128	N/A	1	66	10	20	15

(continued)

Table 11.1 (continued)

Indicators / Countries	EMC	Environmental governance	Agricultural chemicals regulation	Percentage of the rural population with access to an improved water source	Percentage of the urban population with access to an improved water source	Ecological protection
Dominican Republic	38.9	85.5	N/A	84.0	87.0	5.0
	117	76	N/A	75	114	129
Tajikistan	38.8	73.0	N/A	54.0	92.0	10.5
	118	99	N/A	102	104	121
Bangladesh	38.3	82.5	N/A	80.0	85.0	10.9
	119	83	N/A	77	118	120
Azerbaijan	37.8	79.5	N/A	71.0	88.0	17.2
	120	88	N/A	89	113	110
Congo, Rep.	37.8	63.5	N/A	32.0	95.0	24.2
	121	115	N/A	120	93	95
Eritrea	37.6	0.0	N/A	N/A	N/A	25.7
	122	131	N/A	N/A	N/A	92
Uzbekistan	36.4	89.5	N/A	81.0	98.0	6.0
	123	63	N/A	76	70	127
Singapore	35.5	70.0	100.0	0.0	100.0	35.3
	124	106	1	122	1	62
Yemen, Rep.	34.8	60.5	61.9	47.0	72.0	18.8
	125	120	72	110	127	107
Jordan	34.6	95.1	95.2	92.0	98.0	3.9
	126	43	20	53	70	130
Kazakhstan	34.4	71.9	38.1	90.0	99.0	6.8
	127	104	82	60	51	125
Kyrgyz Republic	34.0	55.2	0.0	85.0	99.0	10.0
	128	125	86	72	51	123
Niger	31.7	64.6	57.1	39.0	100.0	17.9
	129	113	74	116	1	108
Iraq	27.2	73.5	N/A	56.0	91.0	0.3
	130	97	N/A	100	106	133
Mali	24.5	41.4	0.0	51.0	87.0	6.5
	131	127	86	107	114	126
Mauritania	23.7	30.0	0.0	48.0	52.0	24.4
	132	130	86	109	130	94
Libya	11.7	0.0	N/A	0.0	0.0	5.2
	133	131	N/A	122	131	128
Highest score	**68.0**	**100.0**	**100.0**	**100.0**	**100.0**	**86.2**
Lowest score	**11.7**	**0.0**	**0.0**	**0.0**	**0.0**	**0.3**
Average score	**49.1**	**82.2**	**76.6**	**78.6**	**94.5**	**33.1**
Standard deviation	**9.1**	**20.0**	**28.2**	**25.6**	**11.6**	**16.4**

Area of plantation and afforesta-tion	Biome protect	Overfishing of fishing resources	**Resource utilization**	Utilization rate of water resources	Percentage of total internal renewable water resources to total water resources	Percentage of agricultural land to total land area	Percentage of fossil fuel energy consumption to total energy consumption
N/A	0.0	16.7	37.7	0.7	64.2	60.3	25.4
N/A	133	98	64	48	66	49	65
0.1	24.4	N/A	42.4	3.0	63.1	40.1	63.4
80	104	N/A	38	16	68	90	20
0.3	10.8	25.0	30.7	0.1	8.6	83.1	31.0
66	115	93	93	88	123	14	52
0.0	40.2	N/A	23.5	1.4	20.8	68.1	3.9
106	84	N/A	120	26	113	36	111
0.1	55.4	25.0	30.2	0.0	23.3	36.6	60.8
92	68	93	97	123	112	96	23
0.0	30.0	55.6	53.4	0.4	41.8	88.8	82.6
98	97	45	10	63	95	8	10
0.8	12.9	N/A	23.9	4.8	13.6	74.1	3.3
43	113	N/A	119	8	118	26	113
N/A	28.5	42.2	1.2	1.3	N/A	0.0	2.4
N/A	101	67	133	28	N/A	133	115
N/A	3.3	34.3	30.5	6.8	60.0	52.5	2.7
N/A	124	83	94	6	76	62	114
0.1	9.1	N/A	14.8	4.0	36.4	13.6	5.3
95	118	N/A	131	12	103	122	108
1.2	14.2	N/A	33.6	1.2	39.9	91.3	2.3
37	111	N/A	78	30	98	5	116
0.1	23.3	N/A	44.7	1.8	80.6	65.4	31.0
93	105	N/A	30	21	36	41	53
0.2	41.6	N/A	17.2	0.3	10.4	40.9	N/A
76	82	N/A	128	68	122	87	N/A
0.0	0.6	N/A	16.7	3.5	35.7	23.8	3.8
108	131	N/A	129	13	104	112	112
0.7	14.3	N/A	31.5	0.3	54.5	39.8	N/A
47	110	N/A	87	69	82	91	N/A
0.0	3.2	78.2	16.5	0.6	3.5	45.5	N/A
104	125	7	130	54	125	80	N/A
0.3	0.6	16.2	32.3	29.1	87.5	10.4	2.0
67	131	100	84	4	19	123	118
100.0	**100.0**	**100.0**	**61.7**	**100.0**	**100.0**	**100.0**	**100.0**
0.0	**0.0**	**13.0**	**1.2**	**0.0**	**0.0**	**0.0**	**0.0**
2.7	**55.5**	**51.9**	**36.6**	**2.8**	**60.6**	**50.9**	**33.0**
10.0	**32.9**	**18.5**	**10.9**	**11.9**	**26.7**	**24.2**	**27.3**

Fig. 11.1 EMC scores of six continents & top three countries of each continent in 2012

60 countries accounting for 70.6 % of the all developed countries. However, the developed countries are not even on EMC: Japan and United Kingdom ranking 4th and 5th; Hungary and Singapore ranking 102nd and 124th respectively. Overall, the majority of developing countries still have low EMC, while the developed countries have relatively higher EMC.

To compare and analyze the EMC levels of all the countries in a more visual way, the EMC scores are displayed in Fig. 11.2. According to Fig. 11.2, the EMC scores of the countries are concentrated, mostly in 40–60 points (up to 103 countries, accounting for 77.44 % of the total), showing little differences among the countries except for individual countries. Among the developed countries, Japan scores the highest, 65.4 points; among the developing countries, Honduras scores the highest, 68.0 points. They have little difference.

11.2 Factor Scores and Contribution Rates of EMC

Table 11.1 lists the evaluation results of the subordinate indicators of EMC and displays the scores and rankings of 3 pillars and 10 individual indicators of EMC in 2012 so as to analyze the influences of the pillars and individual indicators on EMC of the countries.

On pillars, environmental governance enjoys the highest standard deviation, hitting 20.0, indicating that this indicator has the largest differences among the countries and is the most primary factor causing EMC differences among the countries. Resource utilization has low standard deviation, 10.9, with little

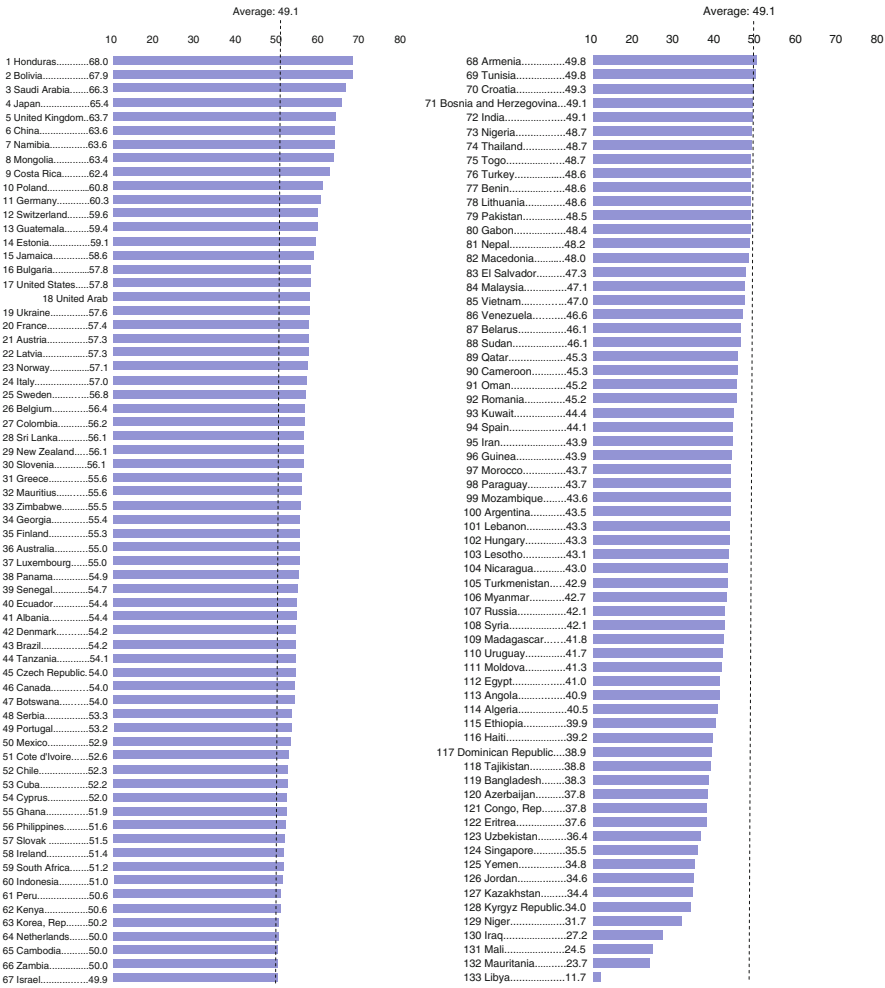

Fig. 11.2 Rankings and scores of EMC 2012

influence on EMC differences among the countries. Overall, the differences among the countries are mainly caused by the differences of environmental safety.

On individual indicators, biome protect enjoys the highest standard deviation, hitting 32.9, indicating that this indicator has the largest differences among the countries and is the most primary factor causing EMC differences among the countries. Agricultural chemicals regulation, percentage of the rural population with access to an improved water source, percentage of total internal renewable water resources to total water resources, percentage of agricultural land to total land area and percentage of fossil fuel energy consumption to total energy consumption have high standard deviation, above 20, contributing a lot to EMC differences

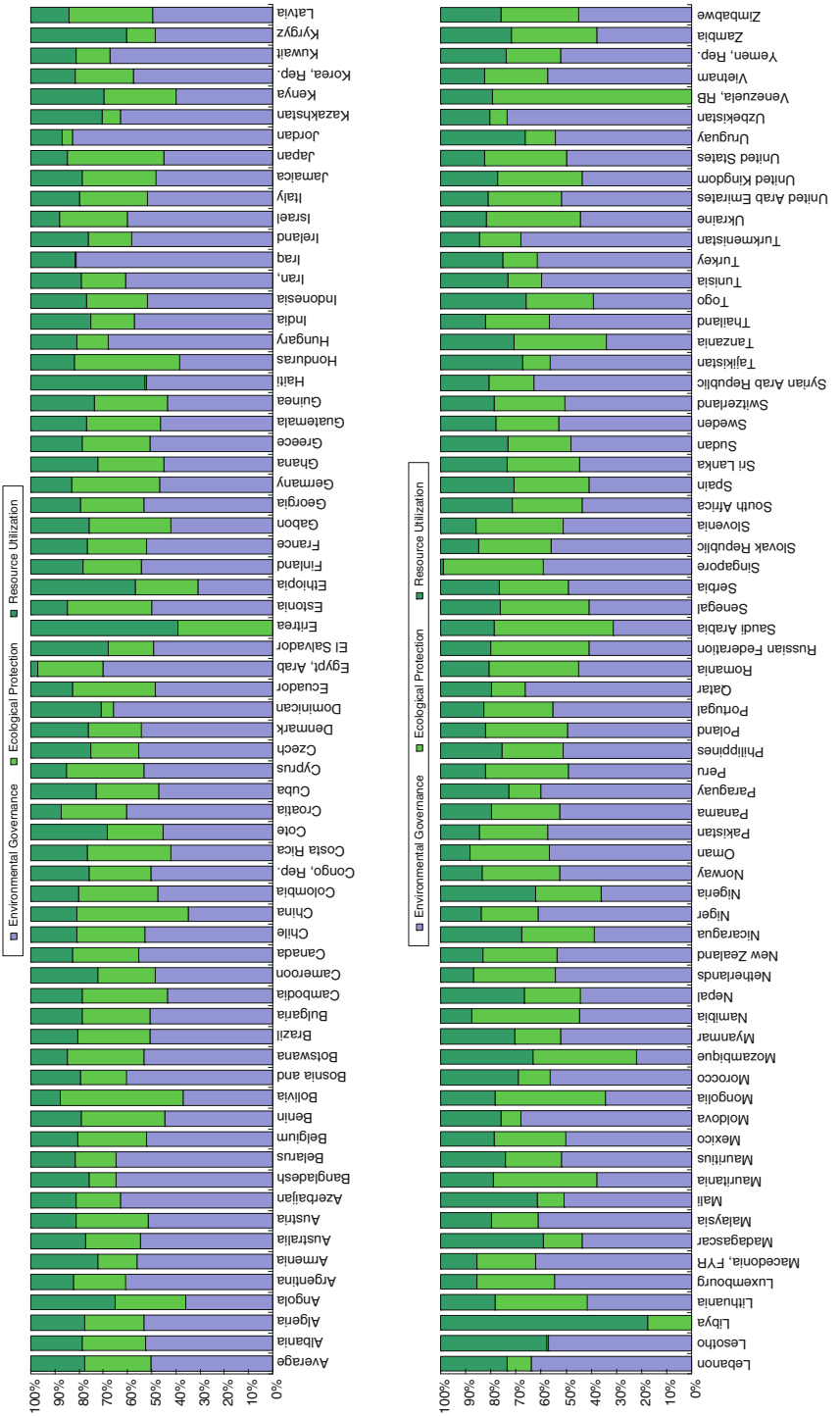

Fig. 11.3 Contribution rates of pillars of EMC 2012

among the countries. The other indicators have low standard deviation, with little influence on EMC differences among the countries.

To analyze the contribution of the pillars to EMC, firstly multiply the scores of the pillars by respective weights, then convert them into the scores at sub-index and finally divide them by the total score of sub-index to get the contribution rates of the pillars. Thus, we could find the contribution of each pillar to the sub-index more visually, as shown in Fig. 11.3.

According to Fig. 11.3, environmental governance contributes the most to EMC with the average contribution rate of 50.3 %; the contribution rate of ecological protection and resource utilization respectively are 27.0 % and 22.4 %. Some countries enjoy very high contribution rates of environmental governance, even above 80 %, e.g. Jordan and Iraq. Therefore, to enhance EMC, the countries shall focus specially on environmental governance, while not ignoring ecological protection and resource utilization.

Chapter 12
Evaluation and Comparative Analysis on EHC

12.1 Evaluation Results of EHC

According to the evaluation indicator system and the mathematic model of EHC, the evaluation and analysis are made on EHC in 2012. Table 12.1 lists the rankings and scores of EHC in 2012 and Fig. 12.1 displays the EHC scores of the six continents as well as the top three countries of each continent in 2012.

According to Table 12.1, the countries with EHC ranking 1st–10th include Singapore, Costa Rica, Gabon, Uruguay, Myanmar, Albania, Ecuador, Brazil, El Salvador and Sri Lanka; the 11th–20th rankings are Georgia, Peru, Panama, Congo, Rep., Norway, Chile, Angola, Paraguay, Guatemala and Philippines; the 21st–30th rankings are Colombia, Cuba, Dominican Republic, Turkey, Armenia, Venezuela, RB, Cameroon, Algeria, Tajikistan and Switzerland; and the bottom ten countries are Zimbabwe, Turkmenistan, Mauritius, Cote d'Ivoire, Kazakhstan, Kuwait, Mauritania, Madagascar, Niger and Lesotho.

In 2012, the highest score of EHC is 80.3 points, the lowest score is 23.8, the average score is 65.1 and the standard deviation is 8.9. The highest score and the lowest score differ greatly with the margin of 56.5 points. 87 countries score higher than the average point. It indicates that the overall level of EHC is rather high and the differences are very little among the countries.

The scores of EHC show olive-shaped distribution. Only one country scores above 80 points; 39 countries score 70–80; 66 countries score 60–70; 17 countries 50–60; 8 countries score 40–50; 2 countries score below 40 points, of 29.2 and 23.8.

The countries with higher EHC are mainly developing countries. Among the 10 countries ranking ahead, 9 are developing countries; among the 30 countries ranking ahead, 27 are developing countries. Overall, the developed countries rank at the middle level on EHC, with 17 countries ranking No. 41–80, accounting for half of the total developed countries. And most developing countries still have relatively low EHC, ranking behind.

To compare and analyze the EHC levels of all the countries in a more visual way, the EHC scores are displayed in Fig. 12.2. According to Fig. 12.2, the EHC scores

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Table 12.1 Scores and rankings of EHC as well as the tertiary and individual indicators in 2012

Indicators / Countries	EHC	Population and Environment	Percentage of population with access to Improved sanitation facilities	Motor vehicles per 1,000 people	Renewable internal freshwater resources per capita	SO_2 emissions per capita
Singapore	80.3	65.9	100.0	81.0	0.1	81.5
	1	91	1	74	123	111
Costa Rica	77.0	82.1	95.0	79.8	26.8	98.3
	2	8	46	77	15	31
Gabon	76.9	83.4	33.0	98.5	100.0	95.7
	3	4	108	16	2	66
Uruguay	76.7	80.8	100.0	75.6	21.2	97.4
	4	13	1	83	22	48
Myanmar	76.0	84.6	81.0	99.4	25.1	99.7
	5	2	77	7	18	7
Albania	75.6	81.9	98.0	85.4	10.1	98.6
	6	9	33	63	39	29
Ecuador	75.3	84.8	92.0	92.5	33.3	97.2
	7	1	56	42	12	50
Brazil	74.4	76.9	80.0	68.3	33.3	96.7
	8	32	78	87	13	58
El Salvador	74.3	79.6	87.0	89.9	3.4	98.1
	9	16	67	50	68	38
Sri Lanka	74.3	81.4	91.0	94.4	3.1	96.5
	10	10	58	38	71	61
Georgia	74.2	82.3	95.0	85.9	15.7	98.9
	11	7	47	60	27	22
Peru	74.2	83.2	68.0	91.9	66.5	82.9
	12	5	90	44	5	108
Panama	74.1	78.6	69.0	82.8	39.1	96.0
	13	24	88	67	8	64
Congo, Rep.	74.0	78.9	30.0	97.0	64.9	94.2
	14	22	114	26	6	78
Norway	73.9	73.5	100.0	28.9	93.3	97.8
	15	46	1	122	3	45
Chile	73.6	81.1	96.0	78.8	61.9	69.9
	16	11	42	80	7	122
Angola	73.4	75.8	57.0	95.3	9.1	99.6
	17	37	92	36	42	10
Paraguay	73.3	78.3	70.0	89.0	17.3	99.2
	18	25	87	52	25	21
Guatemala	73.1	78.3	81.0	85.4	8.2	98.1
	19	26	76	61	43	37

CO_2 emissions per capita	Energy consumption per capita	**Economy and Environment**	Land resource utilization efficiency	Sulfur dioxide emissions per unit of GDP	Carbon dioxide emissions per unit of GDP	Energy consumption per unit of GDP
66.5	50.1	94.7	100.0	96.7	90.8	91.5
121	117	1	1	44	48	36
96.3	92.7	71.9	0.2	98.4	95.4	93.5
43	51	18	42	22	10	25
95.3	89.9	70.4	0.0	96.3	94.6	90.8
51	64	26	107	53	19	40
94.9	91.3	72.5	0.1	98.4	96.1	95.3
53	60	16	79	24	9	16
99.7	98.8	67.4	0.0	97.4	95.1	77.2
11	5	49	97	31	14	85
96.9	96.0	69.2	0.1	97.2	89.9	89.7
39	30	33	56	34	54	45
94.2	94.5	65.8	0.1	94.8	81.4	87.0
56	44	60	82	65	88	56
94.7	90.4	71.8	0.1	97.8	95.4	93.9
54	62	20	73	30	11	23
97.5	95.8	69.0	0.3	95.9	91.7	88.1
36	32	38	36	56	45	50
98.4	97.3	67.2	0.3	88.8	91.8	87.8
27	20	51	38	93	42	51
97.1	95.6	66.2	0.1	96.8	85.6	82.3
38	34	57	87	43	74	74
96.2	95.8	65.2	0.0	75.5	91.7	93.7
46	31	67	93	119	44	24
93.6	92.6	69.7	0.1	96.1	90.1	92.5
60	53	31	62	54	53	28
99.0	98.2	69.0	0.0	85.1	97.1	94.0
23	11	36	115	104	6	22
78.4	48.7	74.2	0.5	99.9	98.9	97.6
105	118	5	30	3	3	4
89.0	86.8	66.0	0.1	81.9	89.7	92.3
77	72	59	68	108	57	29
97.7	95.5	71.0	0.0	99.4	94.4	90.2
34	38	23	98	16	22	41
98.1	95.3	68.3	0.0	97.9	92.4	82.8
30	41	42	110	28	37	71
98.2	95.5	67.9	0.1	95.1	92.4	83.8
28	36	46	59	63	35	67

(continued)

Table 12.1 (continued)

Indicators / Countries	EHC	Population and Environment	Percentage of population with access to Improved sanitation facilities	Motor vehicles per 1,000 people	Renewable internal freshwater resources per capita	SO_2 emissions per capita
Philippines	72.8	79.3	76.0	96.2	6.1	97.2
	20	19	82	30	51	52
Colombia	72.5	73.4	51.0	85.4	21.2	97.9
	21	48	98	61	22	42
Cuba	72.5	79.5	91.0	95.6	4.1	90.9
	22	18	58	34	61	92
Dominican Republic	72.2	76.5	83.0	84.4	2.5	94.7
	23	33	73	65	79	75
Turkey	72.1	75.7	90.0	82.7	3.7	90.8
	24	38	62	68	64	93
Armenia	71.6	78.9	90.0	87.3	2.7	95.6
	25	21	62	55	76	67
Venezuela, RB	71.6	77.8	91.0	82.1	29.9	94.8
	26	29	58	70	14	73
Cameroon	71.4	76.1	47.0	98.5	16.5	99.3
	27	35	102	16	26	20
Algeria	71.4	77.8	95.0	81.2	0.4	98.8
	28	27	47	71	118	26
Tajikistan	71.4	83.9	94.0	95.6	11.0	98.0
	29	3	52	34	33	40
Switzerland	71.0	65.8	100.0	30.9	6.2	98.8
	30	92	1	119	50	27
Croatia	70.9	72.1	99.0	52.8	10.4	93.5
	31	57	31	101	37	82
Honduras	70.7	77.8	71.0	88.3	15.0	97.6
	32	28	86	53	29	46
Morocco	70.2	75.6	69.0	91.6	1.1	95.4
	33	40	88	46	104	69
Egypt, Arab Rep.	70.1	80.6	94.0	94.9	0.0	97.1
	34	15	52	37	131	54
Argentina	70.1	72.6	90.0	61.5	8.2	98.6
	35	54	62	94	44	30
Sweden	70.1	66.8	100.0	35.8	21.9	98.2
	36	88	1	109	21	36
Nicaragua	70.0	78.8	52.0	93.1	39.1	98.0
	37	23	95	40	9	39
Hungary	70.0	72.0	100.0	63.1	0.7	93.9
	38	58	1	92	111	79

CO_2 emissions per capita	Energy consumption per capita	**Economy and Environment**	Land resource utilization efficiency	Sulfur dioxide emissions per unit of GDP	Carbon dioxide emissions per unit of GDP	Energy consumption per unit of GDP
97.9	97.7	66.3	0.2	90.1	87.3	87.5
33	16	56	46	87	71	54
94.2	93.9	71.7	0.1	98.4	94.2	94.0
56	48	21	71	23	25	21
92.9	93.4	65.5	0.2	87.9	83.9	90.1
61	50	64	49	95	79	42
95.0	94.5	67.9	0.3	92.3	88.2	90.8
52	45	45	34	75	64	39
90.2	89.7	68.4	0.3	93.1	88.0	92.3
73	65	41	37	71	65	31
96.6	94.9	64.3	0.1	89.1	85.3	82.8
41	43	72	63	90	76	70
82.9	80.0	65.4	0.1	96.4	79.7	85.3
93	86	66	64	49	92	64
99.4	98.3	66.8	0.0	95.1	93.7	78.3
14	10	53	113	64	29	84
92.6	92.1	65.0	0.0	98.1	78.2	83.8
64	56	69	100	26	97	68
99.0	98.5	58.9	0.0	81.3	83.2	70.9
22	7	94	114	110	82	100
84.8	74.7	76.1	4.8	100.0	99.5	100.0
88	98	2	5	2	2	1
88.4	85.9	69.7	0.3	96.4	89.8	92.3
79	75	29	35	51	55	30
97.5	96.4	63.6	0.0	91.1	83.5	79.9
37	28	77	92	84	81	81
96.2	97.0	64.8	0.1	87.6	82.3	89.2
45	24	71	85	97	85	47
94.2	94.0	59.7	0.1	91.9	70.0	76.9
58	47	91	84	80	109	86
88.7	86.5	67.6	0.0	98.9	84.1	87.6
78	74	48	91	20	77	53
86.3	57.9	73.4	0.4	99.8	98.6	94.9
84	113	8	33	8	4	20
98.0	96.8	61.2	0.0	89.7	81.4	73.9
31	26	85	101	88	90	92
86.8	80.8	68.0	0.5	96.4	87.4	87.8
83	84	44	31	49	70	52

(continued)

Table 12.1 (continued)

Indicators / Countries	EHC	Population and Environment	Percentage of population with access to Improved sanitation facilities	Motor vehicles per 1,000 people	Renewable internal freshwater resources per capita	SO_2 emissions per capita
Sudan	70.0	70.9	34.0	96.9	1.1	99.5
	39	63	107	28	107	13
Tunisia	70.0	76.3	85.0	86.2	0.5	91.8
	40	34	71	58	116	87
Bangladesh	69.8	75.4	53.0	99.9	0.8	99.6
	41	41	94	2	109	9
Senegal	69.8	74.6	51.0	97.5	2.4	98.8
	42	45	98	24	80	25
Mexico	69.4	71.4	85.0	66.2	4.3	91.5
	43	61	71	89	59	88
Portugal	69.4	66.9	100.0	34.0	4.4	91.4
	44	87	1	113	58	89
Jordan	69.2	77.4	98.0	81.2	0.1	93.2
	45	30	33	71	125	84
Denmark	69.2	64.1	100.0	32.5	1.3	98.3
	46	104	1	115	101	33
Ireland	69.2	65.2	99.0	33.3	13.0	92.8
	47	96	31	114	30	85
United Kingdom	69.1	64.9	100.0	35.4	2.8	95.2
	48	97	1	111	75	70
Austria	68.8	64.2	100.0	31.0	7.9	98.6
	49	103	1	118	45	28
Slovak Republic	68.7	69.6	100.0	57.3	2.8	93.3
	50	72	1	97	74	83
France	68.7	64.0	100.0	29.3	3.7	96.4
	51	106	1	121	65	63
Jamaica	68.6	75.3	83.0	85.4	4.2	88.9
	52	42	73	63	60	99
Thailand	68.5	77.0	96.0	79.9	3.9	96.6
	53	31	42	76	63	60
Latvia	68.3	67.1	78.0	43.6	9.8	99.3
	54	86	80	104	41	19
Japan	68.2	62.6	100.0	27.5	4.1	97.2
	55	111	1	123	62	51
New Zealand	68.1	64.9	N/A	11.6	89.8	91.4
	56	99	N/A	130	4	90
Macedonia, FYR	68.1	75.9	88.0	81.1	3.2	97.9
	57	36	66	73	70	42

CO_2 emissions per capita	Energy consumption per capita	**Economy and Environment**	Land resource utilization efficiency	Sulfur dioxide emissions per unit of GDP	Carbon dioxide emissions per unit of GDP	Energy consumption per unit of GDP
99.3	98.2	69.0	0.0	98.2	94.2	83.8
18	12	37	119	25	24	69
94.5	93.9	63.6	0.1	85.2	82.7	86.3
55	48	78	72	103	83	60
99.1	99.5	64.1	0.2	95.8	81.4	79.0
20	2	74	41	57	89	82
98.9	99.0	64.9	0.0	91.5	85.5	82.7
24	4	70	103	83	75	72
89.7	88.7	67.4	0.2	93.0	86.5	90.0
74	68	50	52	72	73	43
87.8	83.6	71.9	0.8	97.0	94.2	95.5
82	79	19	24	37	26	14
91.8	91.7	61.1	0.1	88.2	74.3	81.9
67	59	86	69	94	103	76
77.1	73.7	74.4	2.3	99.9	96.6	98.9
108	99	4	13	4	8	2
76.7	75.7	73.3	0.9	98.9	95.1	98.2
109	95	12	20	19	13	3
79.0	75.4	73.2	3.0	99.1	94.1	96.6
103	96	13	11	18	27	7
77.7	69.3	73.3	1.5	99.9	95.3	96.6
107	104	11	16	5	12	8
82.6	75.2	67.8	0.6	96.9	86.5	87.4
94	97	47	27	42	72	55
85.1	69.3	73.4	1.5	99.4	97.0	95.5
87	103	10	17	14	7	13
92.1	92.2	61.9	0.4	83.0	78.8	85.5
66	55	83	32	107	96	63
90.4	87.7	60.0	0.2	94.4	71.3	74.2
71	70	90	48	68	108	91
90.3	85.5	69.5	0.1	99.6	89.1	89.0
72	76	32	58	10	60	48
75.8	70.3	73.8	4.7	99.6	94.3	96.5
111	101	7	6	11	23	9
81.0	68.2	71.4	0.2	98.1	93.9	93.5
100	106	22	51	27	28	26
89.3	90.0	60.4	0.1	96.5	66.5	78.4
75	63	88	60	47	110	83

(continued)

Table 12.1 (continued)

Indicators / Countries	EHC	Population and Environment	Percentage of population with access to Improved sanitation facilities	Motor vehicles per 1,000 people	Renewable internal freshwater resources per capita	SO_2 emissions per capita
Indonesia	68.1	73.0	52.0	90.5	10.1	97.2
	58	49	95	48	40	53
Greece	68.0	65.6	98.0	44.6	6.2	79.3
	59	94	33	103	49	114
Tanzania	68.0	80.9	N/A	99.4	2.2	99.7
	60	12	N/A	7	84	8
Israel	67.9	65.4	100.0	58.0	0.1	72.2
	61	95	1	96	127	121
Netherlands	67.7	61.7	100.0	35.7	0.8	98.3
	62	114	1	110	110	32
Spain	67.7	63.2	100.0	25.2	2.9	87.7
	63	109	1	125	72	102
Malaysia	67.6	73.0	96.0	57.0	24.3	95.0
	64	50	42	98	19	72
Lebanon	67.6	69.1	98.0	46.7	1.4	89.2
	65	74	33	102	99	98
Botswana	67.5	69.5	60.0	86.3	1.4	80.8
	66	73	91	57	94	113
Syrian Arab Republic	67.4	79.6	96.0	92.5	0.4	93.6
	67	17	42	43	117	80
Cambodia	67.4	71.5	29.0	97.7	10.2	99.6
	68	60	115	22	38	11
Canada	67.4	65.8	100.0	23.7	100.0	73.5
	69	93	1	126	1	120
Nigeria	67.1	70.1	32.0	96.4	1.6	99.5
	70	68	110	29	88	15
Azerbaijan	67.0	68.6	45.0	89.3	1.1	93.6
	71	77	103	51	106	81
Slovenia	67.0	64.3	100.0	30.4	11.0	90.7
	72	102	1	120	34	94
Haiti	67.0	68.2	17.0	98.8	1.6	99.7
	73	80	121	12	91	6
Germany	66.9	60.8	100.0	22.0	1.6	97.1
	74	116	1	127	89	56
Ghana	66.8	66.6	13.0	96.2	1.5	99.5
	75	90	124	30	93	14
Belgium	66.6	60.4	100.0	31.4	1.3	95.9
	76	119	1	117	100	65
Bolivia	66.6	72.4	25.0	91.9	36.4	98.8
	77	56	118	44	11	24

CO_2 emissions per capita	Energy consumption per capita	**Economy and Environment**	Land resource utilization efficiency	Sulfur dioxide emissions per unit of GDP	Carbon dioxide emissions per unit of GDP	Energy consumption per unit of GDP
95.5	94.3	63.1	0.1	92.7	79.3	80.2
49	46	80	57	73	95	78
79.9	81.8	70.5	0.7	94.0	91.1	96.2
101	82	25	26	69	46	11
99.7	97.6	55.1	0.0	94.8	92.2	33.4
9	19	104	120	66	39	120
75.9	77.4	70.3	3.3	92.7	90.1	95.3
110	93	28	9	74	52	15
69.6	61.5	73.8	7.2	99.8	93.0	95.2
118	111	6	2	7	34	18
84.3	79.2	72.3	0.9	97.0	94.9	96.4
91	88	17	21	41	16	10
82.4	80.9	62.2	0.3	95.7	72.5	80.2
95	83	82	39	59	106	79
88.2	89.1	66.0	1.1	90.7	82.5	89.9
81	66	58	19	85	84	44
93.9	92.2	65.6	0.0	80.3	90.3	91.6
59	54	63	117	113	50	33
92.4	92.7	55.3	0.1	83.3	63.3	74.3
65	52	103	66	106	114	90
99.4	98.3	63.3	0.0	96.0	89.2	67.9
15	9	79	104	55	59	103
57.4	42.8	68.9	0.1	95.7	89.0	91.0
125	122	39	88	58	63	38
99.3	95.5	64.0	0.1	97.4	94.6	64.1
17	37	75	78	33	18	109
92.7	90.8	65.4	0.2	91.7	83.9	85.8
63	61	65	45	81	78	62
79.8	73.3	69.7	0.7	97.0	89.5	91.5
102	100	30	25	39	58	35
99.5	99.3	65.7	0.1	97.0	89.8	76.1
13	3	61	80	40	56	87
74.8	69.5	72.9	3.0	99.5	93.3	95.8
113	102	14	10	12	32	12
99.1	98.1	67.1	0.0	97.2	90.8	80.5
21	13	52	90	35	47	77
73.6	57.0	72.8	5.0	99.4	93.5	93.4
114	114	15	4	15	30	27
96.3	95.3	60.8	0.0	95.6	73.9	73.9
44	40	87	124	60	104	93

(continued)

Table 12.1 (continued)

Indicators / Countries	EHC	Population and Environment	Percentage of population with access to Improved sanitation facilities	Motor vehicles per 1,000 people	Renewable internal freshwater resources per capita	SO_2 emissions per capita
Lithuania	66.5	64.8	86.0	31.7	6.2	94.8
	78	100	70	116	48	74
Romania	66.5	68.9	72.0	71.9	2.4	86.2
	79	75	85	85	81	106
Libya	66.4	69.8	97.0	64.4	0.1	94.4
	80	70	39	91	126	77
Eritrea	66.4	67.6	14.0	98.9	0.6	99.6
	81	82	123	11	113	12
Yemen, Rep.	65.9	73.4	52.0	95.9	0.1	95.6
	82	47	95	32	129	68
Korea, Rep.	65.8	64.9	100.0	53.5	1.6	96.6
	83	98	1	100	90	59
Nepal	65.7	71.9	31.0	99.1	7.9	99.4
	84	59	111	10	46	17
Finland	65.6	60.6	100.0	27.3	24.0	94.5
	85	118	1	124	20	76
Cyprus	65.6	60.8	100.0	18.9	0.8	86.6
	86	117	1	128	108	104
Moldova	65.4	75.7	79.0	82.2	0.3	98.3
	87	39	79	69	120	34
Kenya	64.9	70.2	31.0	97.4	0.6	99.4
	88	67	111	25	114	16
Vietnam	64.7	79.0	75.0	98.6	5.0	98.2
	89	20	83	14	53	35
Pakistan	64.1	72.8	45.0	98.6	0.4	98.0
	90	53	103	14	119	41
Czech Republic	64.0	62.3	98.0	40.4	1.5	91.0
	91	113	33	106	92	91
Kyrgyz Republic	63.8	82.5	93.0	93.0	10.7	97.8
	92	6	54	41	36	44
Poland	63.1	62.5	90.0	37.5	1.7	86.3
	93	112	62	108	87	105
Italy	63.1	52.9	N/A	15.1	3.6	97.1
	94	125	N/A	129	66	55
India	62.5	69.6	31.0	98.0	1.4	97.6
	95	71	111	19	95	47
Benin	62.2	66.6	12.0	97.7	1.4	99.7
	96	89	125	22	98	5
Iraq	61.8	75.0	73.0	94.1	1.3	92.6
	97	43	84	39	102	86

CO_2 emissions per capita	Energy consumption per capita	**Economy and Environment**	Land resource utilization efficiency	Sulfur dioxide emissions per unit of GDP	Carbon dioxide emissions per unit of GDP	Energy consumption per unit of GDP
89.2	84.5	68.3	0.2	96.5	87.9	88.5
76	77	43	47	46	67	49
90.6	88.2	64.1	0.2	86.1	83.9	86.4
69	69	73	44	101	80	59
78.1	77.3	63.1	0.0	96.3	73.7	82.3
106	94	81	126	52	105	73
99.9	100.0	65.2	0.0	91.9	93.3	75.6
5	1	68	122	78	33	89
97.7	98.8	58.5	0.0	74.1	74.6	85.3
35	6	95	109	120	101	64
68.9	61.1	66.6	3.4	98.8	80.3	84.0
119	112	55	8	21	91	66
99.8	98.4	59.5	0.0	91.9	93.5	52.5
7	8	93	94	79	31	118
68.3	47.5	70.7	0.3	99.1	91.9	91.4
120	119	24	40	17	41	37
75.7	83.6	70.4	0.8	95.2	90.1	95.3
112	80	27	23	62	51	17
95.5	95.3	55.0	0.1	92.0	60.3	67.8
50	39	105	86	77	117	104
99.4	97.3	59.7	0.0	94.6	89.1	55.0
16	21	92	112	67	62	116
96.0	95.7	50.4	0.1	89.0	53.3	59.1
48	33	111	61	91	125	114
98.0	97.3	55.5	0.1	84.6	71.9	65.3
32	23	100	75	105	107	107
70.6	68.0	65.7	0.8	96.4	79.5	86.0
116	107	62	22	48	94	61
96.6	96.9	45.1	0.0	81.3	44.0	54.9
40	25	118	116	111	127	117
78.4	80.1	63.8	0.5	91.6	76.5	86.5
104	85	76	28	82	98	58
82.2	78.9	73.4	2.2	99.4	94.8	97.1
96	89	9	14	13	17	6
96.3	96.7	55.3	0.2	86.6	63.8	70.8
42	27	101	50	100	113	101
98.7	97.9	57.9	0.0	97.4	75.0	59.1
25	15	96	108	32	99	115
91.3	91.8	48.7	0.1	77.7	50.8	66.4
68	57	113	81	117	126	105

(continued)

Table 12.1 (continued)

Indicators / Countries	EHC	Population and Environment	Percentage of population with access to Improved sanitation facilities	Motor vehicles per 1,000 people	Renewable internal freshwater resources per capita	SO_2 emissions per capita
Belarus	61.8	70.6	93.0	65.4	4.8	95.1
	98	65	54	90	54	71
Luxembourg	61.4	48.2	100.0	7.8	2.3	96.7
	99	129	1	132	82	57
United Arab Emirates	61.4	56.1	97.0	61.6	0.0	82.0
	100	123	39	93	132	110
Togo	61.3	67.3	12.0	100.0	2.3	99.8
	101	85	125	1	83	4
Iran, Islamic Rep.	61.0	70.2	83.0	78.6	2.1	90.3
	102	66	73	81	85	95
Russian Federation	60.8	68.4	87.0	66.8	36.5	82.4
	103	79	67	88	10	109
South Africa	60.5	67.4	77.0	80.2	1.1	77.8
	104	83	81	75	105	116
Bosnia and Herzegovina	60.4	74.7	95.0	83.6	11.4	75.1
	105	44	47	66	32	118
China	60.1	68.6	55.0	90.0	2.5	89.4
	106	76	93	49	78	96
Oman	59.7	59.1	87.0	73.7	0.6	74.0
	107	120	67	84	115	119
Australia	59.4	49.7	100.0	10.1	26.7	47.1
	108	126	1	131	17	126
Namibia	59.3	62.7	33.0	87.5	3.2	62.0
	109	110	108	54	69	123
United States	58.8	48.5	100.0	0.0	10.9	81.2
	110	128	1	133	35	112
Mozambique	58.5	68.4	17.0	98.8	5.1	99.4
	111	78	121	12	52	18
Guinea	57.9	67.9	19.0	99.6	26.8	100.0
	112	81	120	5	16	2
Ethiopia	57.8	67.3	12.0	99.9	1.7	99.8
	113	84	125	2	86	3
Zambia	57.2	72.5	49.0	97.8	7.2	84.5
	114	55	101	20	47	107
Estonia	56.8	57.9	95.0	41.7	11.5	61.5
	115	122	47	105	31	124
Mali	55.4	60.8	36.0	98.5	4.6	N/A
	116	115	106	16	57	N/A

CO_2 emissions per capita	Energy consumption per capita	**Economy and Environment**	Land resource utilization efficiency	Sulfur dioxide emissions per unit of GDP	Carbon dioxide emissions per unit of GDP	Energy consumption per unit of GDP
81.4	78.0	53.1	0.1	93.7	55.0	63.5
98	92	108	76	70	119	111
43.2	35.2	74.6	6.7	99.9	94.5	97.3
130	124	3	3	6	21	5
44.5	35.8	66.7	1.3	96.6	81.8	87.0
129	123	54	18	45	87	57
99.6	97.6	55.3	0.0	97.1	87.9	36.1
12	18	102	106	36	66	119
81.4	78.9	51.8	0.1	87.3	54.9	64.8
97	90	109	70	98	120	108
69.8	62.2	53.3	0.0	87.3	59.8	65.9
117	110	107	95	99	118	106
81.3	79.5	53.7	0.1	76.8	64.2	73.6
99	87	106	67	118	112	96
85.7	87.7	46.2	0.1	57.2	54.5	72.9
85	71	117	65	124	121	97
85.5	86.8	51.6	0.2	81.8	53.4	71.1
86	73	110	43	109	124	99
60.8	44.3	60.3	0.1	90.6	74.6	76.0
124	121	89	83	86	100	88
54.0	56.5	69.1	0.1	92.3	89.1	95.0
127	115	35	89	76	61	19
96.2	95.6	55.9	0.0	40.7	90.6	92.2
47	35	98	129	125	49	32
53.1	44.5	69.2	0.5	97.0	87.7	91.5
128	120	34	29	38	68	34
99.8	97.7	48.6	0.0	87.8	91.8	14.8
6	17	114	128	96	43	123
99.8	N/A	48.0	0.0	99.7	92.2	N/A
8	N/A	116	125	9	38	N/A
99.9	98.0	48.4	0.0	95.6	94.6	3.4
2	14	115	118	61	20	125
99.7	96.2	41.8	0.0	5.9	97.9	63.5
10	29	120	121	129	5	110
62.7	68.3	55.7	0.2	79.2	63.2	80.1
122	105	99	54	115	115	80
100.0	N/A	50.0	0.0	N/A	100.0	N/A
1	N/A	112	130	N/A	1	N/A

(continued)

Table 12.1 (continued)

Indicators / Countries	EHC	Population and Environment	Percentage of population with access to Improved sanitation facilities	Motor vehicles per 1,000 people	Renewable internal freshwater resources per capita	SO_2 emissions per capita
Mongolia	53.9	70.8	50.0	91.4	15.0	88.4
	117	64	100	47	28	100
Bulgaria	53.8	63.5	100.0	54.0	3.5	47.6
	118	108	1	99	67	125
Qatar	53.6	38.7	100.0	34.6	0.0	78.7
	119	132	1	112	130	115
Saudi Arabia	52.8	49.2	N/A	58.8	0.1	75.7
	120	127	N/A	95	128	117
Uzbekistan	52.2	80.6	100.0	95.7	0.7	96.5
	121	14	1	33	112	62
Ukraine	51.4	72.8	95.0	79.6	1.4	87.9
	122	52	47	79	96	101
Serbia	50.0	64.0	92.0	69.1	1.4	43.5
	123	105	57	86	97	127
Zimbabwe	49.8	69.8	44.0	86.2	1.2	97.3
	124	69	105	58	103	49
Turkmenistan	49.6	71.1	98.0	87.2	0.3	87.6
	125	62	33	56	121	103
Mauritius	48.4	72.8	91.0	79.8	2.6	89.4
	126	51	58	78	77	97
Cote d'Ivoire	47.9	54.3	23.0	97.8	4.6	0.0
	127	124	119	20	56	131
Kazakhstan	46.9	58.4	97.0	75.7	4.7	27.8
	128	121	39	82	55	128
Kuwait	46.9	32.5	100.0	39.1	0.0	12.8
	129	133	1	107	133	130
Mauritania	45.4	64.6	26.0	99.6	0.1	100.0
	130	101	117	5	124	1
Madagascar	43.2	63.9	11.0	97.0	19.1	98.9
	131	107	128	26	24	23
Niger	29.2	46.3	9.0	99.3	0.3	17.8
	132	131	129	9	122	129
Lesotho	23.8	47.6	29.0	99.8	2.9	N/A
	133	130	115	4	73	N/A
Highest score	**80.3**	**84.8**	**100.0**	**100.0**	**100.0**	**100.0**
Lowest score	**23.8**	**32.5**	**9.0**	**0.0**	**0.0**	**0.0**
Average score	**65.1**	**69.5**	**74.5**	**72.4**	**11.3**	**89.5**
Standard deviation	**8.9**	**9.4**	**29.1**	**27.3**	**19.5**	**17.0**

CO_2 emissions per capita	Energy consumption per capita	**Economy and Environment**	Land resource utilization efficiency	Sulfur dioxide emissions per unit of GDP	Carbon dioxide emissions per unit of GDP	Energy consumption per unit of GDP
88.4	91.7	36.9	0.0	60.9	25.5	61.4
80	58	122	131	123	129	113
84.3	82.4	44.2	0.1	37.1	65.7	73.8
89	81	119	55	127	111	94
0.0	0.0	68.5	4.4	97.9	82.2	89.6
132	126	40	7	29	86	46
56.0	52.4	56.3	0.1	88.8	62.8	73.6
126	116	97	77	92	116	95
90.5	89.0	23.7	0.0	80.4	0.0	14.4
70	67	130	96	112	132	124
84.3	78.6	30.0	0.1	69.1	23.9	27.0
90	91	125	74	121	130	121
83.0	84.2	36.0	0.2	18.3	54.4	71.2
92	78	123	53	128	122	98
98.2	95.1	29.8	0.0	65.6	53.5	0.0
29	42	126	123	122	123	126
71.8	67.7	28.0	0.0	78.5	6.8	26.5
115	108	127	111	116	131	122
92.8	N/A	24.0	1.6	89.4	87.4	N/A
62	N/A	129	15	89	69	N/A
99.2	97.3	41.4	0.0	3.2	92.0	70.3
19	22	121	102	130	40	102
61.5	64.8	35.5	0.0	39.4	39.5	63.1
123	109	124	105	126	128	112
13.5	4.7	61.2	2.9	85.5	74.4	82.2
131	125	84	12	102	102	75
98.5	N/A	26.1	0.0	100.0	79.7	N/A
26	N/A	128	133	1	92	N/A
99.9	N/A	22.5	0.0	79.5	94.9	N/A
3	N/A	131	127	114	15	N/A
99.9	N/A	12.1	0.0	0.0	92.4	N/A
4	N/A	132	132	131	36	N/A
N/A	N/A	0.0	0.0	N/A	N/A	N/A
N/A	N/A	133	99	N/A	N/A	N/A
100.0	**100.0**	**94.7**	**100.0**	**100.0**	**100.0**	**100.0**
0.0	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
86.6	**82.9**	**60.7**	**1.3**	**88.1**	**81.3**	**79.3**
16.0	**18.5**	**14.0**	**8.7**	**18.4**	**17.7**	**19.3**

Fig. 12.1 EHC scores of six continents & top three countries of each continent in 2012

of the countries are concentrated, mostly in 5060–70 80 points (up to 116 105 countries, accounting for 87.2278.95 % of the total), showing little differences among the countries except for individual countries. Among the developed countries, Norway Singapore scores the highest, 74.180.3 points; among the developing countries, Costa Rica scores the highest, 77.0 68.5 points. They have little difference.

12.2 Factor Scores and Contribution Rates of EHC

Table 12.1 lists the evaluation results of the subordinate indicators of EHC and displays the scores and rankings of two pillars and ten individual indicators of EHC in 2012 so as to analyze the influences of the tertiary and individual indicators on EHC of the countries.

On pillars, the indicator of economy and environment enjoys the highest standard deviation, hitting 14.0, and the indicator of population and environment has the standard deviation of 9.4, indicating that the indicator of economy and environment has larger differences among the countries and is the most primary factor causing EHC differences among the countries. The indicator of population and environment has little influence on EHC differences among the countries. Overall, the differences of EHC among the countries are mainly caused by the differences of economy and environment.

On individual indicators, percentage of population with access to Improved sanitation facilities enjoys the highest standard deviation, hitting 29.1, indicating that

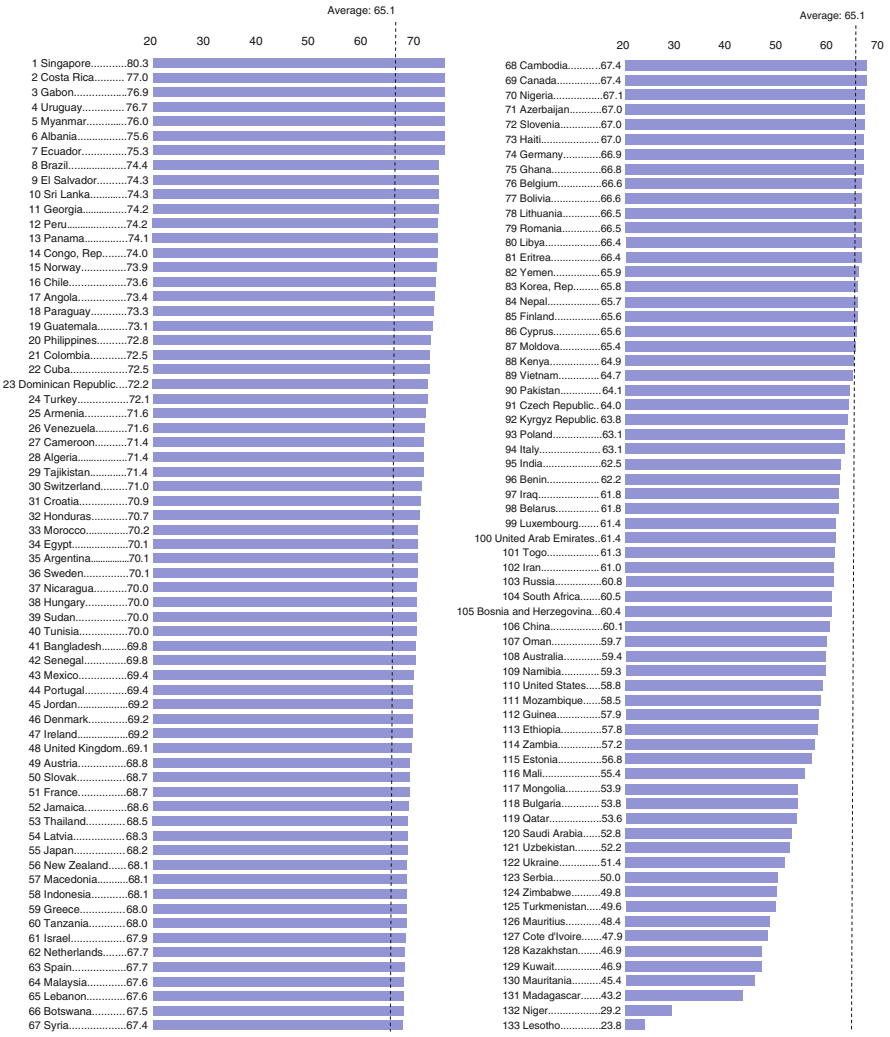

Fig. 12.2 Rankings and scores of EHC in 2012

this indicator has the largest differences among the countries and is the most primary factor causing EHC differences among the countries. Motor vehicles per 1,000 people, renewable internal freshwater resources per capita, energy consumption per capita, sulfur dioxide emissions per unit of GDP and energy consumption per unit of GDP also have high standard deviation, all higher than 18.0, which all contribute a lot to EHC differences among the countries. The other indicators have lower standard deviation, indicating they have less influence on EHC differences among the countries.

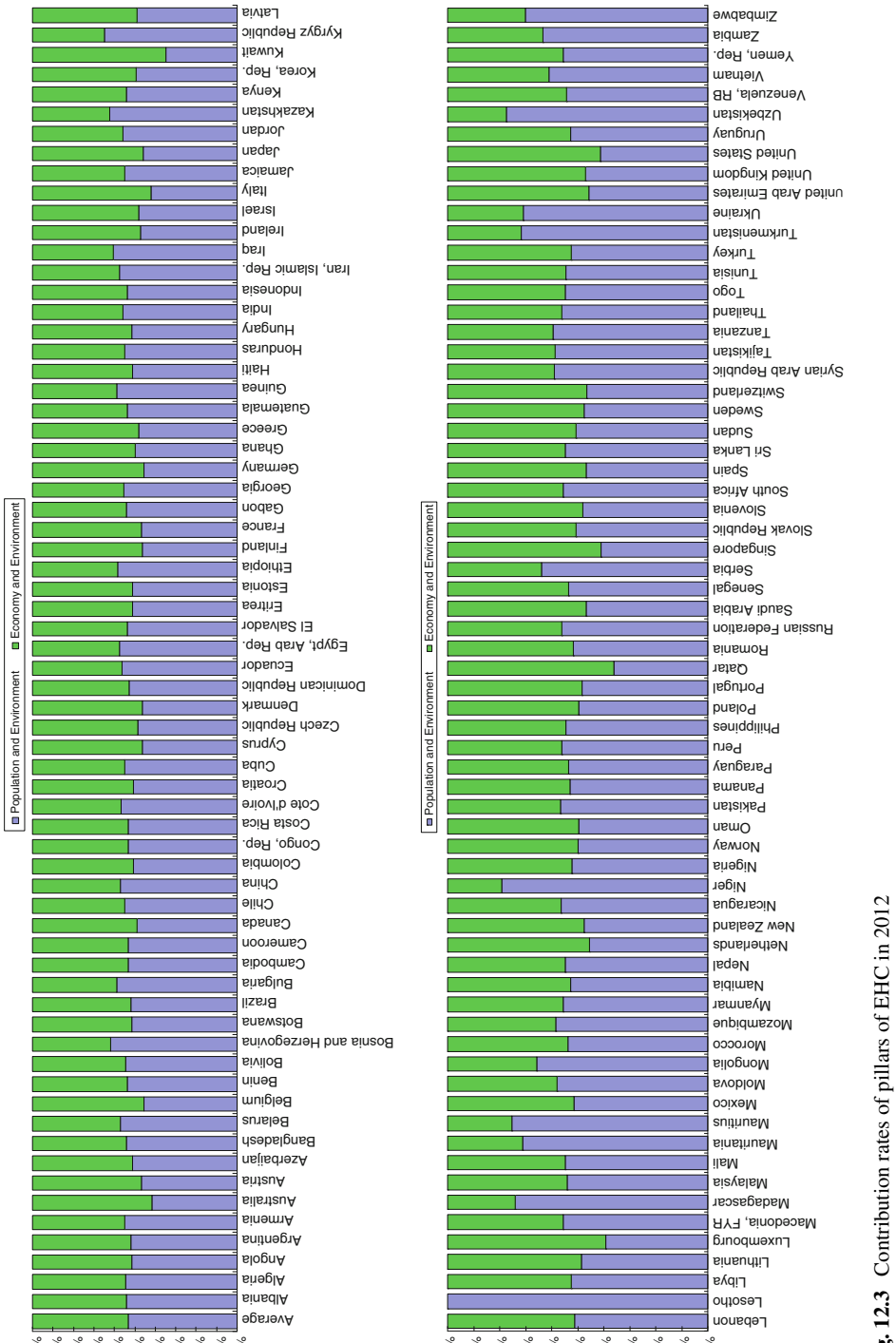

Fig. 12.3 Contribution rates of pillars of EHC in 2012

To analyze the contribution of the pillars to EHC, we could firstly multiply the scores of the pillars by respective weights, then convert them into the scores at sub-index and finally divide them by the total score of sub-index to get the contribution rates of the pillars. Thus, we could find the contribution of each pillar to the sub-index more visually, as shown in Fig. 12.3.

According to Fig. 12.3, population and environment has slightly higher contribution rate to EHC than economy and environment: the former having the average contribution rate of 53.4 % and the latter having the average contribution rate of 46.6 %. Therefore, to enhance EHC, the countries shall focus more on economy and environment and population and environment.

Chapter 13
Main Features of GEC

The GEC evaluation indicator system is a comprehensive evaluation system composed of 1 primary indicator, 5 sub-indexes, 16 pillars and 60 individual indicators covering five aspects, i.e. REC, EEC, ECC, EMC and EHC. Within this system, every part is closely related, infiltrating and influencing one another and their inherent uniqueness and relevance. Accordingly, the evaluation results of GEC comprehensively represent the development level and competitive strength of the countries in the five aspects of resource environment, ecological environment, environment carrying and environment management. Of course, the environment competitiveness of all countries also show some characteristics and rules, both the general rules universally existing in each country and the special rules determined by the different national conditions.

Through the evaluation on GEC of 2012, this report objectively and comprehensively analyses the development level and the gap of GEC, profoundly understands and grasps the development laws and characteristics of all countries, and recognizes the essence and inherent features of GEC. It's of great theoretical and realistic significance to research and find the right approaches, methods and counter measures so as to direct the countries to enhance the environment competitiveness by taking corresponding measures based on the special national conditions of them.

13.1 Environment Competitiveness Is the Overall Representation and Combined Result of Economic, Social and Natural Environment, Reflecting the Capacity and Level of the Countries on Sustainable Development

GEC covers the five aspects of resource environment, ecological environment, environment carrying, environment management and environment coordination. Besides the influence of natural resource environment, it also reflects the comprehensive

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influence of economic and social factors on natural environment. So to speak, environment competitiveness is the overall representation and combined result of economic, social and natural environment; it reflects the capacity and level of the countries on sustainable development in an all-around way. Such a feature is represented in the setting of the indicator system and the variation of the evaluation results of environment competitiveness as well.

According to the evaluation and comparative analysis on environment competitiveness of all the countries, it is observed that: the developed countries behave well on environment competitiveness generally while a majority of developing countries behave poorly, showing a large difference between the developed countries and the developing countries. According to the behavior of sub-indexes, a majority of the countries with higher scores of sub-indexes (except for EEC) are developing countries; the developed countries remain only intermediate level. Comparing with developed countries, many developing countries are "crippled". A majority of them are not balanced on the sub-indexes and thus the developed countries are still higher than the developing countries on overall environment competitiveness. For example, Morocco, ranking at 95 on environment competitiveness: both the ECC and EHC rank ahead, at 13 and 33 respectively; but the REC, EEC and EMC rank behind, at 119, 102 and 97 respectively, which drags down the overall ranking of environment competitiveness greatly. As a further example, Bangladesh, ranking at 99 on environment competitiveness: the REC, ECC and EHC all rank ahead, at 4, 74 and 41 respectively; but the EEC and EMC rank behind, at 132 and 119 respectively. Thus the overall environment competitiveness ranks behind. There are also other developing countries like this, such as Guinea, Oman etc. Either one or two sub-indexes of them rank far behind and drag the overall environment competitiveness. On the contrary, the developed countries are balanced on the sub-indexes. For instance, Norway, ranking at 3 on environment competitiveness: none of any sub-indexes ranks ahead except REC, but all the other sub-indexes rank not behind, about 20. No serious "Short Slab" indicator for Norway and so, Norway enjoys very high environment competitiveness overall. As a further example, Finland, ranking at 28 on environment competitiveness: it also has not any sub-index ranking pretty high or very low, EEC (at 32) the highest and ECC (at 85) the lowest, and all the sub-indexes are balanced. So, Finland ranks relatively high on environment competitiveness (as shown in Table 13.1).

The analysis above indicates that GEC is the result of five aspects working in concert: REC, EEC, ECC, EMC and EHC. All of them shall develop in a balanced way; a short slab tends to cumber the enhancement of overall competitiveness and results in the backwardness of overall environment competitiveness. Only when all behave well, they can support the overall advantage of environment competitiveness. Furthermore, it also indicates the crucial importance of analysis on sub-indexes, pillars and even individual indicators. Merely by the primary indicators, we may not make a correct analysis on the inherent factors and variation characteristics of environment competitiveness: the essence is likely to be concealed behind

Table 13.1 Rankings of representative developing countries and developed countries on environment competitiveness and sub-indexes

	Rank					
Country	Environment competitiveness	REC	EEC	ECC	EMC	EHC
Morocco	95	119	102	13	97	33
Bangladesh	99	4	132	74	119	41
Guinea	100	62	122	3	96	112
Oman	109	128	59	49	91	107
Norway	3	6	25	21	23	15
Finland	28	43	32	46	35	85

the appearance. While by focusing on the analysis of sub-indexes, pillars and individual indicators, we could make profound analysis on the essential characteristics and the real reason of changes for environment competitiveness. During the development process hereafter, the countries should focus on all the aspects of environment competitiveness, advancing in a comprehensive and coordinated way. Much importance should be attached to and effective measures should be taken for those indicators ranking behind especially, thus to improve and enhance them and to ensure the advantage of environment competitiveness.

13.2 ECC Contributes the Most to the Overall Score of Environment Competitiveness, the Countries Differs Slightly on the Scores of REC and ECC and Differs Greatly on the Scores of EEC, EHC and EMC

Figure 13.1 depicts the contribution rates of GEC sub-indexes to the primary indicator (i.e. the environment competitiveness). According to this figure: ECC contributes the most to environment competitiveness at the rate of 27.0 %; EHC also contributes a lot with the rate up to 26.2 %; EEC and EMC both contributes at 19.8 % and REC contributes the least, only at 7.2 %. Therefore, during the process of enhancing the environment competitiveness, the countries shall focus specially on ECC and EHC, while not ignoring REC, EEC and EMC.

According to the analysis before, it is also observed that EEC, EHC and EMC have the standard deviation of 9.3, 9.1 and 8.9 respectively, which are both the main factors causing the environment competitiveness differences among the countries. Relatively, REC and ECC have lower standard deviation, 6.8 and 5.3 respectively, of which, ECC has the lowest standard deviation and exerts the least influence on the environment competitiveness differences among the countries. It also means the environment competitiveness differences among countries are mainly represented in EEC, EHC and EMC with little differences in ECC. Therefore, the countries with

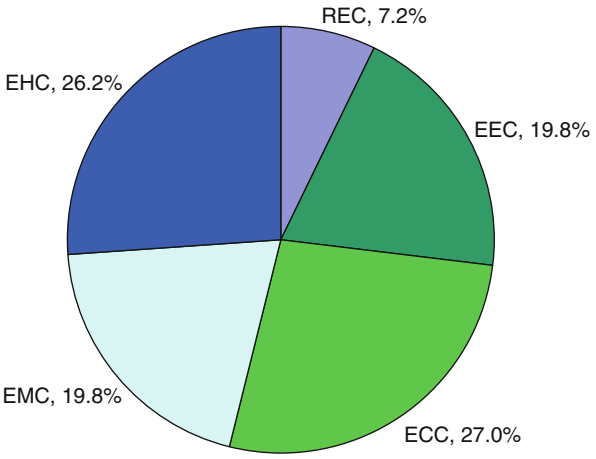

Fig. 13.1 Contribution rates of sub-index scores of GEC

larger differences of environment competitiveness from the other countries shall specially step up their efforts in EEC, EHC and EMC to narrow the differences and catch up.

Furthermore, it can also explain why the REC scores of developed countries are lower than those of most developing countries but the overall environment competitiveness scores are still higher: because many developed countries though are lower than the developing countries at the REC scores with wide margin in ranking, the contribution rates of REC to environment competitiveness are not very great due to the little and not obvious differences of REC scores among the countries; so the overall environment competitiveness of developed countries are influenced slightly by REC. Besides, the developed countries score higher on the other four sub-indexes, surpassing most developing countries, so the environment competitiveness of developed countries is higher than that of most developing countries finally.

13.3 Developing Countries and Developed Countries Differ Greatly, and the Emerging Market Countries Have Much Room for Improvement

Table 13.2 compares the average scores and contribution rates of developed countries, developing countries and emerging market countries on environment competitiveness and the sub-indexes. It should be noted that United Nations Educational Scientific and Cultural Organization (UNDP) modified the groups of countries in Human Development Report 2010 issued on Nov. 4, 2010 and makes the number of developed countries or regions up to 44. In this way, of the 133 countries covered in this report,

Table 13.2 Average scores and contribution rates of different types of countries in environment competitiveness and sub-indexes

	Item											
	Environment competitiveness		REC		EEC		ECC		EMC		EHC	
Country	Score	Contribution rate (%)	Score	Contribution rate (%)	Score	Contribution rate (%)	Score	Contribution rate (%)	Score	Contribution rate (%)	Score	Contribution rate (%)
Developed countries	53.0	100.00	17.9	6.74	58.1	21.95	68.0	25.66	54.4	20.52	66.5	25.13
Developing countries	48.5	100.00	17.8	7.35	46.0	18.97	66.6	27.51	47.3	19.51	64.6	26.67
Emerging market countries	49.7	100.00	18.0	7.23	45.2	18.19	68.0	27.36	52.3	21.03	65.1	26.19

34 are developed countries and 99 are developing countries. What's more, the non-developed countries of G20 are recognized as emerging market countries, 10 in all, including Brazil, Indonesia, Mexico, Russia, Saudi Arabia, Argentina, Turkey, China, India and South Africa.

It is observed from Table 13.2 that developing countries and developed countries differ greatly: the developed countries score 53.0 points on environment competitiveness, 4.5 points higher than that of the developing countries and 3.3 points higher than that of the emerging market countries; the developing countries score lower than the developed countries on all sub-indexes, and there are very large differences on EEC and EMC, respectively 12.2 points and 7.1 points. Emerging market countries score slightly higher than that of developing countries on overall environment competitiveness, with the difference of 1.2 points. But it has a big gap with the developed countries, with the difference of 3.3 points. The score of emerging market countries on EEC are very low, even lower than that of developing countries, and 12.9 points lower than that of developed countries. It greatly pulls down the overall score of environmental competitiveness of emerging market countries.

According to the contribution rates of sub-indexes to environment competitiveness, in developed countries, the contribution rate of REC to environment competitiveness is the lowest, just 6.74 %, and the contribution rates of other sub-indexes are higher than 20 %. Therefore, even though the contribution rate of REC is close to that of the developing countries and is lower than that of emerging market countries, it has no great influence on environment competitiveness and the inferiority of REC can be easily mended by the superiority of other four sub-indexes thus the overall environment competitiveness score is still higher than that of the developing countries and emerging market countries.

Furthermore, according to the country distribution of each echelon for environment competitiveness, among the 34 developed countries, 8 are placed in the first echelon, accounting for 80 %; while among the 99 developing countries, only 2 are placed in the first echelon, showing great difference. The number of developed countries in the second echelon is 2 lower than the number of developing countries. Quite a number of developing countries are placed in the third-fifth echelons, 86 in all, accounting for 86.87 of the total; while among the 34 developed countries, only 17 are placed in the third-fifth echelons, only accounting for 50.0 % of the total. In the fifth echelon, only 2 are developed countries, while up to 31 are developing countries, accounting for 93.94 % of the total in the fifth echelon. The emerging market countries behave not so well in environment competitiveness as in economy. Only 1 of them is placed in the first echelon and the rest are all in the third-fifth echelons, among which, 6 countries are placed in the fourth echelon, accounting for 60 % of the total (Table 13.3).

All the above indicate the developed countries behave well in environment competitiveness, score high and rank ahead; while most developing countries score low and rank behind in environment competitiveness and the emerging market countries should also enhance their environment competitiveness further.

Table 13.3 Number and ratio of the countries in each echelon of environment competitiveness

	Item									
	First echelon		Second echelon		Third echelon		Fourth echelon		Fifth echelon	
Country	Number	Ratio (%)	Number	Ratio (%)	Number	Ratio (%)	Number	Ratio (%)	Number	Ratio (%)
Developed countries	8	23.53	9	26.47	8	23.53	7	20.59	2	5.88
Developing countries	2	2.02	11	11.11	22	22.22	33	33.33	31	31.31
Emerging market countries	1	10.00	0	0.00	2	20.00	6	60.00	1	10.00

13.4 Scores of Environment Competitiveness Differ Slightly Among the Regions but the Ranks Differ Greatly: The Countries of Oceania, Europe, South America and North America Rank Ahead While Asian and African Countries Rank Behind

Table 13.4 lists the average scores of the 133 countries covered in this report by continent (six continents, omitting Antarctica due to no country there) on GEC as well as the numbers and ratios of the countries in the first and second echelons in 2012. As shown in Table 13.4, in 2012, Oceania scores the highest in environment competitiveness, up to 56.3 points; South America, North America and Europe also score rather high, hitting 53.5, 53.0 and 52.3 respectively; Asia and Africa score the lowest, 47.5 and 46.7 points respectively. The score ratio of the six continents is 1.02:1.12: 1: 1.20: 1.13: 1.14, with little differences.

The score differences are little among the continents but the ranking differences are rather great. In number, Europe enjoys the most countries in the first echelon, 6 in all; other continents have 1 country in the first echelon respectively except Africa.

Europe still enjoys the most countries in the first and the second echelons, 12 in all, far beyond the other continents; North America and South America the next, 7 and 6 respectively in all; both Asia and Oceania have 2 countries; Africa have only 1. In ratio, Oceania enjoys the highest ratio of the countries in the first echelon to total countries of it, up to 50 %, and then Europe, South America, North America and Asia; Africa is 0. By further analysis, Oceania hits 100 % for the ratio of the

Table 13.4 Average scores of the six continents in environment competitiveness and numbers and ratios of the countries placed in the first and second echelons

	Item						
	Environment competitiveness	Number and ratio of the countries in the first echelon		Number and ratio of the countries in the second echelon		Number and ratio of the countries in the third echelon	
Region	Average Score	Number	Ratio (%)	Number	Ratio (%)	Number	Ratio (%)
Asia (39 countries)	47.5	1	2.56	1	2.56	2	5.13
Europe (36 countries)	52.3	6	16.67	6	16.67	12	33.33
Africa (33 countries)	46.7	0	0.00	1	3.03	1	3.03
Oceania (2 countries)	56.3	1	50.00	1	50.00	2	100.00
North America (13 countries)	53.0	1	7.69	6	46.15	7	53.85
South America (10 countries)	53.5	1	10.00	5	50.00	6	60.00

countries in the first and second echelons to total countries of them, and then South America, North America and Europe. Asia and Africa both have low ratio, 5.13 % and 3.03 % respectively.

Therefore, both in number and in ratio, Oceania, South America, North America and Europe are strong on GEC with wide gaps from the other continents in ranking and holding the front places in the rankings. In view of the specialty of Oceania (only two countries of New Zealand and Australia), it's normal to score high and rank ahead. South America and North America are also very strong on environment competitiveness, above a half of the countries for the both placed in the first and second echelons. Among the 36 countries of Europe covered in the evaluation, 30 % of them are placed in the first and second echelons, indicating its strong environment competitiveness. Asia and Africa are weak in environment competitiveness, as respectively 39 and 33 countries are covered in the evaluation, but Asia has only 1 country falling into the first echelon and even Africa has none; in the second echelon, there are both only 1 country, at the ratio of 5.13 % and 3.03 % respectively. Therefore, Asian and African countries shall enhance their environment competitiveness further.

Chapter 14
Enlightenment from the Results of GEC Evaluation

Since the 1970s, with the increasingly prominent of population growth, resource shortages, energy crisis, food security, environmental pollution, soil degradation, biodiversity destruction and other issues, the global economic developments as well as the human security are under serious threat. The environment protection and the sustainable development become a systems project for all mankind. In 1972, the Club of Rome published "The Limits to Growth", which marked that the environmental issues had become a common concern of global level. The awareness of environmental issues has increased from the national level to the regional level or even global level. The global environmental issue is not only a natural problem, but it is more a global social problem. In this report, based on the analysis of the global 133 countries or regions for qualifying environmental competitiveness, it reports the great efforts on protecting the environment in different countries and its positive results. Meanwhile, we can see the relative differences on the environmental competitiveness in different countries and their problems, which can provide some enlightenment for human being to response to global climate change, sustainable development.

14.1 Insisting on Strengthening the Environmental Protection and Combining the Development with the Protection

The environmental protection and the economic development are closely related to the human survival and the development. Also the environment protection has a close relationship with the economic development. We must protect our environment in our economic development and actively explore new path of the environmental

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protection under the economic development. The world provides the necessary raw materials and energy for economic development and accommodates the waste generated by economic activity. Meanwhile, the economic development has also counterproductive effect on the environment. The countries with better economic foundation pay more attention and set up higher standard to the environmental development. The outbreak of the global financial crisis makes the governments adjusts the focus of the work to deal with recession and protect jobs as a top priority and the commitment to the environment becomes weakened, which lead to lay aside the global climate and environmental issues. This makes the sustainable world development facing a more complex situation and dealing with all kinds of severe challenges. Under this background, how to handle correctly the relationship between the economic development and the environmental protection has a great practical significance on the integration of prospective development direction, the ideas of innovation and development and the mode and method of development.

In order to achieve the above goals, according to their own natural resources, environmental capacity, ecological conditions, population and national development, all countries should understand their functional position in the global environment and the development direction. Based on the environmental capacity and resource capacity, they should combine the economic development planning and the environmental protection together. For some relatively developed countries or regions whose environmental resources and supply are insufficient should implement optimized development strategy, they should adhere to environmental priorities, develop high-tech industries, optimize industrial structure, accelerate the upgrading of industries and products and firstly complete total amount of emissions reductions task. For some relatively developed countries or regions whose resources are more abundant with higher development potential should implement key projects development strategy. They should accelerate infrastructure construction and promote industrialization and urbanization with scientific and rational use of environmental carrying capacity. Meanwhile, they should control the pollutant emissions strictly and achieve increasing the production without increasing pollution. For some relatively developed countries or regions whose ecological environment is fragile should implement restricted development strategy. They should set up the conservation priorities, select a reasonable development direction, develop local advantage industries, ensure the restoration and conservation of ecological functions and gradually restore the ecological balance.[1] They should take the issue of environment protection into consideration as a part of economic and social development. They should insist on economized, security, clean development to achieve economic and environmental sustainable development. At the same time, they should explore actively new methods of small, effective, low environmental emissions. Even in difficult post-crisis era, it should not take the expense of the environment in order to make up for economic losses, but in accordance with the symbiotic development and inclusive growth requirements, it should promote sustainable development on economic, environmental,

[1] http://www.gov.cn/zwgk/2005-12/13/content_125736.htm

cultural and other social aspects to achieve mutually beneficial and win-win within the limits of the coordinated development between maintaining a reasonable economic and environmental development.

14.2 Improving the Utilization Efficiency of Resources and Promoting Resource Conservation and Recycling

Rational use of resources and protecting the environment is a necessary requirement for achieving sustainable development. With the rapid development of the world economy and population, many countries, the contradictions of lacking of fresh water, land, energy, mineral resources and other resources become more prominent. The pressure from the environment is increasing. The development in waste of resources and with the expense of the environment cannot be sustained. Only with the efficient use of resources and environmental protection, the sustainable development could be achieved.[2]

Therefore, all countries should increase the sense of responsibility and urgency to construct a conservation-oriented society. In the aspect of social production, circulation and consumption of the various fields of economics and society, we must make full use of resources and improve the efficiency of resource use to minimize the consumption of resources and maximize the economic and social benefits. We should accelerate the adjustment of industrial structure and shift the economic developing form from industry-driven to industry, services and agriculture co-driven. We should supporting the transition from funds and natural resources-driven to human capital and technological progress-driven. We should support the transition from the one-way model of "Resources-Products-Waste" to the circulation pattern of "Resources-Products-Waste-Renewable Resources". We must gain the economic growth based on the optimization of economic structure, improvement of the scientific and technological content, quality and efficiency improvement. Then we can gradually form the low-input, high-output, low-consumption, low-emission, recyclable and sustainable economic growth. In agriculture, we should actively adopt water-saving technologies and develop water-saving agriculture. In the development and utilization of mineral resources, we should strengthen the various types of mineral resources comprehensive development and utilization. We can promote the development of deep-processing technology and promote the utilization of the tailings and waste rock. With the principle of "Reduce, Reuse and Recycle", we should develop the circular economy. With low consumption, low emission, high efficiency, we should actively promote the scrap iron and steel, non-ferrous metal scrap, waste paper, waste plastic recycling use project and vigorously support the remanufacturing of used mechanical and electrical products. Finally, we can establish and improve waste separation and sorting systems to improve garbage collection efficiency.

[2] Gao Jin-tian, Dong Fang. Environmental Protection and Sustainable Development of Economic Analysis [J]. Ecological Economy, 2005(1):82–85.

14.3 Increasing the Capital Investment on the Environmental Infrastructure Construction and Enhancing the Capacity of the Environment Carrying

Strengthening environmental protection infrastructure is an important measure to expand domestic demand and stimulate economic development, which can bring considerable economic, social and environmental benefits, and can improve the investment structure, industrial structure and distribution of productive forces. It is also the basic measures to the comprehensive improvement of environmental pollution and destruction, and to protect and improve the environmental quality of urban and rural.[3] Increasing investment in environmental protection is a key method to repay the ecological debt and realize the economic, social and ecological sustainable and coordinated development. Therefore, every country in the world must strengthen the dominant position of government investment in environmental protection, includes the environmental protection in all levels of the budget for fiscal year and gradually increases the investment for the environmental infrastructure and the environment carrying capacity. They should increase the pollution control, the ecological protection, the environmental protection and the investment of environmental regulatory capacity building funding and build up the environmental pilot demonstration. They can focus on building up or perfecting the sewage pipe network and the living garbage waste collection and transportation facilities. People should seriously do the work of investigation and study and select the right infrastructure projects. Focused on the key project construction, they should further improve the environmental infrastructure, establish and improve the diversification of environmental investment and financing mechanism, encourage and support social capital to participate in ecological construction and environmental infrastructure with different kinds of forms. They can implement the green finance policies through building up a corporate credit information database in the financial institutions by recording the environmental integrity enterprise and environmental violations enterprise, which can give full play to the role of financial institutions and credit control to the enterprises on the environmental protection.

14.4 Increasing the Efforts on the Environmental Regulation and Governance to Effectively Improve and Enhance the Environmental Quality

Addressed as an important way and mechanisms to global environmental issues, the efforts on the environmental monitoring and management are related to the destiny of mankind and have become a hot issue. All the countries must build up the

[3] Cai Shou-qiu. Study on Strengthening Environmental Protection Infrastructure [J]. Environment Herald, 1998(5):1–4.

mutual coordination and cooperation relationship in the face of the challenges of global environmental problems. The most important matters in the current global environmental governance are the items of how to invest human, material and financial resources under a certain kind of condition. Different countries in the world demand more and more interests of global environmental governance and the games become more and more complex, which conduct very slow progress of the global environmental governance.

Environmental governance is a systematic project, which requires a large number of integrated and collaborative bodies to coordinate with each other. Every country should recognize the interests in the global environmental governance and enhance the awareness of participation in global environmental governance. They must establish a diversified investment mechanism from the organizations of government, enterprises and society and build up a mechanism of some parts of pollution control facilities operated by the market organizations. They should improve environmental protection system and perfect a unified, coordinated and efficient environmental regulatory regime. They should build up an announcement system of environmental quality and regularly publish in various regions of the indicators related to environmental protection, publish air quality, urban noise, drinking water quality, river water quality and other environmental information, timely release of information on pollution incidents. They should strengthen social supervision through hearings, feasibility studies or social publicity and other forms of public opinion. They should improve the environmental monitoring network, strengthen the environmental quality monitoring and increase the capacity of the pollution monitoring detection technology and routine testing equipment and the environmental emergency monitoring. Some countries should accelerate the construction of nuclear safety information system and implement information resources sharing mechanism. Using the coercive power of government, they should strengthen the environmental supervision, establish a government integrated decision-making mechanism for the ecological construction and environmental protection and improve a short, medium and long-term planning to the environmental protection.

14.5 Strengthening the Coordination and Cooperation in the World Climate and Environmental Issues to Achieve Mutual Benefit and Win-Win

From the view of either the time or the space, the impact of the global environmental problems crosses the borders. Every country has no choice but to sit in the same boat and must cooperate to cope with the current tough stance environmental situation.[4] The earth is a whole environment and the environments within the jurisdiction of

[4]Wu Hao, Ma Bao-bin. China's Participation in Global Environmental Governance: Background, Present Situation and Countermeasures [J]. Journal of Changchun University of Technology, 2011(5):8–11.

various countries are integral part of the overall environment. As a matter of the fact, many of the global environmental problems are often an extension of environmental issues within a certain country. The global problems cannot be solved by an isolated country. We must strengthen cooperation and overall coordination. A number of global issues and common public crisis makes increasingly the necessary of the international cooperation and the common security and common development concept has increasingly become the consensus of statesmen.[5]

In addition to concern the world rankings in the global environment under the competitiveness on the global environment research, it pays more attention to the achievement on forming the global environmental awareness and promoting the environmental technology, the international cooperation and building of the international environmental institution, which makes the global environmental governance achieving a substantial result. International environmental cooperation should become an important part of national environmental protection. The coordination mechanisms between local governments among different countries are the important safeguards to the comprehensive environmental cooperation standardized and orderly functioning. Every country should adhere to the "Common but differentiated Responsibilities" principle to promote the development of global environmental governance.[6] Especially those of the developing countries are facing shortage of funds, lack of technology, weakness of building capacity and other difficulties in global environmental governance. In this case, they are more badly in need to strengthen international cooperation for global environmental governance. From the perspective of development aid to care the global environmental governance, it is a kind of responsible representation, which includes both political arrangements, but is also conducive to the concept promotion standardization and the trade volume increases.

14.6 Strengthening the Environmental Advocacy Efforts to Enhance the Environmental Awareness of People

Protection of the environment is everyone's responsibility. The level of public environmental awareness is a measure of a country and nation on the degree of civilization. Only when everyone conscientiously fulfill their environmental obligations and foster environmental awareness, then we can truly solve environmental problems. The environmental advocacy work is a kind of solid foundation work for environmental work and plays an important role in supervising the environmental work. Protecting the environment is a common cause of the people all over the world and the environmental publicity and education is important to achieve the national environmental

[5] Wu Zhi-cheng, Wang Tian-yun. New Challenges of Global Governance under Globalizaition [J]. Journal of Nanjing University, 2011(2):43–47.

[6] Yu Hong-yuan. Study on the Global Environmental Governance and China Environmental Diplomacy Looking from the United Nations Summit on Sustainable Development [J]. Power and Energy, 2012(4):311–315.

protection. Currently, the people especially in some economic development relatively backward countries should increase environmental awareness. People never realize that protecting the environment also requires a process and the process itself is a process of environmental education.

Countries around the world should further increase the efforts on the environmental advocacy of the national policy on environmental protection and promote the environmental culture and the ecological civilization. They should make full use of various newspapers and magazines, television and radio, the Internet and other media advocacy role by refining shocking data and user-friendly screen to edit all kinds of the environmental pollution hazard information so that the public can be more intuitive to understand their own environmental conditions and consciously take actions to protect the environment. Every year, they should take 4.22 Earth Day and 6.5 World Environment Day as an opportunity to promote environmental resources education, establish mechanisms for public participation and carry out selection of activities such as environmental protection people on establishment of green home, green campus to continuously improve the quality of the environment and achieve maximum harmony between man and nature development. They should support the establishment of various forms of non-governmental environmental organizations work together the government environmental organizations. Also it is important to expand environmental publicity and education pilot, strengthen basic education on the environmental protection and continuously improve national environmental awareness so that the public is more concerned about environmental protection and understand and support environmental protection and participation in environmental protection.

14.7 Developing the Environmental Technology and Innovation to Solve the Global Environmental Problems

Environmental technology has become one of the most important the means to solve environmental problems. The environmental problems rely a lot on the development of science and technology. The environmental technology and innovation becomes a necessary condition for the construction of ecological civilization. To build an ecological civilization, we should vigorously promote scientific technological innovation. Currently, the developed countries have entered on the environmental science study stage of the integrated planet's ecosystems. But the majority of developing countries started the environmental technology late and the factors of the weakness in the infrastructure, low capacity of independent innovation, inadequate with the environmental infrastructure reserves constrain their competitiveness rankings in the global environment.

Environmental Science and Technology should follow the general idea of environmental protection with "the total reduction to improve the quality and prevent from the risk" and promote the environmental protection in leaps and bounds

through scientific progress and technological innovation.[7] People should promote the share on the environmental protection technologies. The developing countries should introduce the advanced environmental technologies and management experience from the developed countries to their environmental technology, equipment and management level. They should strive to master core technologies and key technologies through the introduction of digestion and absorption and also focus on the development of proprietary of the environmental technology. They should strengthen the technological innovation and build up a system which includes resource development, raw materials development, manufacturing, distribution, consumption, recycling processes of resource-saving technical support system. They should promote the construction of the state environmental protection laboratory, engineering technology center, field observation and research station. They should develop information technology, biotechnology, fundamental and pioneering technology and accelerate the development of energy-saving environmental protection, biomedicine and other strategic emerging industries. They should transform traditional industry and develop ecological economy, circular economy and low-carbon economy with advanced technology. They should adjust the industrial structure to change the mode of economic growth and build up a low-carbon, green growth of modern industrial system to achieve a development the new industrialization with low pollution, low consumption and high efficiency.[8]

[7] http://baike.baidu.com/view/8003740.htm

[8] Xiao Xian-jing. Ecological Civilization in the Perspective of Science and Technology Steering – Science and Technology in Recent Years of China Green Innovation [N]. China Social Science Newspaper, 2012.9.22.

Chapter 15
Basic Thinking and Policy & Suggestion to Enhance GEC

Under the multiple pressures of traditional development pattern frustration, economic restructuring, industrial technology innovation, etc., the strong will for worldwide economic transition and economic resurgence & growth is driving the countries to explore the new engine to lead economic growth and the new advantage to reshape international competition. Undoubtedly, the development of new energy and clean energy, the response to climate change and the development of green economy become the important breakthrough for the transformation of global economic development pattern, attract antecedent attention in all countries and are highlighted as the focus of global agenda. It is just in the "storm region" of such a focus that the debate and gaming are conducted on environment among the developed countries and between the developed countries and the developing countries. So to speak, to enhance the environment competitiveness will represent a potential and sustaining power of the economic development of a country or region and relate to the sustainable development of the national or regional economy. The international competition in the future will be centered on environment and become the most vital phenomenon in the area of international competition. The strength of environment competitiveness will directly concern the comprehensive strength of the countries and regions in economy, science, etc. as well as the position of them in international competition. To enhance the environment competitiveness will become the necessary choice and action of all countries and regions.

15.1 Basic Thinking to Enhance GEC

Environment competitiveness is a comprehensive system, including natural environment and ecological environment, environment quality and environmental safety as well as the management and coordination of governments and society for environment. So, the enhancement of environment competitiveness is a systematic project relating to multiple aspects of politics, economy and society. Besides, since

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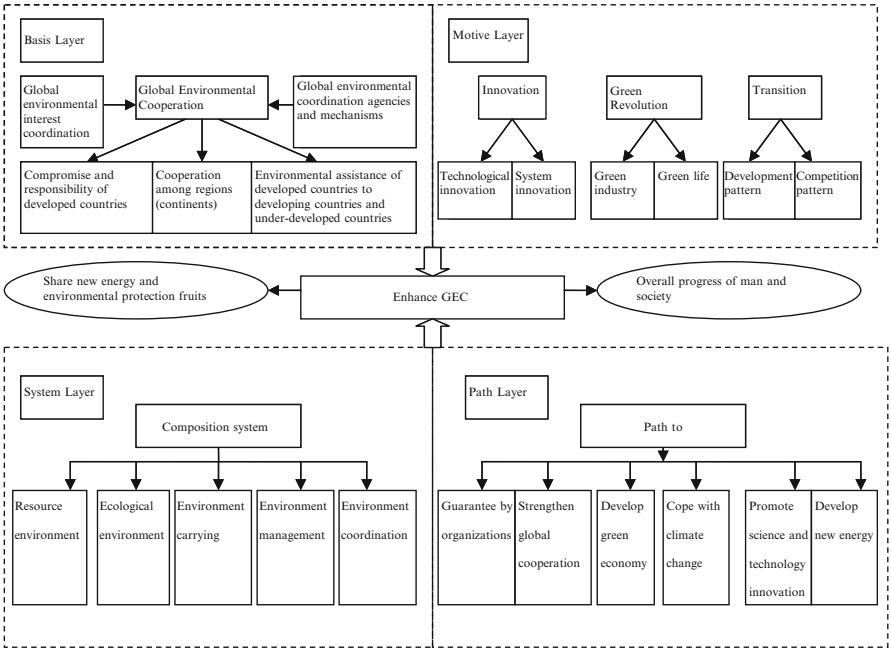

Fig. 15.1 Basic thinking framework to enhance GEC

environment is borderless and the environmental pollution is spreading, the international environmental cooperation is the necessary choice to enhance GEC. Nevertheless, due to the active demand of developed countries for new energy from economic development mode and reindustrialization, during the process of industrialization that the developing countries explore the new approach to address environmental issues and the combined action that the whole world respond to climate change, there are both the mutual interest and the individual interest of the countries and the regions and how to coordinate the interests is the key to environmental issues. It also implies it's a gradual process in proper sequence to enhance GEC, not only confronted with high economic cost but also challenged by high social cost possibly.

In combination with the dynamic evaluation results and the pressure confronted by global environment at present, this report raises the basic thinking framework to enhance GEC. Highlighting one basis, three motive powers, five systems and six paths and forming four aspects of basis layer, motive layer, system layer and path layer (see Fig. 15.1), this framework aims to realize the enhancement of GEC through the coordination and cooperation of all layers and thus to promote the world to get rid of the restriction of resource energy, share the new energy and environmental protection fruits and achieve the overall progress of man and society.

15.1.1 Global Environmental Cooperation Is the Basis to Enhance GEC

Environmental influence is not limited by regional and national boundaries and is characterized by typical externality. Due to the spreading and uncontrollability of environmental destruction and pollution, the event of environmental pollution or environmental safety occurring in a country or region usually endangers the countries and regions around and even causes worldwide environmental disaster. The scarcity of resources has become a common problem confronted by the entire world and the contention for resources usually triggers the conflict and turbulence among countries and results in the instability of world political and economic development. Furthermore, the environmental problems are also beyond social system and beyond ideology: the environmental problems of pollution, climate change, etc. exist in a country of any system. Exclusion and fighting are not the good way to address global environmental problem, but may result in resource waste and increase of social cost. Therefore, to enhance GEC, we shall strengthen global cooperation, organize and establish global environmental cooperation and coordination agencies and build relevant coordination mechanism with coordinating global environmental interest as the core. The developed countries shall lower its strong stance and offer a compromise to take the responsibility for their industrialization; and meanwhile, keep their promises in fund and technique to strengthen the environmental assistance for developing countries. The regions (continents) shall, around common environmental objective, eliminate differences and develop bilateral and multilateral cooperation; based on global common interest, strengthen global dialogue and negotiation and translate them into concerted action as soon as possible, cope with and address global environmental problems jointly and promote the coordinated improvement of GEC.

15.1.2 Transition, Innovation and Green Revolution Are the Motive Powers to Drive the Improvement of GEC

Undergoing the blow of financial crisis and the continued downturn of global economy, from USA and Europe climbing out from the debts to the emerging economies undergoing inflation and slowing down its growth, global economy seems to enter into a period of seeking transition in vibration deceleration. Transition is to transform the economic development pattern, break through the restriction of traditional development mode, change the development pattern with high output relying on high input, readjust the industrial structure and consumption structure and explore the engine to lead a new round of economic growth. Thus, to develop the strategic emerging industries such as new energy and build new industrial mode and consumption mode are the main direction for global economic transition and the important guarantee for

the countries to improve their international status. Innovation includes technological innovation and system innovation. Technological innovation can provide technological support to develop new energy and clean energy and cope with climate change, ensure the reindustrialization in developed countries and the reconstruction of real economy system and ensure the successful advance of new industrialization process in developing countries not at the expense of environment. System innovation means forming the mutual restriction of the countries and regions by establishing global environmental protection system and mechanism to ensure the action concordance of the countries. The development of green revolution around green economy has become the new trend of global economy for green transition. Green revolution, in production, requires developing green agriculture, green industry and green service industry and constructing green industrial system; in consumption, green revolution advocates green consumption pattern and realize green fair employment to give new impetus to GEC under the dynamics of transition, innovation and green revolution.

15.1.3 To Enhance the Five Sub-Indexes Jointly Is the key Point to Enhance GEC

In the GEC indicator system built in this report, GEC is decomposed into five aspects: REC, EEC, ECC, EMC and EHC. These five aspects summarize the content and scope of environment competitiveness and offer a comprehension of environment in an all-around way, including not only the real capacity contained in environment itself applicable for direct comparison such as resources and biology but also the impetus and the potential for development injected by the outside for management and coordination of environment as well as the sustaining power to strengthen environment carrying capacity. The five systems are not isolated, but influence and restrict one another. For instance, the performance of resource environment and ecological environment will influence the difficulty of environment management, the strength of environment management will also concern the degree of environmental influence directly and environment coordination will influence the mode of environment management. Therefore, the five systems shall be integrated into an overall system to enhance environment competitiveness with emphasis on some and meanwhile overall planning for all during concrete implementation process under the premise of concerted general objective. Of course, due to the variation differences of regional and environmental basis, the countries and regions are not uniform in the system of environment composition. The countries and regions shall give full play to the leading action of advantageous indicators, overcome the adverse influence of weak indicators and meanwhile dissect the indicator system layer by layer, find out the key link that restricts the improvement of environment competitiveness and make joint efforts to enhance GEC.

15.1.4 Global Vision and Dynamic Perception Are the Means of Seeking the Path to Enhance GEC

Environmental problem is a global problem. To solve environmental problem, we shall aim at global common interest to form concerted actions worldwide. What's more, environmental problem is not only an existing problem but also an inter-generation problem. We shall focus on long-term sustainable development as well as the resolution of current problems thus to achieve inter-generation equity in a better way. The arising of environmental problems is a process of long-term accumulation; the resolution of environmental problems and the improvement of environment competitiveness also need a long-term process. Furthermore, as new environmental problems emerge continually, the environmental problems become much more complex and we shall shift in thinking and change the innovation pattern continually. As social productivity develops and human civilization advances, the countries and regions understand environment more and more profoundly and protect environment by more and more scientific means. The emerging and practical exploration of the concepts like green economy, recycling economy and low-carbon economy also continually adds new content to the GEC indicator system. So, we shall seek the paths to enhance GEC by dynamic perception in combination with the important task and the urgency of global environmental protection at present around the ultimate goal of global sharing and overall progress of man and society. The paths to enhance GEC include strengthening the guarantee of organization, strengthening global cooperation, developing green economy, responding to climate change, promoting science and technology innovation, developing new energy and clean energy, etc. All these paths are interlaced with the basis and motive powers to enhance GEC, which cover the overall content of outer support and capacity building required by environment competitiveness.

15.2 Policy & Suggestion to Enhance GEC

When global environmental problems have crossed the boundaries of countries and regions currently, it requires all the countries to innovate continually hand in hand. All the countries shall consider development, transition and environmental protection in a comprehensive way, make efforts to achieve mutual coordination and promotion between environment and economy and add new contribution to sustainable development of the world.

15.2.1 To Develop Green Economy Greatly and Advance New Thinking of Sustainable Development

In October 2008, United Nations Environment Programme (UNEP) launched the Green New Deal, advocating developing green economy worldwide with great efforts and proposing the strategy of saving the world from financial crisis by Green New Deal. Green economy is an economic development mode, which, covering the main content of resource-conserving and environment-friendly economy and emphasizing on the integration of economic efficiency, social efficiency and ecological efficiency maximization, can realize the sustainable development of population, resources and environment coordination. The effective implementation of "Green New Deal" and the development of green economy can lay a sound foundation to realize the strategic target of sustainable development. The whole countries, especially the developed countries, pay much attention to the development of green economy and take green economy as the new trend of global sustainable development. It has become the global consensus and important direction to deal with global economic crisis, promote economic restructuring and enhance national competitiveness by developing green economy.

To develop green economy, the development idea of green economy shall run through all areas of economic and social development as well as all links of industrial development. In resource utilization and environmental protection, it requires replacing material resources with intelligence resource to greater degree and in larger scale, enhancing the utilization efficiency of resources, reducing the emission of pollution, and controlling resource consumption within the threshold of resource regeneration and pollution emission within the threshold of natural purification. To solve environmental pollution, we shall change from "terminal improvement" to the safety production of "all-process cleaning", try to separate economic growth from resource consumption, environmental pollution and ecological damage and realize the coordination between economic development and resource utilization and environmental protection. All the countries shall attach importance to the enhancement of ecological system stability, take effective measures to protect biodiversity and the overall resilience of ecological system; actively advance global new energy revolution, greatly develop renewable energy sources, promote the application of new energies such as nuclear energy, solar energy, wind energy, tidal energy, biologic energy, ocean energy and geothermal energy, reduce the consumption of fossil energy; accelerate economic restructuring and industrial structure optimization, develop the "light" industry and green industry with high knowledge content, less environmental pollution, less resource consumption, strong agglomeration and radiation capacities, guide resource integration and allocation towards green industry and construct modern green economic and industrial system; increase green investment, improve the investing and financing channels of green finance, strengthen the credit aid to new energy enterprises, give play to the impetus of government investment, develop green economy by attracting venture capital investment, angel investment and stock equity fund, etc. with green credit policy and

provide the fund guarantee for the development of green economy; advocate green consumption conception, encourage green consumption by the measures of government procurement and green product subsidy, guide consumers to buy energy-saving products and green products, facilitate the forming of sustainable green consumption mode worldwide and realize the good interaction between green production and green consumption. The all countries shall also accelerate to formulate the strategic planning of green economic development, confirm the target, task and important aspects of green economic development, comprehensively coordinate the relevant national policies and the actions of interest subjects, accelerate to establish the green system of national accounts reflecting the values of ecological capital and environmental capital, give full play to the guarantee action of market mechanism, laws and regulations, science and technology innovation and system innovation in promoting green economic development and lay the foundation for facilitating global sustainable development and realizing the "green transition" of traditional "brown economy".

15.2.2 To Cope with Global Climate Change Positively and Promote the Healthy Development of Low-Carbon Economy

Climate change is the vital global problem confronted by the man for living and development and it is mainly characterized by global climate warming. It has become global focus and world consensus to respond to climate change and implement low-carbon development. The all countries and regions shall further improve their policies of industry, public finance & taxation, finance, technology and consumption to deal with climate change; emphasize on controlling greenhouse gas emission and mitigating climate change by the policy means of regulations and standards, taxation, convertible permit, voluntary agreement, subsidy and encouragement, etc.; establish the greenhouse gas emissions trading system, guide voluntary trading activities on emission reduction; establish complete low-carbon product standard, label and certification system and build the data base of low-carbon certification; improve the system of government agencies purchasing low-carbon products and promote the coordination and interaction between low-carbon production system and consumption system. In basic research and technological research responding to climate change, we shall emphasize on the basic theoretical research such as global environment monitoring, climate change assessment and the forecasting of global climate change trend in the future, intensify the organization and coordination of scientific and technical work responding to climate change, strengthen the construction of science and technology supporting system responding to climate change, establish the subject and R&D fund specially for climate change, advance the R&D of key low-carbon technology; build and improve the statistical and accounting system and the appraisal and examination

system on greenhouse gas emission, strengthen the statistics and investigation on energy activity, industrial production, agriculture and forestry related to greenhouse gas emission, provide the accurate information in time on greenhouse gas emission monitoring, statistics and accounting, establish the target responsibility system and the appraisal and examination system controlling greenhouse gas emission, and enhance the consciousness and initiative responding to climate change; greatly develop low-carbon energy, try to reduce the consumption of high-carbon energy such as coal and petroleum, increase the proportion of relatively clean and low-carbon natural gas energy, advocate the utilization of "zero-carbon energy" such as solar energy, wind energy and tidal energy, pay adequate attention to the energy conservation and emission reduction of the key fields of industry, construction and transportation, reduce the emission of greenhouse gases such as carbon dioxide and increase forest carbon sink, enhance the capacity of forest absorption and carbon dioxide storage and increase the absorption of greenhouse gases by forest planting, etc., try to realize the win-win low-carbon and green economic development pattern for economic and social development and ecological environmental protection.

15.2.3 To Enhance the Ability of Science & Technology Innovation and Support the Coordinated Development of Service Environment and Economy

Science and technology innovation plays an important role in supporting and leading the human beings to enhance environment improvement. The economic development is unsustainable just depending on resource input and energy consumption; real sustainable development can be realized only through science and technology innovation and driven by innovation. The sustainable development of environment and economy led by science and technology innovation requires reassembling, optimizing and upgrading the capital, labor and all kinds of material resources by means of the innovation factors such as science and technology, knowledge, modern enterprise management system and commercial operation mode thus to improve the ability of science and technology innovation as well as the internal motive power of economic sustainable development and to form the endogenous growth of economy.

To enhance the ability of science and technology innovation, the cooperation of government, production, study and research shall be strengthened further among governments, colleges and universities, research institutions and enterprises to improve the construction of science and technology innovation system. The governments shall further give play to the organization and coordination action in facilitating science and technology innovation, increase the public R&D

input in green technology and low-carbon technology, formulate the related policies of fiscal and taxation policies, financial support, personnel training and intellectual property rights to encourage science and technology innovation, establish special fund to support the independent technical innovation of "green" enterprises, compose interest compensation mechanism and risk sharing mechanism to promote the introduction, absorption and integration of technological innovation. As the subject of innovation system, enterprises shall strengthen the connection with research institutions and colleges and universities, give full play to the innovation advantage of colleges and universities, research institutions and enterprises in basic research, application research and experiment development, build the technological innovation organizations such as research institutions and industrial technology alliance in combination, carry out the activities of science and technology innovation for green technology and low-carbon technology, enhance the ability of science and technology innovation and the ability to transform science and technology innovation into real productivity. The intermediary service agencies such as technology transfer center, high-tech enterprise incubator and technical exchange market shall also give full play to the intermediary advantage and the lubricating action, provide green technical exchange platform and green technology introduction channel, promote the diffusion & application and commercial transformation of green technology achievement; accelerate to build and improve innovative alliances, strengthen the connection of innovation systems among the countries and regions, promote the free flow, sharing and complementation of innovative resources, concentrate advantageous resources to overcome the material problems and key areas related to climate change, energy-conservation & emission-reduction, energy safety, resource utilization efficiency and pollution control; by developing the technology of energy-conservation & emission-reduction, low-carbon technology, the technology of resource recycling utilization and the utilization technology high efficiency and cleaning, reduce the proportion of non-renewable resources like coal in energy structure, develop new energy, renewable energy and new alternative energy and enhance the utilization efficiency of resources and energy practically; strengthen the R&D and industrialization process of no-ham-to-the-environment technology, reduce the utilization of natural resources and the discharge of wastes, develop various green production technologies and waste-to-resource technologies to provide sound technological support for the development of green economy and the realization of sustainable development; by science and technology innovation, realize the optimization and upgrading of industrial structure, realize the substitution of intelligence resource and innovation resource for environmental and material resources as well as the knowledgeable and ecological transition of economic activities, realize the transition of resource-intensive enterprise to technology-intensive and environmental-protection enterprise to promote the sustainable development of global economy.

15.2.4 To Strengthen International Cooperation and Form the Robust Composite Force for Global Environment Improvement

International environmental cooperation means the cooperation of countries and other subjects of international action in the area of environmental protection, taking collective actions to respond to and solve the occurred environmental problems with common influence on the world or the occurring actions with damage or damage threat to global environment thus to achieve the target of seeking common interest of mankind. Protecting environment is the common responsibility and task of the universe; expanding and deepening international environmental cooperation is the only way to promote global sustainable development. Only by cooperation, the consensus can be reached; only by cooperation, the joint development can be realized; only by cooperation, global environmental problems can be solved entirely.

Both developed and developing countries shall strengthen the environmental cooperation, based on their own national conditions, insist on the principle of "common but differentiated responsibilities": the developed countries undertake more responsibilities and obligations to compensate for the climate "debt" caused by them for over-consumption of natural resources and massive emissions of greenhouse gases during the process of industrialization. Many a developing countries are in the of rapid development stage of industrialization and urbanization, on one hand, confronted with the arduous tasks of poverty eradication, economic development, economic structure adjustment and the transition to green economy and, on the other hand, restricted by the factors of resources, environment and energy. Therefore, the developed countries shall also provide fund and technical aids for the developing countries to help them develop green economy and low-carbon economy, enhance their ability and activeness in dealing with environmental problems and participate in international environmental cooperation in a better way. In environment and trading, intellectual property rights protection and environmental technology transfer, the developed countries shall respect the development demand and rights of developing countries, shall not erect barrier to the economic development and trade of developing countries or take trade protectionism in disguised form on the ground of environmental protection or in the name of green economy and green standard, shall also not place obstacles in the technology transfer to developing countries under the banner of protecting intellectual property rights. As for the developing countries, at the primary stage of transforming to green economy, they shall accelerate to form and implement the sustainable development strategy applicable for the basic conditions of themselves to obtain adequate support from developed countries and lay the foundation for further global environmental cooperation. The success of internal environmental cooperation relies on the good faith of the participating subjects and the practical measures adopted, thus the countries shall start from the common interest of the universe, transfer the sovereignty more, keep on the

promise on environmental cooperation, emphasize on long-term interest and global interest, make concerted efforts and take the initiative to protect the earth environment that the human beings depend on. So, we shall further consolidate and deepen the environmental cooperation among the governments, expand the cooperation fields, form the new pattern of environmental cooperation with reasonable structure and prominent key points and carry out the collaboration in key fields under more flexible and improved cooperation mechanism to really form the strong composite force of global environment improvement.

15.2.5 To Reinforce the Guarantee of Organization Mechanism and Establish Effective Framework of Global Environment Improvement

Global environment improvement includes the standardization of various levels and areas such as inter-governmental organizations and non-governmental organizations, financing mechanisms, policy instruments, rules and procedures, etc. The key of global environment improvement lies in constructing effective global improvement framework to direct and coordinate the practical activities of different countries and regions in enhancing environmental protection and promoting sustainable development. The international mechanisms at present have not solved the deteriorating environmental problems worldwide yet, therefore, the international organizations and mechanisms of international environmental protection shall have further development. First, we shall give play to the core leadership and organization & coordination action of United Nations further, guide the related agencies, multilateral mechanisms and treaty mechanisms of international community to take concerted action for sustainable development; give play to the positive role of the related UN agencies in the aspect of various environmental problems resolution and the field of sustainable development such as the United Nations Economic and Social Council (ECOSOC), the United Nations Commission on Sustainable Development (CSD), the United Nations Conference on Trade and Development (UNCTAD), the United Nations Educational Scientific and Cultural Organization (UNESCO), World Health Organization (WHO) and World Meteorological Organization (WMO), etc., promote and implement the related international documents such as Agenda 21 and Plan of Implementation of the World Summit on Sustainable Development. Secondly, we shall further strengthen the function of the United Nations Environment Programme (UNEP) and give play to its important role in global environment improvement. Rather than a standing institution, UNEP reports to the General Assembly through ECOSOC; headquartered at Nairobi of Kenya, its function is restricted greatly. So, it is recommended to define UNEP as a special global environment improvement institution to be conferred with new functions and tasks, offered with firmer fund guarantee, wider membership

foundation and greater power to support the environmental science research and coordinate global environmental strategy; raise the status and importance of sustainable development mechanism in UN system; by promoting the status of UNEP, integrate and lead global environmental affairs, supervise international environmental problems effectively and ensure the effective implementation of environmental protection in international community. Thirdly, we shall facilitate the reform of CSD and further promote international environmental cooperation. CSD is one of the forums of UN discussing and deliberating international environment and development cooperation, which play a positive role in mobilizing international environmental cooperation and urging the decisions of the United Nations Conference on Environment and Development (UNCED) but the authoritative weight and influence are limited still. According to the proposal raised at Rio+20, the United Nations Conference on Sustainable Development, high level political forum is planned to build to replace CSD and supervise the performance of environmental protection in the countries and regions. Furthermore, international financial institutions, world trade organizations and multilateral development banks shall involve sustainable development into their planning and projects and coordinate with the relevant UN agencies to combine environmental protection and economic development in a more organic way. Finally, we shall give full play to the role of non-governmental organizations in global environment improvement. The non-governmental organizations on environment operate around global ecological environmental protection. As the reserve force of governments and international organizations in environmental policies, they are the important element and drive in global environment improvement system. We shall give full play to the powerful functions of the non-governmental organizations (such as the International Union for Conservation of Nature (IUCN), World Wildlife Fund (WWF) and Greenpeace) in environment management and supervision, participating in environmental protection and improvement, popularizing environmental protection education and enhancing environmental protection consciousness, promoting public expression and the communication between the public and the governments thus to make a positive contribution to environmental protection and sustainable development.

Part III
Sub Report

Chapter 16
Report on Global Environment Competitiveness of Albania

Score: 53.12
Rank: 31

Albania is a country in Southeastern Europe, bordered by Montenegro to the northwest, Kosovo to the northeast, Macedonia to the east and Greece to the south and southeast. The coastal lowlands have typically Mediterranean weather; the highlands have a Mediterranean continental climate. And natural resources is poor. Albania has a total area of 27.4 thousand of square kilometers. As of late 2011, the gross population was 3.22 million, with GDP reaching USD 12.96 billion. Based on the index system of global environment competitiveness, comprehensive analysis on factors and indictors indicates that environment competitiveness index of Albania ranks at 31 among 133 countries.

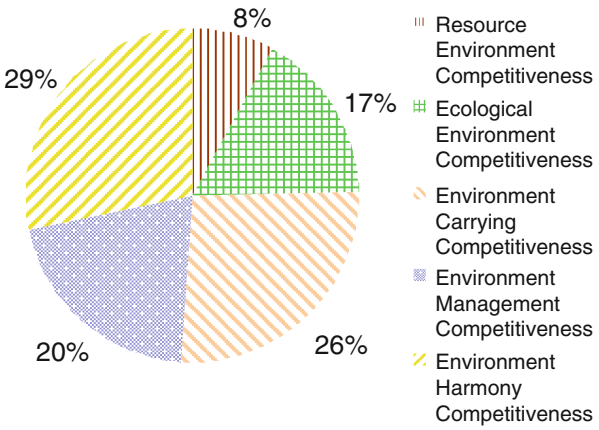

Fig. 16.1 Contribution of sub-index to GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_16,

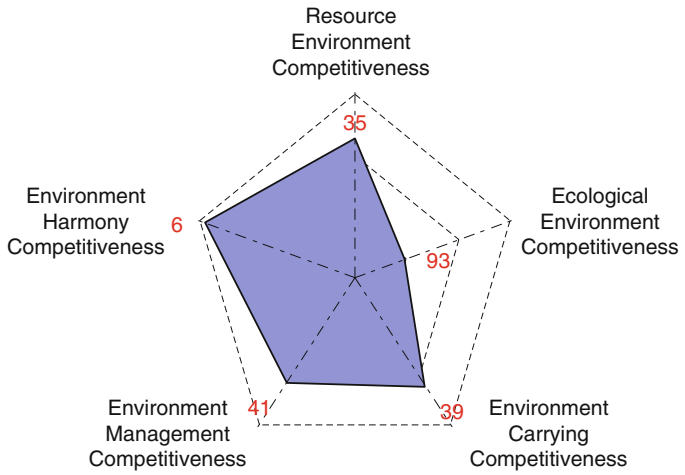

Fig. 16.2 Rank of sub-index of GEC

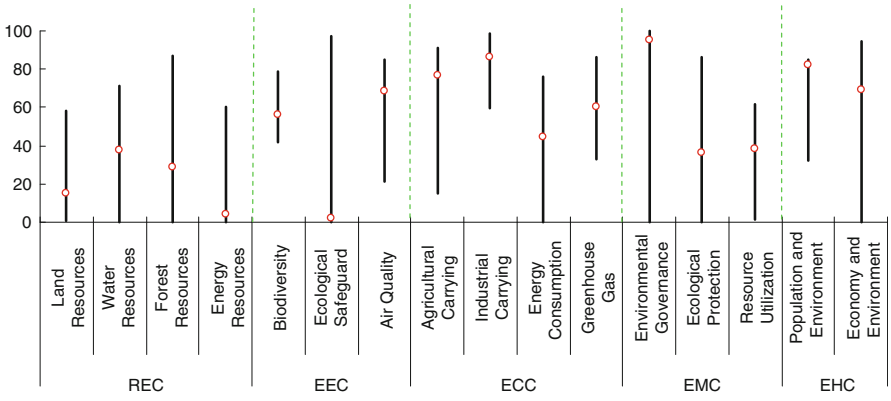

Fig. 16.3 Score and rank of the pillars of GEC

Table 16.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	21.10	35	Groundwater	32.57	23
1.1 Land Resources	14.85	52	Total internal renewable water resources	49.51	20
Land area per capita	1.51	97	1.3 Forest Resources	28.83	70
Percentage of arable land to total land area	38.44	35	Growing stock in forest and other wooded land	50.23	93
Arable land per capita	9.05	68	Proportion of land area covered by forest	33.13	65
1.2 Water Resources	37.45	25	Forest area per capita	1.68	70
Surface water	14.91	18	1.4 Energy Resources	3.77	83
Annual precipitation	52.83	31			

(continued)

Table 16.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
Fossil energy	0.00	64	3.3 Energy Consumption	44.27	12
Energy production	0.51	83	Energy consumption per unit of land area	99.84	53
Proportion of combustible renewable and waste to total energy consumption	10.57	61	Ratio of clean energy consumption	45.00	12
Net energy imports of the energy consumption	9.87	59	Elasticity of energy consumption	13.99	59
2 Ecological Environment Competitiveness	44.73	93	Elasticity of electric power consumption	18.23	13
2.1 Biodiversity	56.07	98	3.4 Greenhouse Gas	60.21	76
Threatened fish species	81.60	90	Growth rate of CO_2 emissions	46.02	86
Threatened mammal species	98.37	11	Growth rate of Methane emissions	56.84	80
Threatened plant species	100.00	1	CO_2 emissions per unit of land area	99.85	62
GEF benefits index for biodiversity	0.20	109	CO_2 emissions per unit of energy consumption	52.33	44
2.2 Ecological Safeguard	1.99	123	4 Environment Management Competitiveness	54.41	41
Terrestrial protected areas	N/A	N/A	4.1 Environmental Governance	95.00	44
Marine protected areas	1.99	65	Agricultural chemicals regulation	N/A	N/A
2.3 Air Quality	68.29	48	Percentage of the rural population with access to an improved water source	94.00	49
Inhalable particles (PM10)	72.26	84	Percentage of the urban population with access to an improved water source	96.00	89
Particulate matter (PM2.5)	84.42	69	4.2 Ecological Protection	35.96	58
Index of indoor air pollution	N/A	N/A	Area of plantation and afforestation	0.12	81
Nitrogen oxides emission	68.79	19	Biome protect	42.50	80
Sulfur dioxide emission	40.97	10	Overfishing of fishing resources	77.21	9
3 Environment Carrying Competitiveness	69.78	39	4.3 Resource Utilization	38.40	61
3.1 Agricultural Carrying	76.88	20	Utilization rate of water resources	0.17	81
Cereal yield per unit of arable land	49.55	29	Percentage of total internal renewable water resources to total water resources	61.07	72
Fertilizer consumption per unit of arable land	92.81	74	Percentage of agricultural land to total land area	51.94	65
Annual freshwater withdrawals for agriculture per unit of arable land	97.40	78			
3.2 Industrial Carrying	86.06	105			
Net exports of goods as a percentage of GDP	90.56	20			
Electric power consumption per unit of value added of industry	72.17	117			
SO_2 emissions per unit of value added of industry	99.81	68			
Annual freshwater withdrawals for industry per value added of industry	81.69	123			

(continued)

Table 16.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
Percentage of fossil fuel energy consumption to total energy consumption	40.43	42	SO_2 emissions per capita	98.62	29
			CO_2 emissions per capita	96.92	39
			Energy consumption per capita	96.00	30
5 Environment Harmony Competitiveness	75.59	6	5.2 Economy and Environment	69.25	33
5.1 Population and Environment	81.94	9	Land resource utilization efficiency	0.14	56
Percentage of population with access to Improved sanitation facilities	98.00	33	Sulfur dioxide emissions per unit of GDP	97.22	34
Motor vehicles per 1,000 people	85.43	63	Carbon dioxide emissions per unit of GDP	89.90	54
Renewable internal freshwater resources per capita	10.12	39	Energy consumption per unit of GDP	89.74	45

Table 16.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	0	3	3	8	0
Ecological Environment Competitiveness	11	1	2	1	4	1
Environment Carrying Competitiveness	15	0	5	2	6	2
Environment Management Competitiveness	10	0	0	3	6	0
Environment Harmony Competitiveness	10	1	1	7	1	0
Total	60	2	11	16	25	3

Chapter 17
Report on Global Environment Competitiveness of Algeria

Score: 46.5
Rank: 104

Algeria is an Arab country in the north of Africa, bordered in the northeast by Tunisia, in the east by Libya, in the west by Morocco, in the southwest by Western Sahara, Mauritania, and Mali, in the southeast by Niger, and in the north by the Mediterranean Sea. Mali and the Mediterranean Sea in the north. And natural resources is rich. To the north, it has a Mediterranean climate and a tropical desert climate to the south. It covers 2,381.7 thousand of square kilometres. It had a population of 35.98 million and domestic production the gross (GDP) of USD 188.68 billion in 2011. Through the evaluation of global environment competitiveness, we can know that the environment competitiveness index of Algeria ranks at 104 among 133 countries.

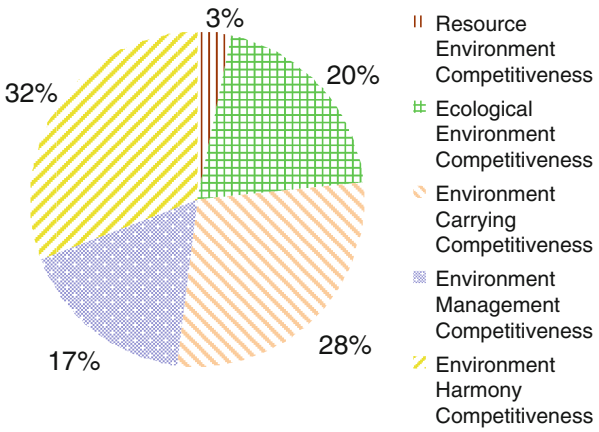

Fig. 17.1 Contribution of sub-index to GEC

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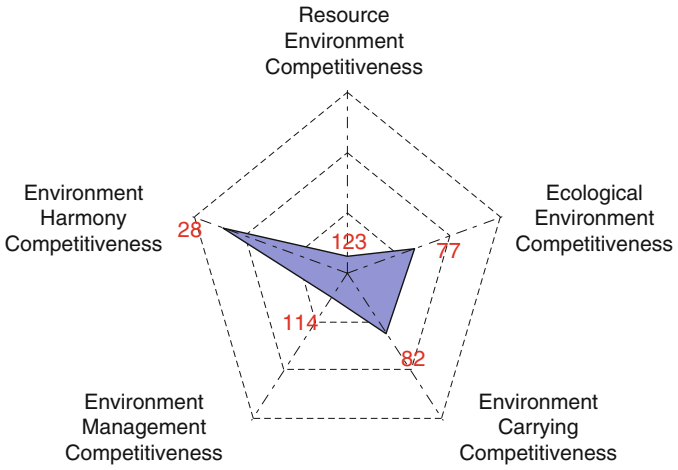

Fig. 17.2 Rank of sub-index of GEC

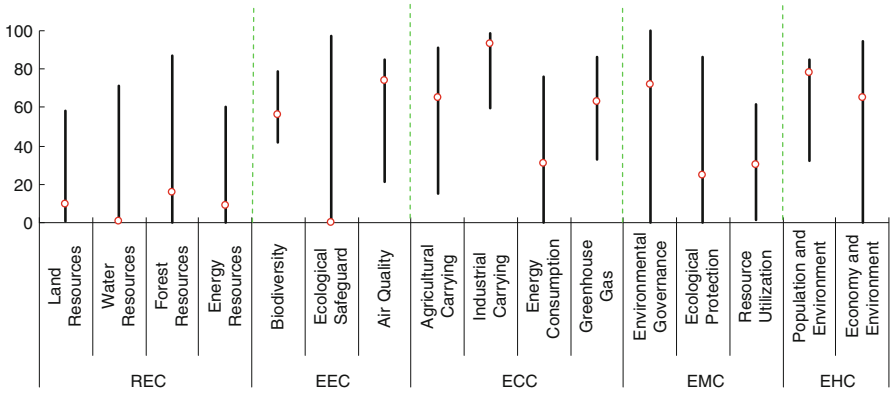

Fig. 17.3 Score and rank of the pillars of GEC

Table 17.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	7.88	123	Groundwater	0.05	126
			Total internal renewable water resources	0.24	122
1.1 Land Resources	9.25	88	1.3 Forest Resources	15.48	120
Land area per capita	11.91	20	Growing stock in forest and other wooded land	50.35	90
Percentage of arable land to total land area	5.19	111	Proportion of land area covered by forest	0.73	124
Arable land per capita	9.77	64			
1.2 Water Resources	0.84	127	Forest area per capita	0.29	112
Surface water	0.05	121	1.4 Energy Resources	8.95	46
Annual precipitation	3.02	126			

(continued)

Table 17.1 (continued)

Indicators	Score	Rank
Fossil energy	0.83	33
Energy production	4.29	22
Proportion of combustible renewable and waste to total energy consumption	0.20	108
Net energy imports of the energy consumption	47.72	9
2 Ecological Environment Competitiveness	46.48	77
2.1 Biodiversity	56.10	97
Threatened fish species	83.02	85
Threatened mammal species	92.39	81
Threatened plant species	99.30	66
GEF benefits index for biodiversity	2.90	64
2.2 Ecological Safeguard	0.27	131
Terrestrial protected areas	N/A	N/A
Marine protected areas	0.27	83
2.3 Air Quality	73.91	42
Inhalable particles (PM10)	49.64	119
Particulate matter (PM2.5)	88.43	44
Index of indoor air pollution	100.00	1
Nitrogen oxides emission	67.97	61
Sulfur dioxide emission	40.71	63
3 Environment Carrying Competitiveness	66.20	82
3.1 Agricultural Carrying	64.97	83
Cereal yield per unit of arable land	13.49	104
Fertilizer consumption per unit of arable land	99.37	22
Annual freshwater withdrawals for agriculture per unit of arable land	99.20	56
3.2 Industrial Carrying	93.18	48
Net exports of goods as a percentage of GDP	76.61	86
Electric power consumption per unit of value added of industry	97.10	14
SO_2 emissions per unit of value added of industry	99.97	22
Annual freshwater withdrawals for industry per value added of industry	99.06	37
3.3 Energy Consumption	30.65	116
Energy consumption per unit of land area	99.97	20
Ratio of clean energy consumption	0.13	111
Elasticity of energy consumption	14.24	39
Elasticity of electric power consumption	8.26	112
3.4 Greenhouse Gas	63.11	57
Growth rate of CO_2 emissions	62.21	32
Growth rate of Methane emissions	57.05	77
CO_2 emissions per unit of land area	99.95	37
CO_2 emissions per unit of energy consumption	34.15	90
4 Environment Management Competitiveness	40.52	114
4.1 Environmental Governance	72.06	103
Agricultural chemicals regulation	57.14	74
Percentage of the rural population with access to an improved water source	79.00	79
Percentage of the urban population with access to an improved water source	85.00	118
4.2 Ecological Protection	24.67	93
Area of plantation and afforestation	0.52	55
Biome protect	37.10	89
Overfishing of fishing resources	44.44	64
4.3 Resource Utilization	30.10	98
Utilization rate of water resources	2.13	20
Percentage of total internal renewable water resources to total water resources	96.43	5
Percentage of agricultural land to total land area	20.51	117
Percentage of fossil fuel energy consumption to total energy consumption	1.34	120

(continued)

Table 17.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
5 Environment Harmony Competitiveness	71.43	28	Energy consumption per capita	92.13	56
5.1 Population and Environment	77.83	27	5.2 Economy and Environment	65.03	69
Percentage of population with access to Improved sanitation facilities	95.00	47	Land resource utilization efficiency	0.02	100
Motor vehicles per 1,000 people	81.23	71	Sulfur dioxide emissions per unit of GDP	98.14	26
Renewable internal freshwater resources per capita	0.38	118	Carbon dioxide emissions per unit of GDP	78.17	97
SO_2 emissions per capita	98.84	26	Energy consumption per unit of GDP	83.79	68
CO_2 emissions per capita	92.57	64			

Table 17.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	0	2	2	2	8
Ecological Environment Competitiveness	11	1	0	2	5	2
Environment Carrying Competitiveness	15	0	4	5	3	3
Environment Management Competitiveness	10	1	1	1	5	2
Environment Harmony Competitiveness	10	0	3	1	5	1
Total	60	2	10	11	20	16

Chapter 18
Report on Global Environment Competitiveness of Angola

Angola is a country in Southern Africa bordered by Namibia on the south, the Democratic Republic of the Congo on the north, and Zambia on the east; its west coast is on the Atlantic Ocean. Most area of Algola has a tropical savanna climate. And natural resources is rich. It covers 1,246.7 thousand of square kilometres. It had a population of 19.62 million and domestic production the gross (GDP) of USD 104.33 billion in 2011. Through the evaluation of global environment competitiveness, we can know that the environment competitiveness index of Angola ranks at 88 among 133 countries.

Score: 48.03
Rank: 88

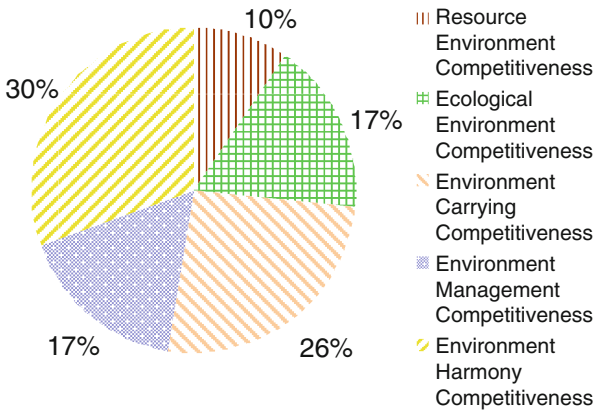

Fig. 18.1 Contribution of sub-index to GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_18,

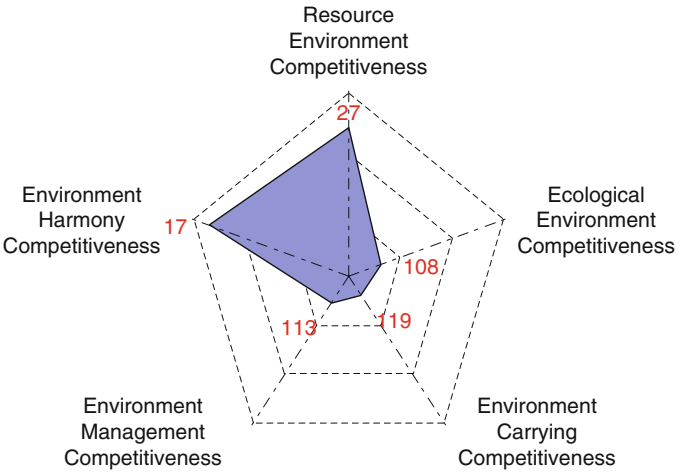

Fig. 18.2 Rank of sub-index of GEC

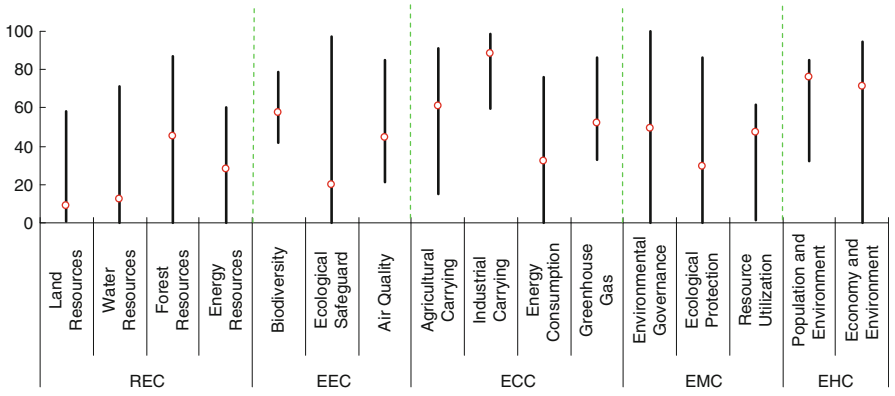

Fig. 18.3 Score and rank of the pillars of GEC

Table 18.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	22.98	27	Groundwater	6.66	78
1.1 Land Resources	9.13	89	Total internal renewable water resources	5.99	91
Land area per capita	11.43	21	1.3 Forest Resources	45.21	18
Percentage of arable land to total land area	5.42	110	Growing stock in forest and other wooded land	56.87	24
Arable land per capita	9.78	63	Proportion of land area covered by forest	54.82	23
1.2 Water Resources	12.04	77	Forest area per capita	20.74	13
Surface water	1.26	98	1.4 Energy Resources	28.34	4
Annual precipitation	34.24	60			

(continued)

Table 18.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
Fossil energy	1.84	27	Energy consumption per unit of land area	99.98	11
Energy production	5.24	19	Ratio of clean energy consumption	3.91	76
Proportion of combustible renewable and waste to total energy consumption	60.20	20	Elasticity of energy consumption	13.71	80
Net energy imports of the energy consumption	92.74	3	Elasticity of electric power consumption	10.39	81
2 Ecological Environment Competitiveness	41.17	108	3.4 Greenhouse Gas	51.85	124
2.1 Biodiversity	57.61	74	Growth rate of CO_2 emissions	19.64	130
Threatened fish species	81.60	90	Growth rate of Methane emissions	50.40	110
Threatened mammal species	91.85	84	CO_2 emissions per unit of land area	99.99	21
Threatened plant species	98.02	89	CO_2 emissions per unit of energy consumption	69.56	24
GEF benefits index for biodiversity	8.30	33	4 Environment Management Competitiveness	40.87	113
2.2 Ecological Safeguard	20.05	69	4.1 Environmental Governance	49.00	126
Terrestrial protected areas	33.42	58	Agricultural chemicals regulation	N/A	N/A
Marine protected areas	0.00	90	Percentage of the rural population with access to an improved water source	38.00	117
2.3 Air Quality	44.67	112	Percentage of the urban population with access to an improved water source	60.00	129
Inhalable particles (PM10)	57.66	109	4.2 Ecological Protection	29.75	82
Particulate matter (PM2.5)	76.09	95	Area of plantation and afforestation	0.17	78
Index of indoor air pollution	8.90	95	Biome protect	65.60	59
Nitrogen oxides emission	60.69	119	Overfishing of fishing resources	33.33	85
Sulfur dioxide emission	40.95	17	4.3 Resource Utilization	47.58	20
3 Environment Carrying Competitiveness	61.73	119	Utilization rate of water resources	0.01	126
3.1 Agricultural Carrying	61.18	110	Percentage of total internal renewable water resources to total water resources	72.91	55
Cereal yield per unit of arable land	3.06	127	Percentage of agricultural land to total land area	55.27	58
Fertilizer consumption per unit of arable land	99.92	4	Percentage of fossil fuel energy consumption to total energy consumption	62.14	22
Annual freshwater withdrawals for agriculture per unit of arable land	99.93	19			
3.2 Industrial Carrying	88.69	91			
Net exports of goods as a percentage of GDP	55.28	121			
Electric power consumption per unit of value added of industry	99.80	4			
SO_2 emissions per unit of value added of industry	99.99	7			
Annual freshwater withdrawals for industry per value added of industry	99.69	14			
3.3 Energy Consumption	32.00	84			

(continued)

Table 18.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
5 Environment Harmony Competitiveness	73.38	17	CO_2 emissions per capita	97.75	34
5.1 Population and Environment	75.75	37	Energy consumption per capita	95.46	38
Percentage of population with access to Improved sanitation facilities	57.00	92	5.2 Economy and Environment	71.00	23
Motor vehicles per 1,000 people	95.31	36	Land resource utilization efficiency	0.02	98
Renewable internal freshwater resources per capita	9.13	42	Sulfur dioxide emissions per unit of GDP	99.35	16
SO_2 emissions per capita	99.60	10	Carbon dioxide emissions per unit of GDP	94.41	22
			Energy consumption per unit of GDP	90.23	41

Table 18.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	1	7	1	4	1
Ecological Environment Competitiveness	11	0	0	1	7	3
Environment Carrying Competitiveness	15	3	2	0	4	6
Environment Management Competitiveness	10	0	1	3	2	3
Environment Harmony Competitiveness	10	1	3	4	2	0
Total	60	5	13	9	19	13

Chapter 19
Report on Global Environment Competitiveness of Argentina

Argentina is a country in South America, bordered by Chile to the west and south, Bolivia and Paraguay to the north, and Brazil and Uruguay to the northeast. Its southeast coast is on the Atlantic Ocean. It crosses the subtropical and temperate region. And natural resources is rich. It covers 2,736.7 thousand square kilometres. It had a population of 40.76 million and domestic production the gross (GDP) of USD 446.04 billion in 2011. Through the evaluation of global environment competitiveness, we can know that the environment competitiveness index of Argentina ranks at 66 among 133 countries.

Score: 49.88
Rank: 66

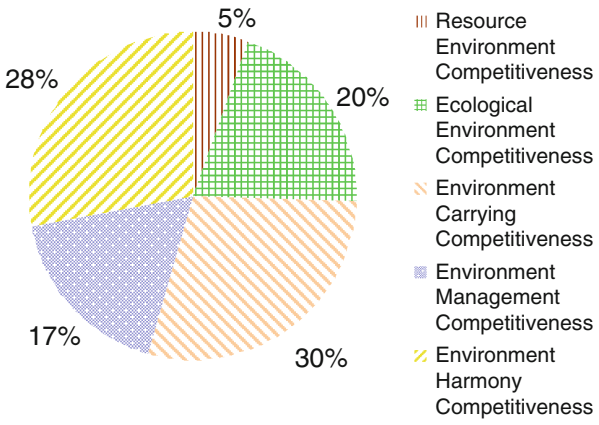

Fig. 19.1 Contribution of sub-index to GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_19,

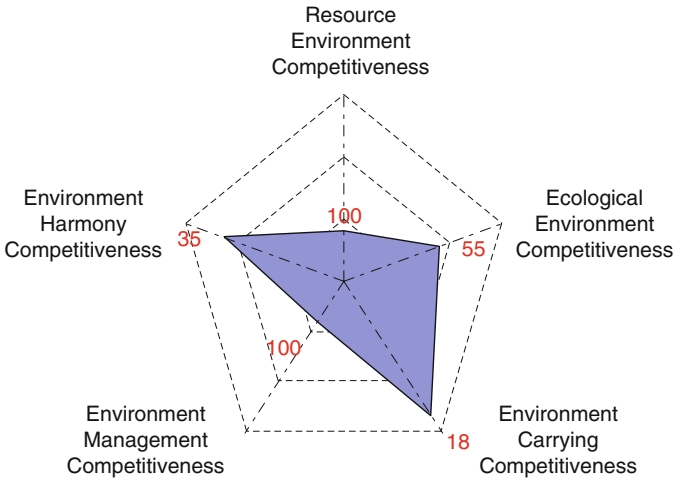

Fig. 19.2 Rank of sub-index of GEC

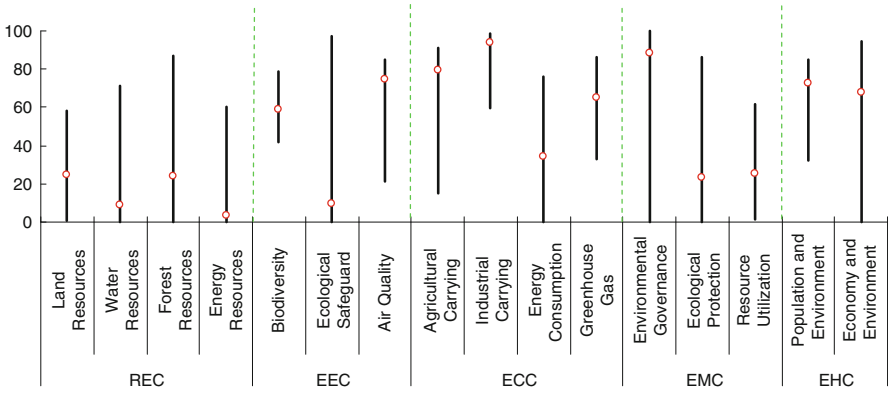

Fig. 19.3 Score and rank of the pillars of GEC

Table 19.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	13.52	100	Annual precipitation	20.36	93
1.1 Land Resources	24.98	17	Groundwater	6.70	77
Land area per capita	12.08	19	Total internal renewable water resources	5.09	93
Percentage of arable land to total land area	23.47	62	1.3 Forest Resources	24.15	84
Arable land per capita	43.70	4	Growing stock in forest and other wooded land	58.88	18
1.2 Water Resources	8.84	99	Proportion of land area covered by forest	12.48	96
Surface water	3.21	70			

(continued)

Table 19.1 (continued)

Indicators	Score	Rank
Forest area per capita	4.99	33
1.4 Energy Resources	3.46	89
Fossil energy	0.15	54
Energy production	1.97	36
Proportion of combustible renewable and waste to total energy consumption	3.57	92
Net energy imports of the energy consumption	13.41	42
2 Ecological Environment Competitiveness	50.33	55
2.1 Biodiversity	59.05	32
Threatened fish species	82.55	88
Threatened mammal species	79.35	117
Threatened plant species	97.96	91
GEF benefits index for biodiversity	17.70	20
2.2 Ecological Safeguard	9.34	101
Terrestrial protected areas	14.67	94
Marine protected areas	1.33	72
2.3 Air Quality	74.52	40
Inhalable particles (PM10)	58.39	106
Particulate matter (PM2.5)	90.03	34
Index of indoor air pollution	100.00	1
Nitrogen oxides emission	58.35	124
Sulfur dioxide emission	40.59	72
3 Environment Carrying Competitiveness	71.98	18
3.1 Agricultural Carrying	79.74	11
Cereal yield per unit of arable land	51.53	25
Fertilizer consumption per unit of arable land	97.95	41
Annual freshwater withdrawals for agriculture per unit of arable land	99.14	58
3.2 Industrial Carrying	94.15	28
Net exports of goods as a percentage of GDP	88.18	29
Electric power consumption per unit of value added of industry	92.20	62
SO_2 emissions per unit of value added of industry	99.97	25
Annual freshwater withdrawals for industry per value added of industry	96.26	81
3.3 Energy Consumption	34.07	60
Energy consumption per unit of land area	99.95	27
Ratio of clean energy consumption	11.58	49
Elasticity of energy consumption	14.17	44
Elasticity of electric power consumption	10.58	76
3.4 Greenhouse Gas	65.01	43
Growth rate of CO_2 emissions	54.59	52
Growth rate of Methane emissions	77.15	4
CO_2 emissions per unit of land area	99.93	44
CO_2 emissions per unit of energy consumption	38.79	76
4 Environment Management Competitiveness	43.48	100
4.1 Environmental Governance	88.26	67
Agricultural chemicals regulation	80.95	53
Percentage of the rural population with access to an improved water source	N/A	N/A
Percentage of the urban population with access to an improved water source	98.00	70
4.2 Ecological Protection	23.30	97
Area of plantation and afforestation	1.81	31
Biome protect	29.10	99
Overfishing of fishing resources	46.15	62
4.3 Resource Utilization	25.61	117
Utilization rate of water resources	0.16	83
Percentage of total internal renewable water resources to total water resources	29.30	108
Percentage of agricultural land to total land area	60.68	48
Percentage of fossil fuel energy consumption to total energy consumption	12.30	91

(continued)

Table 19.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
5 Environment Harmony Competitiveness	70.12	35	CO_2 emissions per capita	88.68	78
5.1 Population and Environment	72.59	54	Energy consumption per capita	86.53	74
Percentage of population with access to Improved sanitation facilities	90.00	62	5.2 Economy and Environment	67.64	48
Motor vehicles per 1,000 people	61.48	94	Land resource utilization efficiency	0.05	91
Renewable internal freshwater resources per capita	8.19	44	Sulfur dioxide emissions per unit of GDP	98.88	20
SO_2 emissions per capita	98.56	30	Carbon dioxide emissions per unit of GDP	84.09	77
			Energy consumption per unit of GDP	87.55	53

Table 19.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	0	3	2	9	0
Ecological Environment Competitiveness	11	1	0	3	3	4
Environment Carrying Competitiveness	15	1	6	7	1	0
Environment Management Competitiveness	10	0	0	3	4	2
Environment Harmony Competitiveness	10	0	2	3	5	0
Total	60	2	11	18	22	6

Chapter 20
Report on Global Environment Competitiveness of Armenia

Score: 49.16
Rank: 77

Armenia is landlocked in the South Caucasus. Located at the crossroads of Western Asia and Eastern Europe, bordered by Turkey to the west, Georgia to the north, the de facto independent Nagorno-Karabakh Republic and Azerbaijan to the east, and Iran and the Azerbaijani exclave of Nakhchivan to the south. It covers 28.5 thousand square kilometres. It had a population of 3.10 million and domestic production the gross (GDP) of USD 10.25 billion in 2011. Through the evaluation of global environment competitiveness, we can know that the environment competitiveness index of Slovenia ranks at 77 among 133 countries.

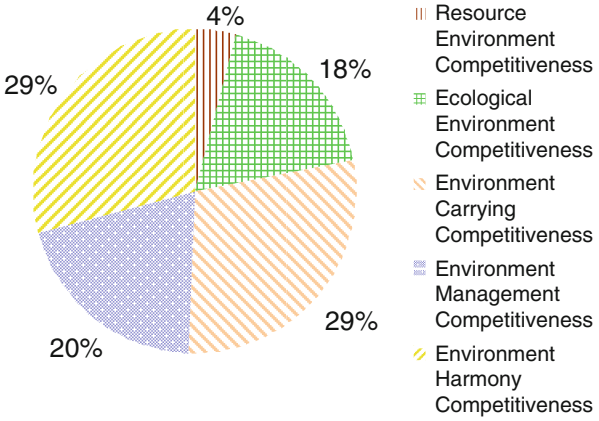

Fig. 20.1 Contribution of sub-index to GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_20,

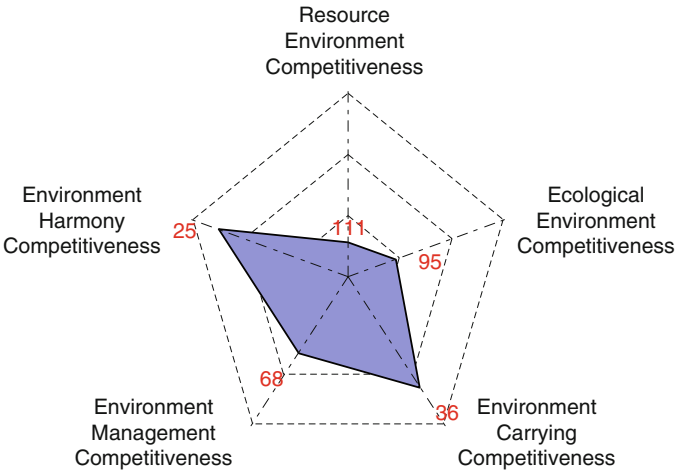

Fig. 20.2 Rank of sub-index of GEC

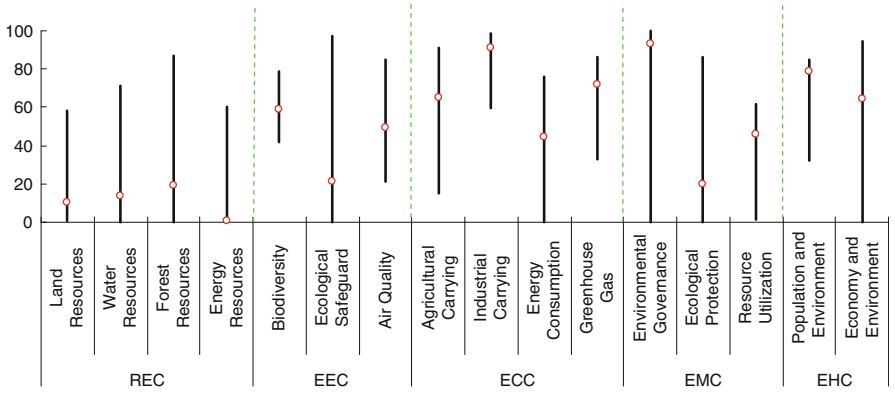

Fig. 20.3 Score and rank of the pillars of GEC

Table 20.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	10.34	111	Groundwater	21.77	34
1.1 Land Resources	10.26	81	Total internal renewable water resources	12.15	74
Land area per capita	1.63	89	1.3 Forest Resources	19.44	103
Percentage of arable land to total land area	25.52	57	Growing stock in forest and other wooded land	50.10	101
Arable land per capita	6.49	79	Proportion of land area covered by forest	10.60	100
1.2 Water Resources	13.91	69	Forest area per capita	0.58	100
Surface water	1.84	94	1.4 Energy Resources	0.77	118

(continued)

Table 20.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
Fossil energy	0.00	64	Energy consumption per unit of land area	99.82	58
Energy production	0.28	104	Ratio of clean energy consumption	54.05	7
Proportion of combustible renewable and waste to total energy consumption	0.04	115	Elasticity of energy consumption	15.00	21
Net energy imports of the energy consumption	4.41	100	Elasticity of electric power consumption	10.09	89
2 Ecological Environment Competitiveness	43.90	95	3.4 Greenhouse Gas	71.97	15
2.1 Biodiversity	58.81	38	Growth rate of CO_2 emissions	73.01	12
Threatened fish species	98.58	9	Growth rate of Methane emissions	57.02	78
Threatened mammal species	95.11	49	CO_2 emissions per unit of land area	99.84	64
Threatened plant species	99.94	22	CO_2 emissions per unit of energy consumption	56.96	38
GEF benefits index for biodiversity	0.20	109	4 Environment Management Competitiveness	49.84	68
2.2 Ecological Safeguard	21.47	65	4.1 Environmental Governance	93.09	52
Terrestrial protected areas	21.47	77	Agricultural chemicals regulation	85.71	46
Marine protected areas	N/A	N/A	Percentage of the rural population with access to an improved water source	97.00	43
2.3 Air Quality	49.55	98	Percentage of the urban population with access to an improved water source	99.00	51
Inhalable particles (PM10)	67.15	92	4.2 Ecological Protection	20.20	103
Particulate matter (PM2.5)	69.01	110	Area of plantation and afforestation	0.03	104
Index of indoor air pollution	19.50	79	Biome protect	47.10	77
Nitrogen oxides emission	68.89	11	Overfishing of fishing resources	N/A	N/A
Sulfur dioxide emission	40.91	28	4.3 Resource Utilization	46.10	26
3 Environment Carrying Competitiveness	70.09	36	Utilization rate of water resources	1.47	25
3.1 Agricultural Carrying	64.99	82	Percentage of total internal renewable water resources to total water resources	74.81	50
Cereal yield per unit of arable land	19.20	88	Percentage of agricultural land to total land area	72.75	30
Fertilizer consumption per unit of arable land	97.64	46	Percentage of fossil fuel energy consumption to total energy consumption	35.38	47
Annual freshwater withdrawals for agriculture per unit of arable land	93.40	102			
3.2 Industrial Carrying	90.83	76			
Net exports of goods as a percentage of GDP	91.80	13			
Electric power consumption per unit of value added of industry	79.37	112			
SO_2 emissions per unit of value added of industry	99.50	103			
Annual freshwater withdrawals for industry per value added of industry	92.63	105			
3.3 Energy Consumption	44.74	11			

(continued)

Table 20.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
5 Environment Harmony Competitiveness	71.63	25	CO_2 emissions per capita	96.57	41
5.1 Population and Environment	78.92	21	Energy consumption per capita	94.87	43
Percentage of population with access to Improved sanitation facilities	90.00	62	5.2 Economy and Environment	64.35	72
Motor vehicles per 1,000 people	87.28	55	Land resource utilization efficiency	0.10	63
Renewable internal freshwater resources per capita	2.68	76	Sulfur dioxide emissions per unit of GDP	89.11	90
SO_2 emissions per capita	95.65	67	Carbon dioxide emissions per unit of GDP	85.32	76
			Energy consumption per unit of GDP	82.85	70

Table 20.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	0	0	2	7	5
Ecological Environment Competitiveness	11	1	2	2	5	1
Environment Carrying Competitiveness	15	1	5	2	5	2
Environment Management Competitiveness	10	0	3	4	1	2
Environment Harmony Competitiveness	10	0	1	2	7	0
Total	60	2	11	12	25	10

Chapter 21
Report on Global Environment Competitiveness of Slovenia

Score: 54.84
Rank: 21

Australia is located in the southern hemisphere and eastern hemisphere, surrounded by the Indian and Pacific oceans, and the Tasman Sea lying between Australia and New Zealand. It crosses the subtropical and tropical region. And natural resources is rich. It covers 7,682.3 thousand of square kilometres. As of late 2011, the gross population was 22.32 million, with GDP reaching USD 1,379.38 billion. Through the evaluation of global environment competitiveness, we can know that the environment competitiveness index of Australia ranks at 21 among 133 countries.

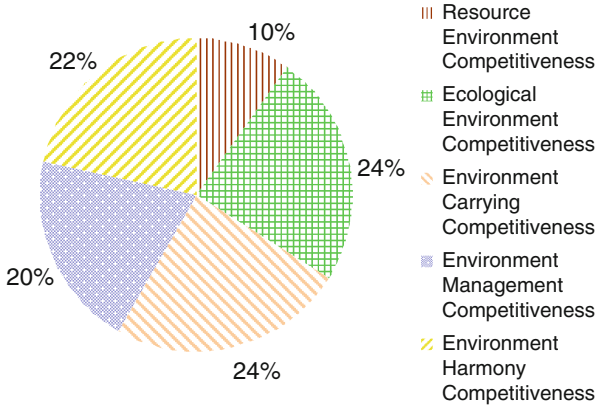

Fig. 21.1 Contribution of sub-index to GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_21,

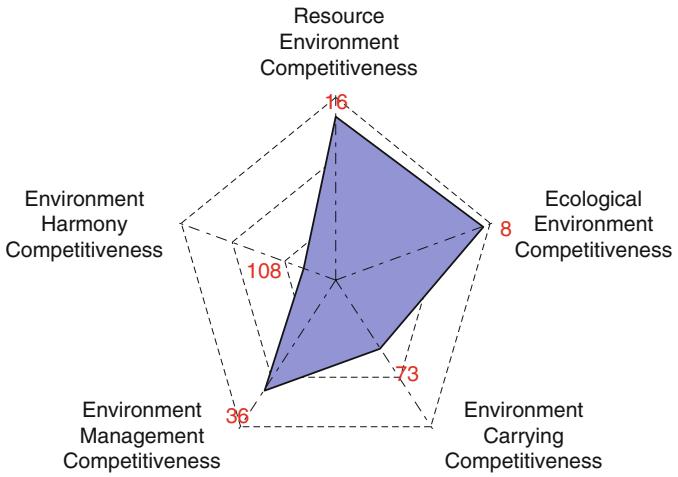

Fig. 21.2 Rank of sub-index of GEC

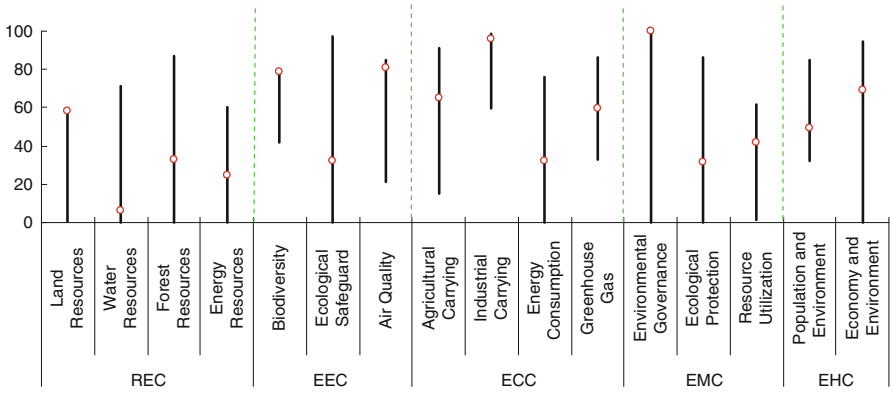

Fig. 21.3 Score and rank of the pillars of GEC

Table 21.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	27.39	16	Groundwater	1.31	106
1.1 Land Resources	57.92	1	Total internal renewable water resources	3.23	105
Land area per capita	62.02	3	1.3 Forest Resources	32.79	54
Percentage of arable land to total land area	10.38	98	Growing stock in forest and other wooded land	N/A	N/A
Arable land per capita	100.00	1	Proportion of land area covered by forest	22.62	79
1.2 Water Resources	5.85	106	Forest area per capita	46.35	3
Surface water	0.62	107	1.4 Energy Resources	24.97	6

(continued)

Table 21.1 (continued)

Indicators	Score	Rank
Fossil energy	47.73	2
Energy production	14.22	8
Proportion of combustible renewable and waste to total energy consumption	4.51	87
Net energy imports of the energy consumption	31.82	16
2 Ecological Environment Competitiveness	65.67	8
2.1 Biodiversity	79.07	1
Threatened fish species	51.42	126
Threatened mammal species	70.11	125
Threatened plant species	98.42	84
GEF benefits index for biodiversity	87.70	3
2.2 Ecological Safeguard	32.10	40
Terrestrial protected areas	28.53	67
Marine protected areas	37.45	9
2.3 Air Quality	80.81	21
Inhalable particles (PM10)	90.51	12
Particulate matter (PM2.5)	97.30	10
Index of indoor air pollution	100.00	1
Nitrogen oxides emission	55.54	126
Sulfur dioxide emission	32.78	124
3 Environment Carrying Competitiveness	66.69	73
3.1 Agricultural Carrying	65.23	79
Cereal yield per unit of arable land	15.22	95
Fertilizer consumption per unit of arable land	97.66	45
Annual freshwater withdrawals for agriculture per unit of arable land	99.47	46
3.2 Industrial Carrying	95.86	9
Net exports of goods as a percentage of GDP	89.78	24
Electric power consumption per unit of value added of industry	94.74	39
SO_2 emissions per unit of value added of industry	99.74	77
Annual freshwater withdrawals for industry per value added of industry	99.19	34
3.3 Energy Consumption	31.98	86
Energy consumption per unit of land area	99.97	18
Ratio of clean energy consumption	2.08	89
Elasticity of energy consumption	14.23	40
Elasticity of electric power consumption	11.64	36
3.4 Greenhouse Gas	59.81	80
Growth rate of CO_2 emissions	61.26	35
Growth rate of Methane emissions	60.69	52
CO_2 emissions per unit of land area	99.95	40
CO_2 emissions per unit of energy consumption	15.87	122
4 Environment Management Competitiveness	55.05	36
4.1 Environmental Governance	100.00	1
Agricultural chemicals regulation	N/A	N/A
Percentage of the rural population with access to an improved water source	100.00	1
Percentage of the urban population with access to an improved water source	100.00	1
4.2 Ecological Protection	31.46	76
Area of plantation and afforestation	2.47	21
Biome protect	61.20	65
Overfishing of fishing resources	40.38	72
4.3 Resource Utilization	41.55	46
Utilization rate of water resources	0.18	79
Percentage of total internal renewable water resources to total water resources	96.09	7
Percentage of agricultural land to total land area	62.93	44
Percentage of fossil fuel energy consumption to total energy consumption	6.99	103

(continued)

Table 21.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
5 Environment Harmony Competitiveness	59.38	108	CO_2 emissions per capita	53.98	127
5.1 Population and Environment	49.65	126	Energy consumption per capita	56.46	115
Percentage of population with access to Improved sanitation facilities	100.00	1	5.2 Economy and Environment	69.12	35
Motor vehicles per 1,000 people	10.12	131	Land resource utilization efficiency	0.05	89
Renewable internal freshwater resources per capita	26.67	17	Sulfur dioxide emissions per unit of GDP	92.28	76
SO_2 emissions per capita	47.07	126	Carbon dioxide emissions per unit of GDP	89.13	61
			Energy consumption per unit of GDP	95.02	19

Table 21.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	5	0	1	4	3
Ecological Environment Competitiveness	11	3	2	1	2	3
Environment Carrying Competitiveness	15	1	2	6	6	0
Environment Management Competitiveness	10	3	1	2	3	0
Environment Harmony Competitiveness	10	1	1	1	3	4
Total	60	13	6	11	18	10

Chapter 22
Report on Global Environment Competitiveness of Austria

Score: 56.65
Rank: 8

Austria is located in Central Europe. It covers 82.4 thousand of square kilometres, bordered by the Czech Republic and Germany to the north, Hungary and Slovakia to the east, Slovenia and Italy to the south, and Switzerland and Liechtenstein to the west. Most of Austria is in tropical region. And natural resources is rich. As of late 2011, the gross population was 8.42 million, with GDP reaching USD 417.66 billion. Through the evaluation of global environment competitiveness, we can know that the environment competitiveness index of Austria ranks at 8 among 133 countries.

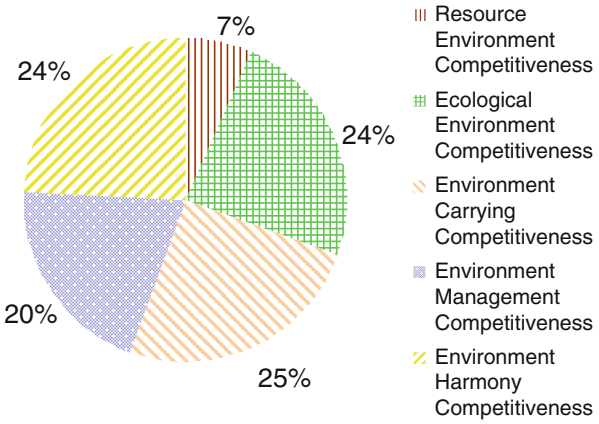

Fig. 22.1 Contribution of sub-index to GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_22,

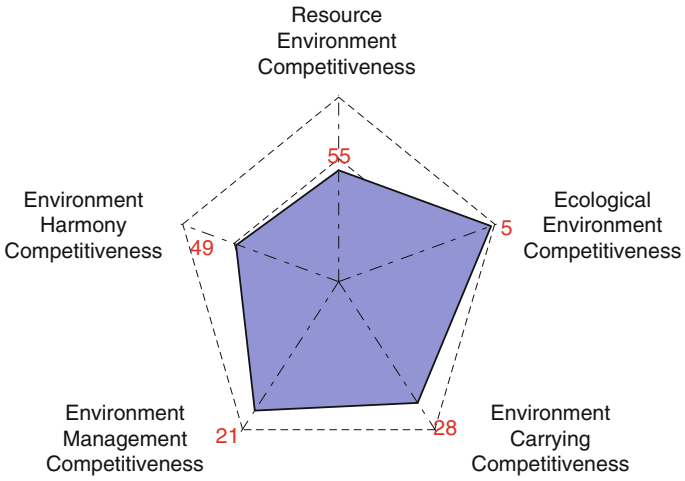

Fig. 22.2 Rank of sub-index of GEC

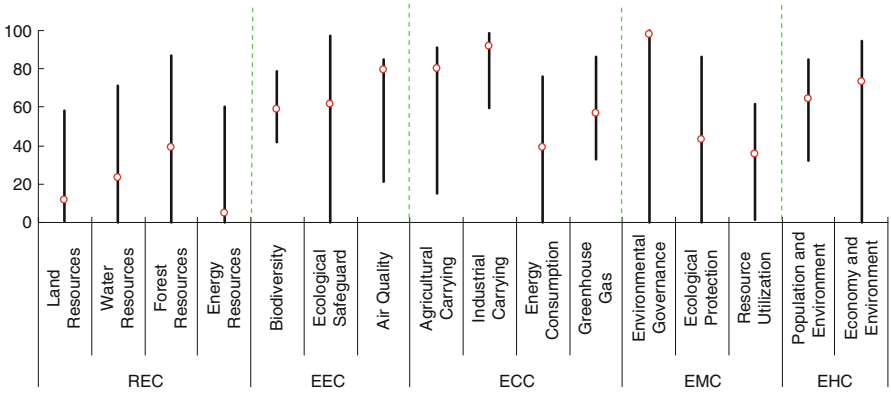

Fig. 22.3 Score and rank of the pillars of GEC

Table 22.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	18.53	55	Groundwater	10.45	64
1.1 Land Resources	11.35	76	Total internal renewable water resources	33.65	35
Land area per capita	1.74	86	1.3 Forest Resources	39.12	29
Percentage of arable land to total land area	27.96	49	Growing stock in forest and other wooded land	53.44	40
Arable land per capita	7.57	73	Proportion of land area covered by forest	55.31	22
1.2 Water Resources	23.14	46	Forest area per capita	3.22	54
Surface water	10.17	32	1.4 Energy Resources	4.96	71
Annual precipitation	38.30	53			

(continued)

Table 22.1 (continued)

Indicators	Score	Rank
Fossil energy	0.00	64
Energy production	1.42	51
Proportion of combustible renewable and waste to total energy consumption	19.09	44
Net energy imports of the energy consumption	4.30	102
2 Ecological Environment Competitiveness	67.89	5
2.1 Biodiversity	58.65	45
Threatened fish species	94.81	28
Threatened mammal species	98.37	11
Threatened plant species	99.47	60
GEF benefits index for biodiversity	0.30	105
2.2 Ecological Safeguard	61.96	10
Terrestrial protected areas	61.96	19
Marine protected areas	N/A	N/A
2.3 Air Quality	79.27	28
Inhalable particles (PM10)	80.29	58
Particulate matter (PM2.5)	84.32	70
Index of indoor air pollution	100.00	1
Nitrogen oxides emission	68.06	56
Sulfur dioxide emission	40.92	22
3 Environment Carrying Competitiveness	70.77	28
3.1 Agricultural Carrying	80.46	9
Cereal yield per unit of arable land	56.28	22
Fertilizer consumption per unit of arable land	93.28	72
Annual freshwater withdrawals for agriculture per unit of arable land	99.89	22
3.2 Industrial Carrying	91.47	70
Net exports of goods as a percentage of GDP	74.32	90
Electric power consumption per unit of value added of industry	94.84	36
SO_2 emissions per unit of value added of industry	99.99	5
Annual freshwater withdrawals for industry per value added of industry	96.72	74
3.3 Energy Consumption	39.31	27
Energy consumption per unit of land area	99.13	108
Ratio of clean energy consumption	20.45	31
Elasticity of energy consumption	18.04	9
Elasticity of electric power consumption	19.62	12
3.4 Greenhouse Gas	56.63	107
Growth rate of CO_2 emissions	39.56	109
Growth rate of Methane emissions	59.48	64
CO_2 emissions per unit of land area	99.06	113
CO_2 emissions per unit of energy consumption	45.49	58
4 Environment Management Competitiveness	57.31	21
4.1 Environmental Governance	98.10	24
Agricultural chemicals regulation	95.24	20
Percentage of the rural population with access to an improved water source	100.00	1
Percentage of the urban population with access to an improved water source	100.00	1
4.2 Ecological Protection	42.88	29
Area of plantation and afforestation	N/A	N/A
Biome protect	87.00	30
Overfishing of fishing resources	N/A	N/A
4.3 Resource Utilization	35.77	71
Utilization rate of water resources	0.19	78
Percentage of total internal renewable water resources to total water resources	65.71	63
Percentage of agricultural land to total land area	45.43	81
Percentage of fossil fuel energy consumption to total energy consumption	31.74	51

(continued)

Table 22.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
5 Environment Harmony Competitiveness	68.76	49	CO_2 emissions per capita	77.68	107
5.1 Population and Environment	64.22	103	Energy consumption per capita	69.25	104
Percentage of population with access to Improved sanitation facilities	100.00	1	5.2 Economy and Environment	73.30	11
Motor vehicles per 1,000 people	30.99	118	Land resource utilization efficiency	1.48	16
Renewable internal freshwater resources per capita	7.90	45	Sulfur dioxide emissions per unit of GDP	99.86	5
SO_2 emissions per capita	98.65	28	Carbon dioxide emissions per unit of GDP	95.28	12
			Energy consumption per unit of GDP	96.60	8

Table 22.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	0	2	7	5	0
Ecological Environment Competitiveness	11	2	4	4	1	0
Environment Carrying Competitiveness	15	3	2	2	4	4
Environment Management Competitiveness	10	1	4	0	4	0
Environment Harmony Competitiveness	10	2	4	1	0	3
Total	60	8	16	14	14	7

Chapter 23
Report on Global Environment Competitiveness of Azerbaijan

Score: 46.22
Rank: 106

Azerbaijan is the largest country in the south of Caucasus region, bounded by the Caspian Sea to the east, Russia to the north, Georgia to the northwest, Armenia to the west, and Iran to the south, and bounded by the Caspian Sea to the east. It has a kind of subtropical sub alpine types. And natural resources is rich. Azerbaijan has a total area of 82.6 thousand of square kilometers. As of late 2011, the gross population was 9.17 million, with GDP reaching USD 63.4 billion. Through the evaluation of global environment competitiveness, we can know that the environment competitiveness index of Azerbaijan ranks at 106 among 133 countries.

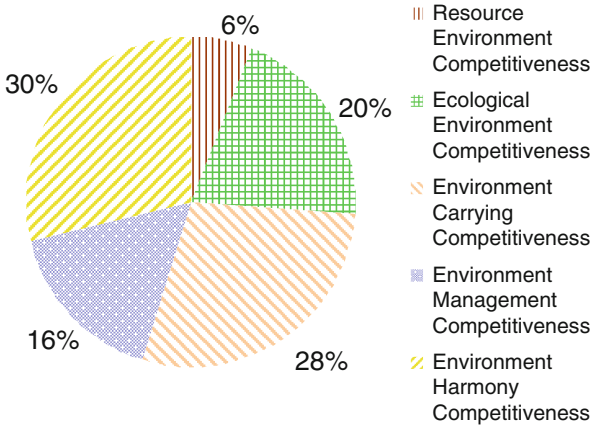

Fig. 23.1 Contribution of sub-index to GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_23,

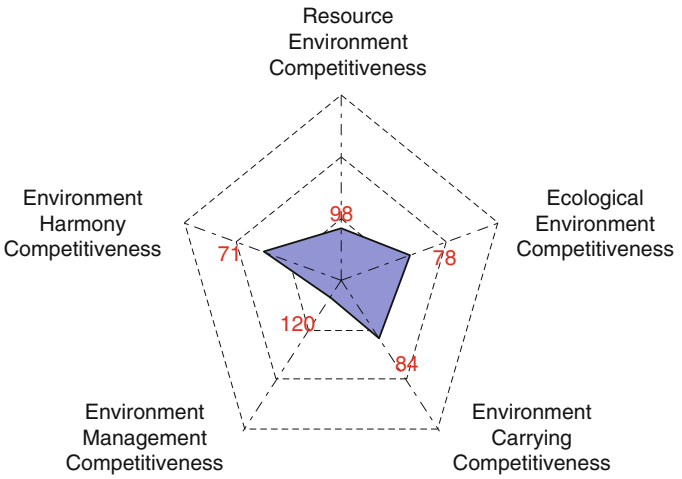

Fig. 23.2 Rank of sub-index of GEC

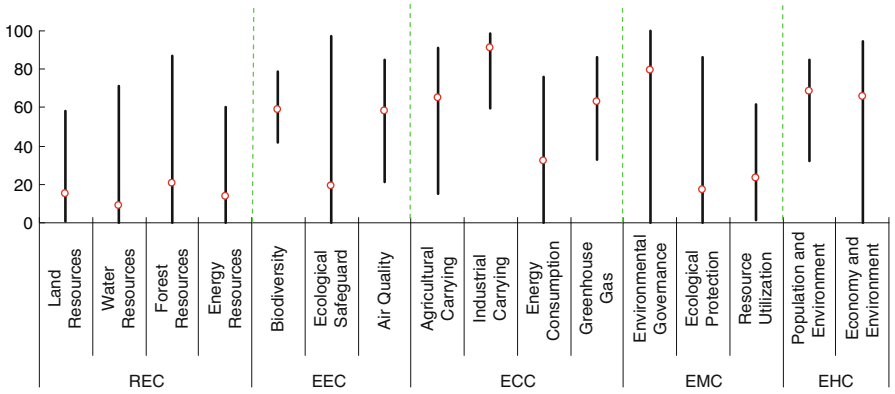

Fig. 23.3 Score and rank of the pillars of GEC

Table 23.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	14.03	98	Groundwater	11.31	61
1.1 Land Resources	15.11	50	Total internal renewable water resources	4.95	94
Land area per capita	1.60	92	1.3 Forest Resources	20.63	97
Percentage of arable land to total land area	38.63	34	Growing stock in forest and other wooded land	50.38	87
Arable land per capita	9.62	65	Proportion of land area covered by forest	13.26	92
1.2 Water Resources	9.10	97	Forest area per capita	0.71	96
Surface water	4.25	64	1.4 Energy Resources	13.83	32
Annual precipitation	15.89	104			

(continued)

Table 23.1 (continued)

Indicators	Score	Rank
Fossil energy	2.16	24
Energy production	7.30	15
Proportion of combustible renewable and waste to total energy consumption	0.00	120
Net energy imports of the energy consumption	70.82	5
2 Ecological Environment Competitiveness	46.47	78
2.1 Biodiversity	58.62	47
Threatened fish species	95.28	27
Threatened mammal species	96.20	37
Threatened plant species	100.00	1
GEF benefits index for biodiversity	0.80	88
2.2 Ecological Safeguard	19.02	71
Terrestrial protected areas	19.02	80
Marine protected areas	N/A	N/A
2.3 Air Quality	57.95	67
Inhalable particles (PM10)	80.29	58
Particulate matter (PM2.5)	77.88	94
Index of indoor air pollution	33.20	60
Nitrogen oxides emission	68.45	41
Sulfur dioxide emission	40.59	71
3 Environment Carrying Competitiveness	65.78	84
3.1 Agricultural Carrying	64.84	84
Cereal yield per unit of arable land	18.59	89
Fertilizer consumption per unit of arable land	98.91	31
Annual freshwater withdrawals for agriculture per unit of arable land	92.44	106
3.2 Industrial Carrying	91.00	73
Net exports of goods as a percentage of GDP	73.55	93
Electric power consumption per unit of value added of industry	97.26	13
SO_2 emissions per unit of value added of industry	99.89	44
Annual freshwater withdrawals for industry per value added of industry	93.31	99
3.3 Energy Consumption	32.03	83
Energy consumption per unit of land area	99.70	82
Ratio of clean energy consumption	2.83	85
Elasticity of energy consumption	14.09	48
Elasticity of electric power consumption	11.51	39
3.4 Greenhouse Gas	63.12	56
Growth rate of CO_2 emissions	61.30	34
Growth rate of Methane emissions	48.85	118
CO_2 emissions per unit of land area	99.67	82
CO_2 emissions per unit of energy consumption	44.49	60
4 Environment Management Competitiveness	37.81	120
4.1 Environmental Governance	79.50	88
Agricultural chemicals regulation	N/A	N/A
Percentage of the rural population with access to an improved water source	71.00	89
Percentage of the urban population with access to an improved water source	88.00	113
4.2 Ecological Protection	17.24	110
Area of plantation and afforestation	0.03	106
Biome protect	40.20	84
Overfishing of fishing resources	N/A	N/A
4.3 Resource Utilization	23.53	120
Utilization rate of water resources	1.42	26
Percentage of total internal renewable water resources to total water resources	20.79	113
Percentage of agricultural land to total land area	68.06	36
Percentage of fossil fuel energy consumption to total energy consumption	3.85	111

(continued)

Table 23.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
5 Environment Harmony Competitiveness	66.99	71	CO_2 emissions per capita	92.71	63
5.1 Population and Environment	68.57	77	Energy consumption per capita	90.79	61
Percentage of population with access to Improved sanitation facilities	45.00	103	5.2 Economy and Environment	65.41	65
Motor vehicles per 1,000 people	89.26	51	Land resource utilization efficiency	0.22	45
Renewable internal freshwater resources per capita	1.07	106	Sulfur dioxide emissions per unit of GDP	91.69	81
SO_2 emissions per capita	93.57	81	Carbon dioxide emissions per unit of GDP	83.90	78
			Energy consumption per unit of GDP	85.84	62

Table 23.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	0	2	3	7	2
Ecological Environment Competitiveness	11	1	1	5	4	0
Environment Carrying Competitiveness	15	0	1	5	8	1
Environment Management Competitiveness	10	0	1	1	3	4
Environment Harmony Competitiveness	10	0	0	2	6	2
Total	60	1	5	16	28	9

Chapter 24
Report on Global Environment Competitiveness of Bangladesh

Bangladesh is a country in South Asia, bordered by India on all sides, Burma (Myanmar) on the southeast and theBay of Bengal to its south. Most of Bangladesh belongs to subtropics monsoon climate region. And natural resources is rich. It has a total area of 130.2 thousand of square kilometers. As of late 2011, the gross population was 150.49 million, with GDP reaching USD 111.88 billion. Through the evaluation of global environment competitiveness, we can know that the environment competitiveness index of Bangladesh ranks at 99 among 133 countries.

Score: 46.98
Rank: 99

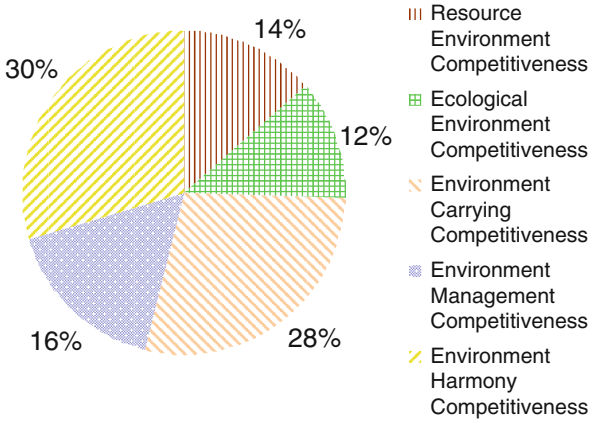

Fig. 24.1 Contribution of sub-index to GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_24,

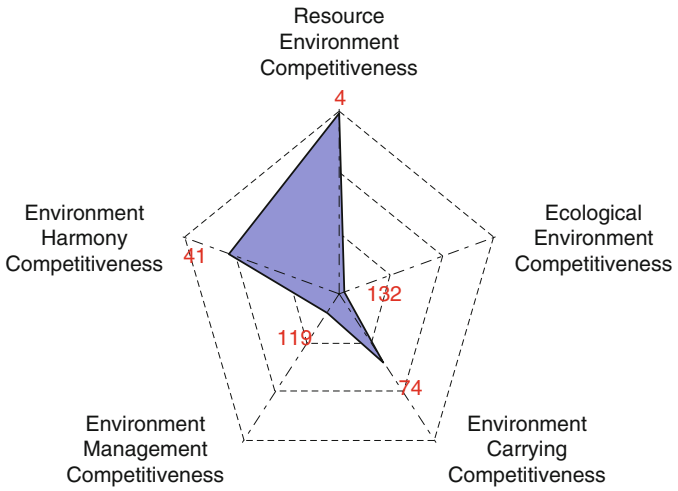

Fig. 24.2 Rank of sub-index of GEC

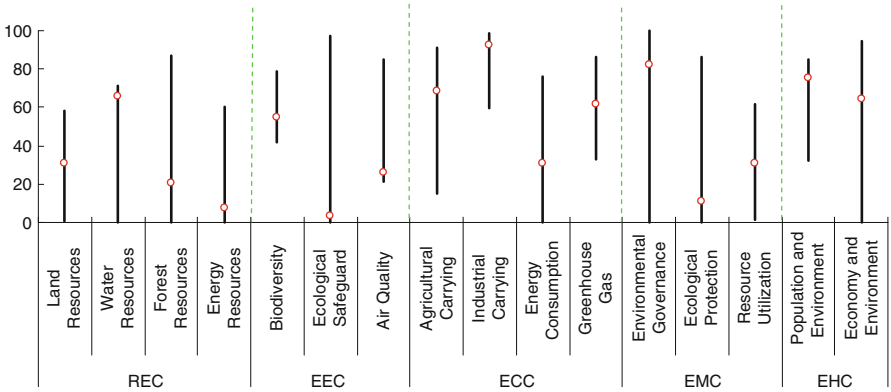

Fig. 24.3 Score and rank of the pillars of GEC

Table 24.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	32.28	4	Groundwater	23.34	31
1.1 Land Resources	30.61	10	Total internal renewable water resources	40.68	29
Land area per capita	0.13	132	1.3 Forest Resources	20.26	100
Percentage of arable land to total land area	99.50	2	Growing stock in forest and other wooded land	50.21	95
Arable land per capita	2.37	119	Proportion of land area covered by forest	12.95	93
1.2 Water Resources	66.01	4	Forest area per capita	0.07	126
Surface water	100.00	1	1.4 Energy Resources	7.66	53
Annual precipitation	100.00	1			

(continued)

Table 24.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
Fossil energy	0.00	63	Energy consumption per unit of land area	99.49	97
Energy production	0.18	115	Ratio of clean energy consumption	0.77	99
Proportion of combustible renewable and waste to total energy consumption	30.12	31	Elasticity of energy consumption	13.64	85
Net energy imports of the energy consumption	10.52	55	Elasticity of electric power consumption	8.79	109
2 Ecological Environment Competitiveness	27.92	132	3.4 Greenhouse Gas	61.66	65
2.1 Biodiversity	54.99	110	Growth rate of CO_2 emissions	49.93	75
Threatened fish species	91.51	45	Growth rate of Methane emissions	53.50	96
Threatened mammal species	81.52	113	CO_2 emissions per unit of land area	99.55	93
Threatened plant species	99.12	72	CO_2 emissions per unit of energy consumption	55.39	41
GEF benefits index for biodiversity	1.40	76	4 Environment Management Competitiveness	38.30	119
2.2 Ecological Safeguard	3.14	117	4.1 Environmental Governance	82.50	83
Terrestrial protected areas	4.62	115	Agricultural chemicals regulation	N/A	N/A
Marine protected areas	0.93	74	Percentage of the rural population with access to an improved water source	80.00	77
2.3 Air Quality	26.21	131	Percentage of the urban population with access to an improved water source	85.00	118
Inhalable particles (PM10)	16.06	132	4.2 Ecological Protection	10.86	120
Particulate matter (PM2.5)	34.09	132	Area of plantation and afforestation	0.31	66
Index of indoor air pollution	1.40	118	Biome protect	10.80	115
Nitrogen oxides emission	64.44	101	Overfishing of fishing resources	25.00	93
Sulfur dioxide emission	40.60	69	4.3 Resource Utilization	30.68	93
3 Environment Carrying Competitiveness	66.65	74	Utilization rate of water resources	0.11	88
3.1 Agricultural Carrying	68.30	56	Percentage of total internal renewable water resources to total water resources	8.56	123
Cereal yield per unit of arable land	42.57	37	Percentage of agricultural land to total land area	83.08	14
Fertilizer consumption per unit of arable land	77.21	116	Percentage of fossil fuel energy consumption to total energy consumption	30.97	52
Annual freshwater withdrawals for agriculture per unit of arable land	93.70	101			
3.2 Industrial Carrying	92.31	56			
Net exports of goods as a percentage of GDP	85.42	42			
Electric power consumption per unit of value added of industry	87.54	93			
SO_2 emissions per unit of value added of industry	99.85	58			
Annual freshwater withdrawals for industry per value added of industry	96.43	80			
3.3 Energy Consumption	30.67	114			

(continued)

Table 24.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
5 Environment Harmony Competitiveness	69.77	41	CO_2 emissions per capita	99.14	20
5.1 Population and Environment	75.44	41	Energy consumption per capita	99.47	2
Percentage of population with access to Improved sanitation facilities	53.00	94	5.2 Economy and Environment	64.11	74
Motor vehicles per 1,000 people	99.88	2	Land resource utilization efficiency	0.25	41
Renewable internal freshwater resources per capita	0.84	109	Sulfur dioxide emissions per unit of GDP	95.81	57
SO_2 emissions per capita	99.63	9	Carbon dioxide emissions per unit of GDP	81.42	89
			Energy consumption per unit of GDP	78.95	82

Table 24.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	5	0	3	4	2
Ecological Environment Competitiveness	11	0	0	1	1	9
Environment Carrying Competitiveness	15	0	0	5	8	2
Environment Management Competitiveness	10	0	1	0	5	3
Environment Harmony Competitiveness	10	2	1	3	3	1
Total	60	7	2	12	21	17

Chapter 25
Report on Global Environment Competitiveness of Belarus

Score: 48.44
Rank: 83

Belarus is a landlocked country in Eastern Europe, bordered by Russia to the northeast, Ukraine to the south, Poland to the west, and Lithuania and Latvia to the northwest. Belarus has a temperate continental climate and rich in mineral resources. It covers 202.8 thousand of square kilometres. It had a population of 9.47 million and domestic production the gross (GDP) of USD 55.13 billion in 2011. Through the evaluation of global environment competitiveness, we can know that the environment competitiveness index of Belarus ranks at 83 among 133 countries.

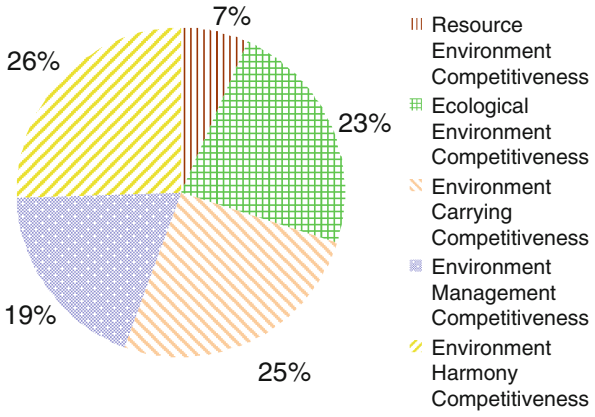

Fig. 25.1 Contribution of sub-index to GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_25,

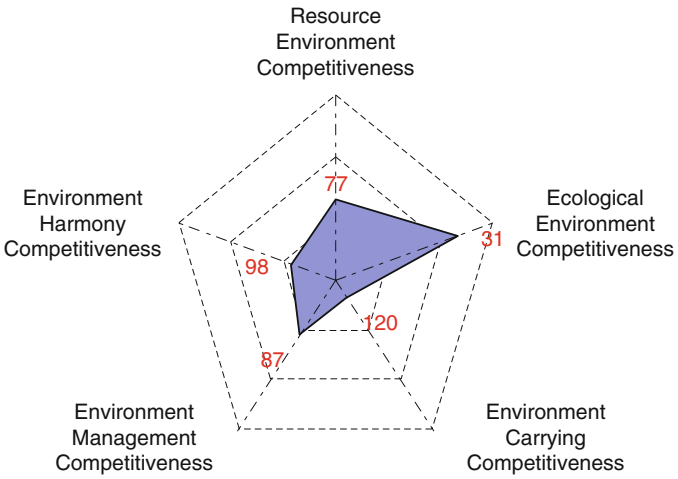

Fig. 25.2 Rank of sub-index of GEC

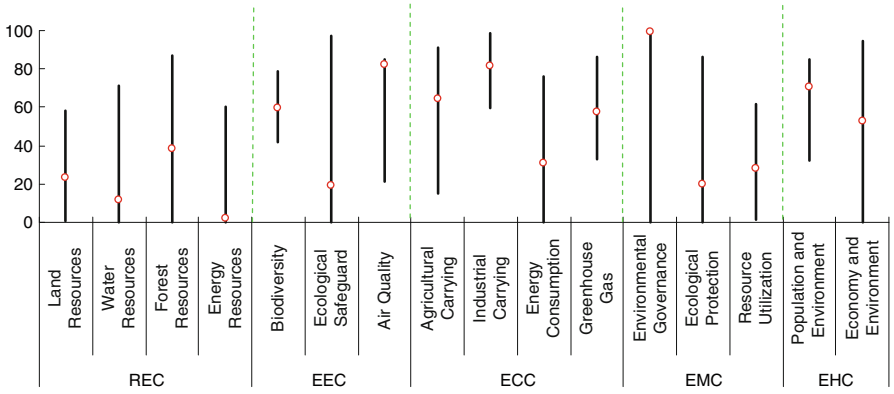

Fig. 25.3 Score and rank of the pillars of GEC

Table 25.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	16.41	77	Groundwater	12.75	57
1.1 Land Resources	23.58	22	Total internal renewable water resources	9.25	82
Land area per capita	3.84	45	1.3 Forest Resources	38.37	30
Percentage of arable land to total land area	46.17	25	Growing stock in forest and other wooded land	54.79	30
Arable land per capita	27.32	10	Proportion of land area covered by forest	50.04	31
1.2 Water Resources	11.63	82	Forest area per capita	6.38	28
Surface water	3.09	73	1.4 Energy Resources	1.76	110
Annual precipitation	21.45	88			

(continued)

Table 25.1 (continued)

Indicators	Score	Rank
Fossil energy	0.00	64
Energy production	0.45	91
Proportion of combustible renewable and waste to total energy consumption	6.68	71
Net energy imports of the energy consumption	1.78	118
2 Ecological Environment Competitiveness	56.56	31
2.1 Biodiversity	59.38	25
Threatened fish species	99.06	6
Threatened mammal species	97.83	17
Threatened plant species	100.00	1
GEF benefits index for biodiversity	0.00	128
2.2 Ecological Safeguard	19.29	70
Terrestrial protected areas	19.29	79
Marine protected areas	N/A	N/A
2.3 Air Quality	82.40	13
Inhalable particles (PM10)	95.62	2
Particulate matter (PM2.5)	86.00	64
Index of indoor air pollution	100.00	1
Nitrogen oxides emission	66.51	90
Sulfur dioxide emission	40.67	66
3 Environment Carrying Competitiveness	61.33	120
3.1 Agricultural Carrying	64.19	93
Cereal yield per unit of arable land	27.71	67
Fertilizer consumption per unit of arable land	77.26	115
Annual freshwater withdrawals for agriculture per unit of arable land	99.77	35
3.2 Industrial Carrying	81.54	123
Net exports of goods as a percentage of GDP	52.37	124
Electric power consumption per unit of value added of industry	86.87	96
SO_2 emissions per unit of value added of industry	99.84	61
Annual freshwater withdrawals for industry per value added of industry	87.07	118
3.3 Energy Consumption	30.75	111
Energy consumption per unit of land area	99.71	81
Ratio of clean energy consumption	0.02	113
Elasticity of energy consumption	13.82	76
Elasticity of electric power consumption	9.43	105
3.4 Greenhouse Gas	57.31	104
Growth rate of CO_2 emissions	49.63	77
Growth rate of Methane emissions	51.01	108
CO_2 emissions per unit of land area	99.64	85
CO_2 emissions per unit of energy consumption	36.62	84
4 Environment Management Competitiveness	46.10	87
4.1 Environmental Governance	99.50	17
Agricultural chemicals regulation	N/A	N/A
Percentage of the rural population with access to an improved water source	99.00	30
Percentage of the urban population with access to an improved water source	100.00	1
4.2 Ecological Protection	19.59	105
Area of plantation and afforestation	2.41	22
Biome protect	42.50	80
Overfishing of fishing resources	N/A	N/A
4.3 Resource Utilization	28.03	105
Utilization rate of water resources	0.30	67
Percentage of total internal renewable water resources to total water resources	48.95	89
Percentage of agricultural land to total land area	52.03	64
Percentage of fossil fuel energy consumption to total energy consumption	10.86	96

(continued)

Table 25.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
5 Environment Harmony Competitiveness	61.82	98	CO_2 emissions per capita	81.44	98
5.1 Population and Environment	70.59	65	Energy consumption per capita	78.03	92
Percentage of population with access to Improved sanitation facilities	93.00	54	5.2 Economy and Environment	53.06	108
Motor vehicles per 1,000 people	65.43	90	Land resource utilization efficiency	0.08	76
Renewable internal freshwater resources per capita	4.75	54	Sulfur dioxide emissions per unit of GDP	93.68	70
SO_2 emissions per capita	95.12	71	Carbon dioxide emissions per unit of GDP	55.00	119
			Energy consumption per unit of GDP	63.46	111

Table 25.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	0	4	3	6	1
Ecological Environment Competitiveness	11	4	3	0	4	0
Environment Carrying Competitiveness	15	0	0	0	8	7
Environment Management Competitiveness	10	0	3	0	4	2
Environment Harmony Competitiveness	10	0	0	2	6	2
Total	60	4	10	5	28	12

Chapter 26
Report on Global Environment Competitiveness of Belgium

Score: 53.99
Rank: 25

Belgium is a federal state in Western Europe, bordered by Netherlands, Germany, Luxembourg and France, and it also has a coast on the north sea to the west. The Belgian climate, like most of northwest Europe, is maritime temperate. And poor in mineral resources. It covers 30.3 thousand of square kilometres. As of late 2011, the gross population was 11.02 million, with GDP reaching USD 513.66 billion. Through the evaluation of global environment competitiveness, we can know that the environment competitiveness index of Belgium ranks at 25 among 133 countries.

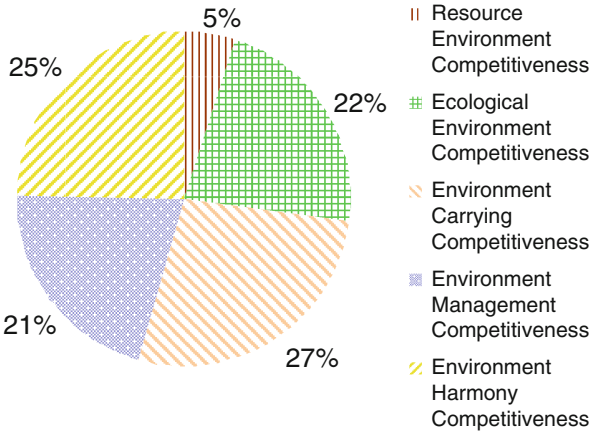

Fig. 26.1 Contribution of sub-index to GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_26,

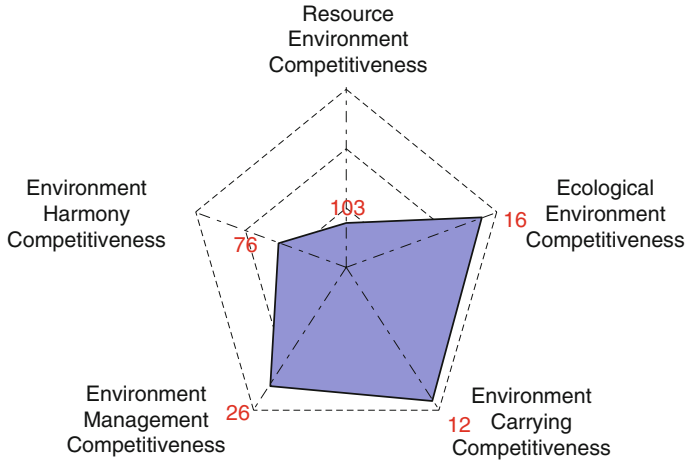

Fig. 26.2 Rank of sub-index of GEC

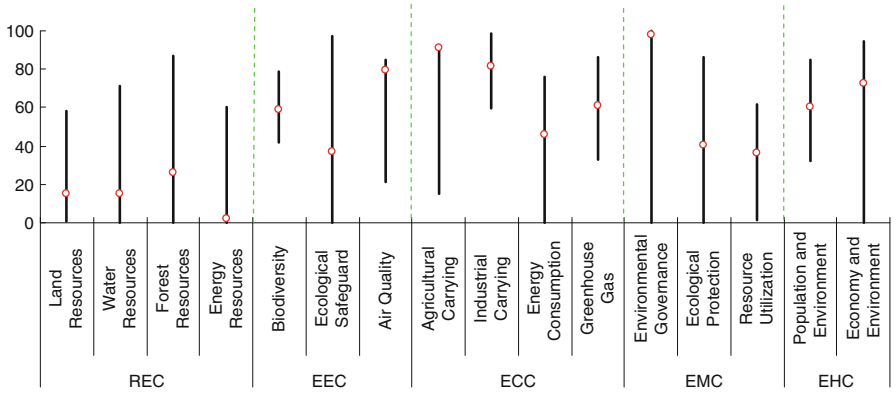

Fig. 26.3 Score and rank of the pillars of GEC

Table 26.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	13.29	103	Groundwater	4.24	92
1.1 Land Resources	15.11	51	Total internal renewable water resources	19.99	52
Land area per capita	0.47	125	1.3 Forest Resources	25.78	79
Percentage of arable land to total land area	46.22	24	Growing stock in forest and other wooded land	50.51	84
Arable land per capita	3.50	110	Proportion of land area covered by forest	26.26	74
1.2 Water Resources	14.93	66	Forest area per capita	0.43	105
Surface water	6.52	49	1.4 Energy Resources	2.10	107
Annual precipitation	28.96	66			

(continued)

Table 26.1 (continued)

Indicators	Score	Rank
Fossil energy	0.00	64
Energy production	1.49	48
Proportion of combustible renewable and waste to total energy consumption	5.47	80
Net energy imports of the energy consumption	3.23	107
2 Ecological Environment Competitiveness	60.50	16
2.1 Biodiversity	58.64	46
Threatened fish species	94.81	28
Threatened mammal species	98.37	11
Threatened plant species	100.00	1
GEF benefits index for biodiversity	0.00	128
2.2 Ecological Safeguard	37.23	27
Terrestrial protected areas	37.23	52
Marine protected areas	N/A	N/A
2.3 Air Quality	79.36	27
Inhalable particles (PM10)	84.67	42
Particulate matter (PM2.5)	80.91	85
Index of indoor air pollution	100.00	1
Nitrogen oxides emission	67.61	74
Sulfur dioxide emission	40.68	64
3 Environment Carrying Competitiveness	73.11	12
3.1 Agricultural Carrying	90.90	2
Cereal yield per unit of arable land	100.00	1
Fertilizer consumption per unit of arable land	69.71	118
Annual freshwater withdrawals for agriculture per unit of arable land	99.94	18
3.2 Industrial Carrying	81.73	122
Net exports of goods as a percentage of GDP	41.04	132
Electric power consumption per unit of value added of industry	92.66	59
SO_2 emissions per unit of value added of industry	99.97	21
Annual freshwater withdrawals for industry per value added of industry	93.24	101
3.3 Energy Consumption	45.67	9
Energy consumption per unit of land area	95.71	123
Ratio of clean energy consumption	37.12	18
Elasticity of energy consumption	20.99	6
Elasticity of electric power consumption	28.87	6
3.4 Greenhouse Gas	60.96	74
Growth rate of CO_2 emissions	47.58	80
Growth rate of Methane emissions	59.40	66
CO_2 emissions per unit of land area	96.09	126
CO_2 emissions per unit of energy consumption	54.16	43
4 Environment Management Competitiveness	56.45	26
4.1 Environmental Governance	98.10	24
Agricultural chemicals regulation	95.24	20
Percentage of the rural population with access to an improved water source	100.00	1
Percentage of the urban population with access to an improved water source	100.00	1
4.2 Ecological Protection	40.25	46
Area of plantation and afforestation	0.51	56
Biome protect	81.10	43
Overfishing of fishing resources	52.38	51
4.3 Resource Utilization	36.39	69
Utilization rate of water resources	1.37	27
Percentage of total internal renewable water resources to total water resources	62.50	69
Percentage of agricultural land to total land area	53.25	61
Percentage of fossil fuel energy consumption to total energy consumption	28.44	57

(continued)

Table 26.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
5 Environment Harmony Competitiveness	66.62	76	Energy consumption per capita	56.99	114
5.1 Population and Environment	60.44	119	5.2 Economy and Environment	72.81	15
Percentage of population with access to Improved sanitation facilities	100.00	1	Land resource utilization efficiency	4.95	4
Motor vehicles per 1,000 people	31.36	117	Sulfur dioxide emissions per unit of GDP	99.36	15
Renewable internal freshwater resources per capita	1.32	100	Carbon dioxide emissions per unit of GDP	93.54	30
SO_2 emissions per capita	95.89	65	Energy consumption per unit of GDP	93.38	27
CO_2 emissions per capita	73.58	114			

Table 26.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	0	1	3	8	2
Ecological Environment Competitiveness	11	2	4	3	2	0
Environment Carrying Competitiveness	15	4	2	1	3	5
Environment Management Competitiveness	10	1	3	3	3	0
Environment Harmony Competitiveness	10	2	3	0	2	3
Total	60	9	13	10	18	10

Chapter 27
Report on Global Environment Competitiveness of Benin

Score: 50.28
Rank: 63

Benin is a country in West Africa. It covers 110.6 square kilometres and bordered by Togo to the west, by Nigeria to the east and by Burkina Faso and Niger to the north, bounded by the Atlantic Ocean to the south. It crosses the coast climate, vice equatorial climate and tropical region. And poor in mineral resources. It had a population of 9.1 million and domestic production the gross (GDP) of USD 7.29 billion in 2011. Through the evaluation of global environment competitiveness, we can know that the environment competitiveness index of Benin ranks at 63 among 133 countries.

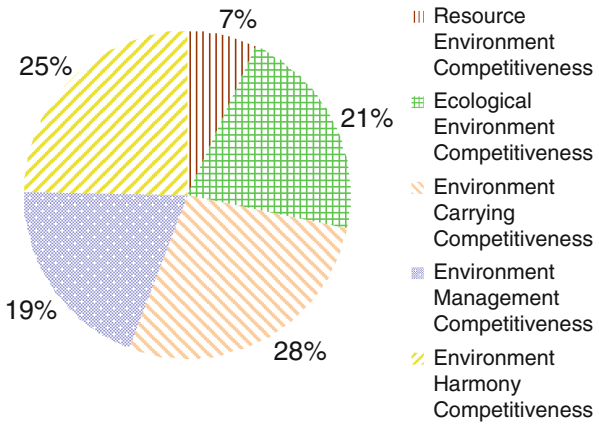

Fig. 27.1 Contribution of sub-index to GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_27,

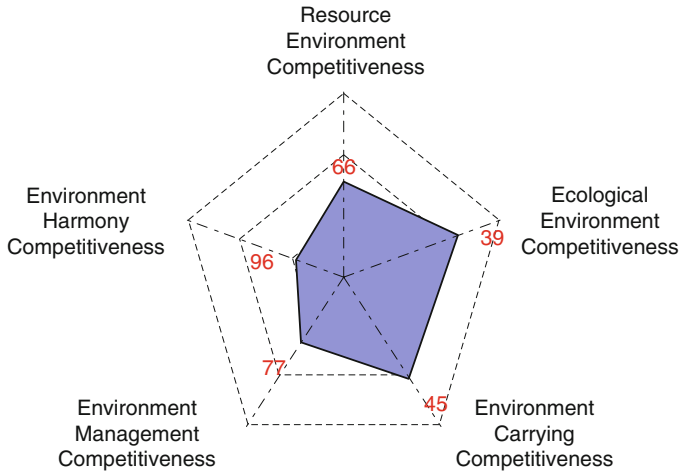

Fig. 27.2 Rank of sub-index of GEC

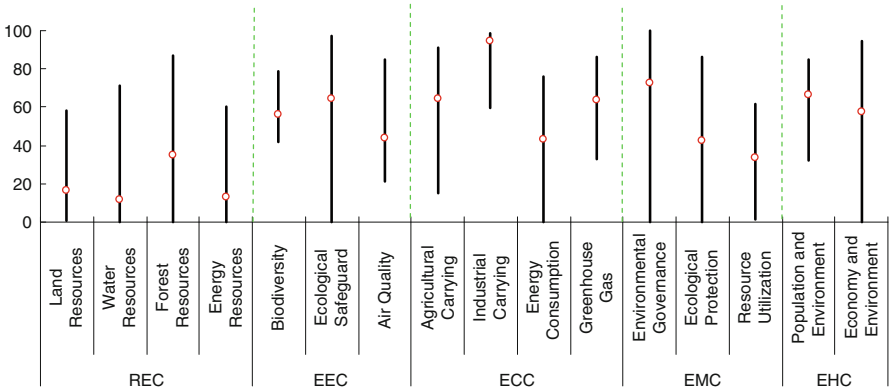

Fig. 27.3 Score and rank of the pillars of GEC

Table 27.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	17.69	66	Groundwater	2.30	102
1.1 Land Resources	16.47	43	Total internal renewable water resources	4.70	97
Land area per capita	2.17	74	1.3 Forest Resources	34.93	43
Percentage of arable land to total land area	38.74	33	Growing stock in forest and other wooded land	50.49	85
Arable land per capita	13.27	36	Proportion of land area covered by forest	46.86	35
1.2 Water Resources	11.52	83	Forest area per capita	3.46	52
Surface water	2.55	82	1.4 Energy Resources	13.19	36

(continued)

Table 27.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
Fossil energy	0.00	64	Energy consumption per unit of land area	99.93	34
Energy production	0.23	111	Ratio of clean energy consumption	0.00	116
Proportion of combustible renewable and waste to total energy consumption	60.26	19	Elasticity of energy consumption	30.36	3
Net energy imports of the energy consumption	7.06	79	Elasticity of electric power consumption	N/A	N/A
2 Ecological Environment Competitiveness	53.78	39	3.4 Greenhouse Gas	63.37	55
2.1 Biodiversity	56.19	96	Growth rate of CO_2 emissions	40.92	106
Threatened fish species	87.26	71	Growth rate of Methane emissions	66.00	20
Threatened mammal species	94.02	64	CO_2 emissions per unit of land area	99.96	35
Threatened plant species	99.24	67	CO_2 emissions per unit of energy consumption	69.05	25
GEF benefits index for biodiversity	0.20	109	4 Environment Management Competitiveness	48.63	77
2.2 Ecological Safeguard	64.40	8	4.1 Environmental Governance	72.27	102
Terrestrial protected areas	64.40	17	Agricultural chemicals regulation	66.67	65
Marine protected areas	N/A	N/A	Percentage of the rural population with access to an improved water source	68.00	92
2.3 Air Quality	44.00	115	Percentage of the urban population with access to an improved water source	84.00	121
Inhalable particles (PM10)	64.96	96	4.2 Ecological Protection	42.18	33
Particulate matter (PM2.5)	71.50	106	Area of plantation and afforestation	0.02	107
Index of indoor air pollution	1.00	120	Biome protect	98.90	18
Nitrogen oxides emission	68.39	44	Overfishing of fishing resources	41.67	70
Sulfur dioxide emission	40.98	7	4.3 Resource Utilization	33.59	79
3 Environment Carrying Competitiveness	69.08	45	Utilization rate of water resources	0.02	124
3.1 Agricultural Carrying	64.64	86	Percentage of total internal renewable water resources to total water resources	36.93	101
Cereal yield per unit of arable land	11.62	108	Percentage of agricultural land to total land area	35.26	99
Fertilizer consumption per unit of arable land	100.00	2	Percentage of fossil fuel energy consumption to total energy consumption	62.17	21
Annual freshwater withdrawals for agriculture per unit of arable land	99.97	10			
3.2 Industrial Carrying	94.42	26			
Net exports of goods as a percentage of GDP	90.81	17			
Electric power consumption per unit of value added of industry	91.42	68			
SO_2 emissions per unit of value added of industry	99.79	70			
Annual freshwater withdrawals for industry per value added of industry	95.67	87			
3.3 Energy Consumption	43.43	16			

(continued)

Table 27.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
5 Environment Harmony Competitiveness	62.23	96	CO_2 emissions per capita	98.73	25
5.1 Population and Environment	66.59	89	Energy consumption per capita	97.86	15
Percentage of population with access to Improved sanitation facilities	12.00	125	5.2 Economy and Environment	57.87	96
Motor vehicles per 1,000 people	97.65	22	Land resource utilization efficiency	0.02	108
Renewable internal freshwater resources per capita	1.37	98	Sulfur dioxide emissions per unit of GDP	97.38	32
SO_2 emissions per capita	99.75	5	Carbon dioxide emissions per unit of GDP	75.01	99
			Energy consumption per unit of GDP	59.06	115

Table 27.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	0	1	6	5	2
Ecological Environment Competitiveness	11	1	1	1	5	3
Environment Carrying Competitiveness	15	2	4	3	3	3
Environment Management Competitiveness	10	0	1	1	4	4
Environment Harmony Competitiveness	10	1	2	1	4	2
Total	60	4	9	12	21	14

Chapter 28
Report on Global Environment Competitiveness of Bolivia

Score: 55.22
Rank: 15

Bolivia is located in South-Central America bordered by Brazil to the north and east, Paraguay and Argentina to the south, Chile to the southwest, and Peru to the west. It crosses the sub-tropical and tropical region. And poor in mineral resources. Bulivya has a total area of 1083.3 thousand of square kilometers. As of late 2011, the gross population was 10.09 million, with GDP reaching USD 23.95 billion. Through the evaluation of global environment competitiveness, we can know that the environment competitiveness index of Bolivia ranks at 15 among 133 countries.

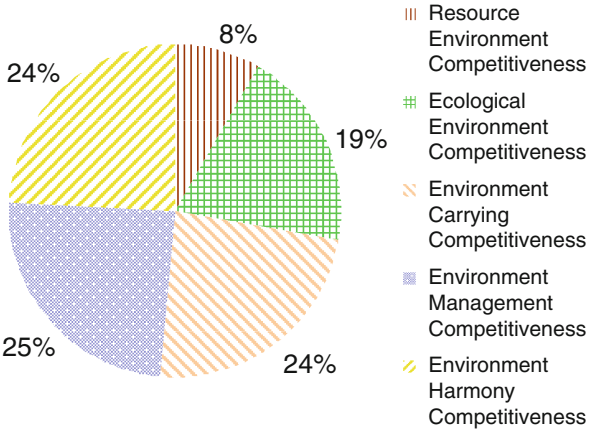

Fig. 28.1 Contribution of sub-index to GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_28,

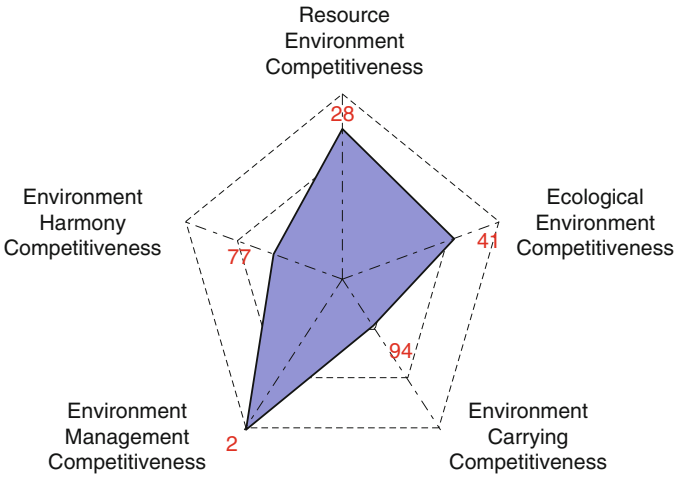

Fig. 28.2 Rank of sub-index of GEC

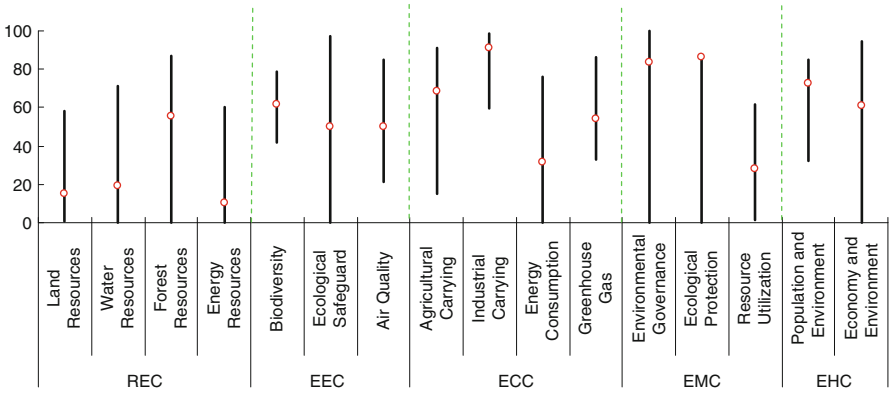

Fig. 28.3 Score and rank of the pillars of GEC

Table 28.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	22.83	28	Groundwater	17.25	45
1.1 Land Resources	14.83	53	Total internal renewable water resources	14.13	66
Land area per capita	19.34	12	1.3 Forest Resources	55.26	9
Percentage of arable land to total land area	5.85	109	Growing stock in forest and other wooded land	62.85	12
Arable land per capita	17.80	25	Proportion of land area covered by forest	61.51	14
1.2 Water Resources	19.18	55	Forest area per capita	39.33	5
Surface water	5.94	55	1.4 Energy Resources	10.20	44
Annual precipitation	39.41	49			

(continued)

Table 28.1 (continued)

Indicators	Score	Rank
Fossil energy	0.00	61
Energy production	1.70	41
Proportion of combustible renewable and waste to total energy consumption	26.10	35
Net energy imports of the energy consumption	29.20	17
2 Ecological Environment Competitiveness	53.63	41
2.1 Biodiversity	61.99	13
Threatened fish species	100.00	1
Threatened mammal species	89.13	99
Threatened plant species	95.80	103
GEF benefits index for biodiversity	12.50	24
2.2 Ecological Safeguard	50.00	15
Terrestrial protected areas	50.00	31
Marine protected areas	N/A	N/A
2.3 Air Quality	50.09	96
Inhalable particles (PM10)	58.39	106
Particulate matter (PM2.5)	85.19	65
Index of indoor air pollution	17.90	81
Nitrogen oxides emission	65.78	97
Sulfur dioxide emission	40.92	24
3 Environment Carrying Competitiveness	65.15	94
3.1 Agricultural Carrying	68.57	55
Cereal yield per unit of arable land	22.13	83
Fertilizer consumption per unit of arable land	99.52	18
Annual freshwater withdrawals for agriculture per unit of arable land	99.54	42
3.2 Industrial Carrying	91.23	71
Net exports of goods as a percentage of GDP	75.91	87
Electric power consumption per unit of value added of industry	93.60	46
SO_2 emissions per unit of value added of industry	99.89	45
Annual freshwater withdrawals for industry per value added of industry	95.53	89
3.3 Energy Consumption	31.76	92
Energy consumption per unit of land area	99.99	5
Ratio of clean energy consumption	5.41	68
Elasticity of energy consumption	12.54	116
Elasticity of electric power consumption	9.08	107
3.4 Greenhouse Gas	54.30	115
Growth rate of CO_2 emissions	36.60	115
Growth rate of Methane emissions	49.11	117
CO_2 emissions per unit of land area	99.99	20
CO_2 emissions per unit of energy consumption	49.20	50
4 Environment Management Competitiveness	67.88	2
4.1 Environmental Governance	83.50	79
Agricultural chemicals regulation	N/A	N/A
Percentage of the rural population with access to an improved water source	71.00	89
Percentage of the urban population with access to an improved water source	96.00	89
4.2 Ecological Protection	86.20	1
Area of plantation and afforestation	N/A	N/A
Biome protect	86.20	32
Overfishing of fishing resources	N/A	N/A
4.3 Resource Utilization	27.84	106
Utilization rate of water resources	0.01	129
Percentage of total internal renewable water resources to total water resources	41.78	96
Percentage of agricultural land to total land area	40.32	88
Percentage of fossil fuel energy consumption to total energy consumption	29.25	55

(continued)

Table 28.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
5 Environment Harmony Competitiveness	66.6	77	CO_2 emissions per capita	96.27	44
5.1 Population and Environment	72.39	56	Energy consumption per capita	95.29	40
Percentage of population with access to Improved sanitation facilities	25.00	118	5.2 Economy and Environment	60.84	87
Motor vehicles per 1,000 people	91.85	44	Land resource utilization efficiency	0.01	124
Renewable internal freshwater resources per capita	36.40	11	Sulfur dioxide emissions per unit of GDP	95.61	60
SO_2 emissions per capita	98.85	24	Carbon dioxide emissions per unit of GDP	73.85	104
			Energy consumption per unit of GDP	73.88	93

Table 28.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	1	3	8	1	1
Ecological Environment Competitiveness	11	1	2	1	5	2
Environment Carrying Competitiveness	15	1	2	3	5	4
Environment Management Competitiveness	10	1	0	1	4	2
Environment Harmony Competitiveness	10	0	2	4	1	3
Total	60	4	9	17	16	12

Chapter 29
Report on Global Environment Competitiveness of Bosnia and Herzegovina

Score: 46.51
Rank: 103

Bosnia and Herzegovina is a country on the Balkan Peninsula, bordered by Croatia to the north, west and south, Serbia to the east, and Montenegro to the southeast. It crosses the subtropical and temperate region. And poor in mineral resources. Bosnia and Herzegovina has a total area of 51 thousand of square kilometers. As of late 2011, the gross population was 3.75 million, with GDP reaching USD 18.09 billion. Through the evaluation of global environment competitiveness, we can know that the environment competitiveness index of Bosnia and Herzegovina ranks at 103 among 133 countries.

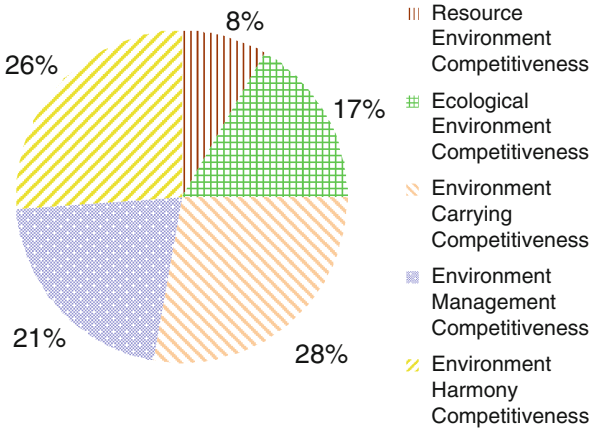

Fig. 29.1 Contribution of sub-index to GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_29,

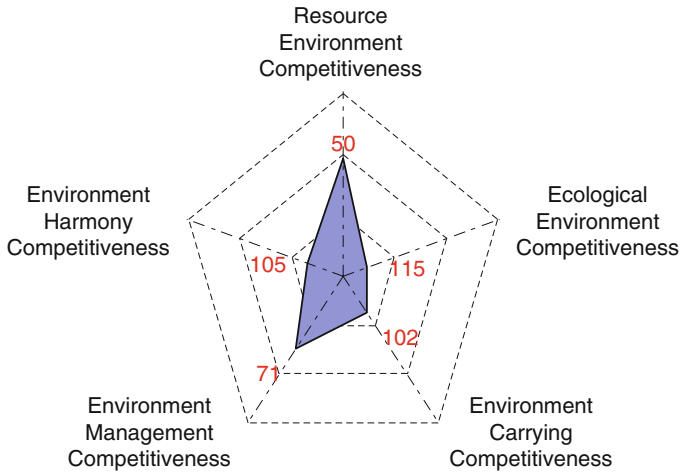

Fig. 29.2 Rank of sub-index of GEC

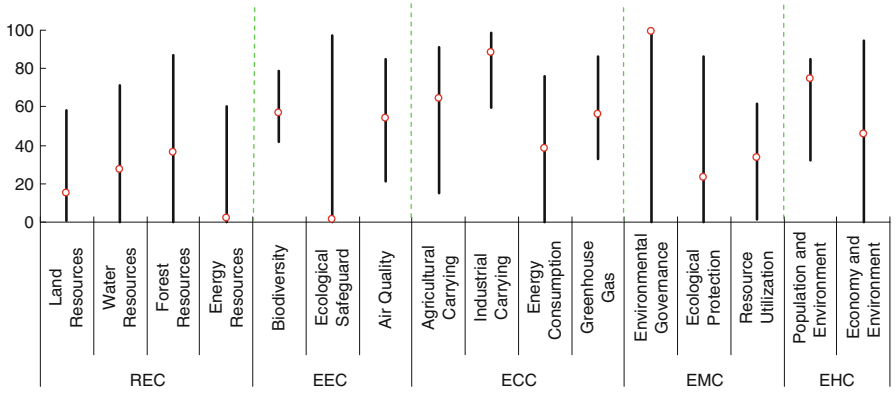

Fig. 29.3 Score and rank of the pillars of GEC

Table 29.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	19.19	50	Groundwater	32.65	22
1.1 Land Resources	14.73	54	Total internal renewable water resources	35.11	31
Land area per capita	2.43	67	1.3 Forest Resources	36.62	36
Percentage of arable land to total land area	33.34	40	Growing stock in forest and other wooded land	51.08	73
Arable land per capita	12.54	44	Proportion of land area covered by forest	50.18	30
1.2 Water Resources	27.61	36	Forest area per capita	4.06	45
Surface water	7.69	43	1.4 Energy Resources	2.13	106
Annual precipitation	35.00	58			

(continued)

Table 29.1 (continued)

Indicators	Score	Rank
Fossil energy	0.00	64
Energy production	1.17	55
Proportion of combustible renewable and waste to total energy consumption	N/A	N/A
Net energy imports of the energy consumption	8.61	70
2 Ecological Environment Competitiveness	39.05	115
2.1 Biodiversity	56.80	86
Threatened fish species	85.38	77
Threatened mammal species	97.83	17
Threatened plant species	100.00	1
GEF benefits index for biodiversity	0.40	103
2.2 Ecological Safeguard	1.13	125
Terrestrial protected areas	1.36	122
Marine protected areas	0.80	75
2.3 Air Quality	54.17	82
Inhalable particles (PM10)	84.67	42
Particulate matter (PM2.5)	88.91	40
Index of indoor air pollution	10.30	92
Nitrogen oxides emission	68.76	24
Sulfur dioxide emission	40.34	81
3 Environment Carrying Competitiveness	64.73	102
3.1 Agricultural Carrying	64.49	91
Cereal yield per unit of arable land	39.34	44
Fertilizer consumption per unit of arable land	98.02	40
Annual freshwater withdrawals for agriculture per unit of arable land	N/A	N/A
3.2 Industrial Carrying	88.17	93
Net exports of goods as a percentage of GDP	79.48	73
Electric power consumption per unit of value added of industry	76.37	114
SO_2 emissions per unit of value added of industry	98.31	125
Annual freshwater withdrawals for industry per value added of industry	98.51	50
3.3 Energy Consumption	38.20	31
Energy consumption per unit of land area	99.74	76
Ratio of clean energy consumption	15.38	41
Elasticity of energy consumption	16.68	12
Elasticity of electric power consumption	21.00	9
3.4 Greenhouse Gas	56.49	108
Growth rate of CO_2 emissions	54.21	54
Growth rate of Methane emissions	59.55	62
CO_2 emissions per unit of land area	99.57	91
CO_2 emissions per unit of energy consumption	14.91	124
4 Environment Management Competitiveness	49.12	71
4.1 Environmental Governance	99.00	21
Agricultural chemicals regulation	N/A	N/A
Percentage of the rural population with access to an improved water source	98.00	40
Percentage of the urban population with access to an improved water source	100.00	1
4.2 Ecological Protection	23.53	96
Area of plantation and afforestation	1.29	32
Biome protect	2.90	126
Overfishing of fishing resources	73.81	13
4.3 Resource Utilization	33.36	80
Utilization rate of water resources	0.03	115
Percentage of total internal renewable water resources to total water resources	74.10	52
Percentage of agricultural land to total land area	49.32	70
Percentage of fossil fuel energy consumption to total energy consumption	9.99	98

(continued)

Table 29.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
5 Environment Harmony Competitiveness	60.43	105	CO_2 emissions per capita	85.75	85
5.1 Population and Environment	74.70	44	Energy consumption per capita	87.66	71
Percentage of population with access to Improved sanitation facilities	95.00	47	5.2 Economy and Environment	46.16	117
Motor vehicles per 1,000 people	83.58	66	Land resource utilization efficiency	0.10	65
Renewable internal freshwater resources per capita	11.45	32	Sulfur dioxide emissions per unit of GDP	57.15	124
SO_2 emissions per capita	75.07	118	Carbon dioxide emissions per unit of GDP	54.50	121
			Energy consumption per unit of GDP	72.90	97

Table 29.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	0	2	7	3	1
Ecological Environment Competitiveness	11	1	2	2	4	2
Environment Carrying Competitiveness	15	0	1	5	6	3
Environment Management Competitiveness	10	0	1	3	3	2
Environment Harmony Competitiveness	10	0	0	3	3	4
Total	60	1	6	20	19	12

Chapter 30
Report on Global Environment Competitiveness of Botswana

Botswana is a landlocked country located in Southern Africa, bordered by South Africa to the south and southeast, Namibia to the west and north, and Zimbabwe to the northeast. It covers 566.7 thousand of square kilometres. It had a population of 2.03 million and domestic production the gross (GDP) of USD 17.33 billion in 2011. Through the evaluation of global environment competitiveness, we can know that the environment competitiveness index of Botswana ranks at 42 among 133 countries.

Score: 52.38
Rank: 42

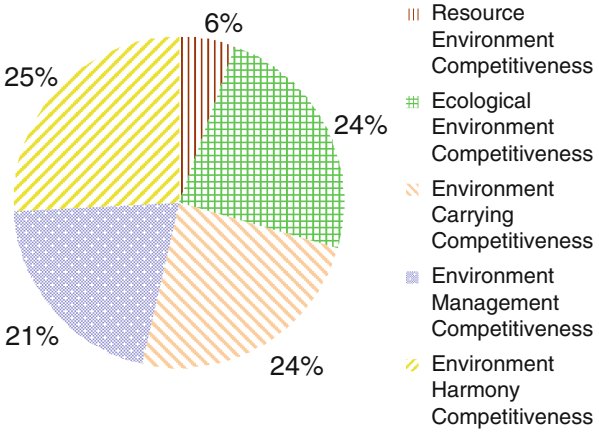

Fig. 30.1 Contribution of sub-index to GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_30,

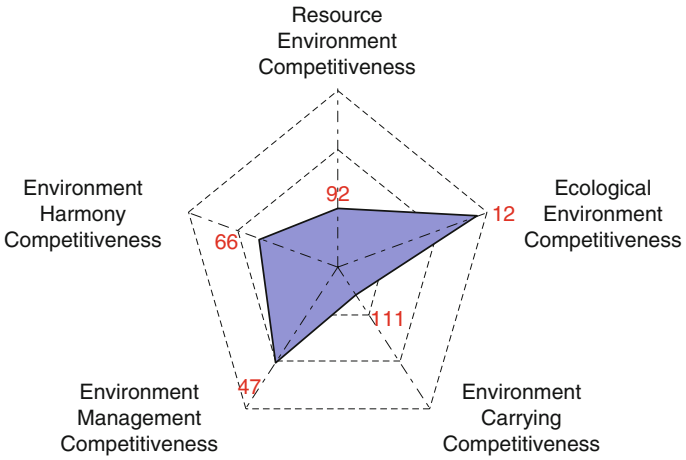

Fig. 30.2 Rank of sub-index of GEC

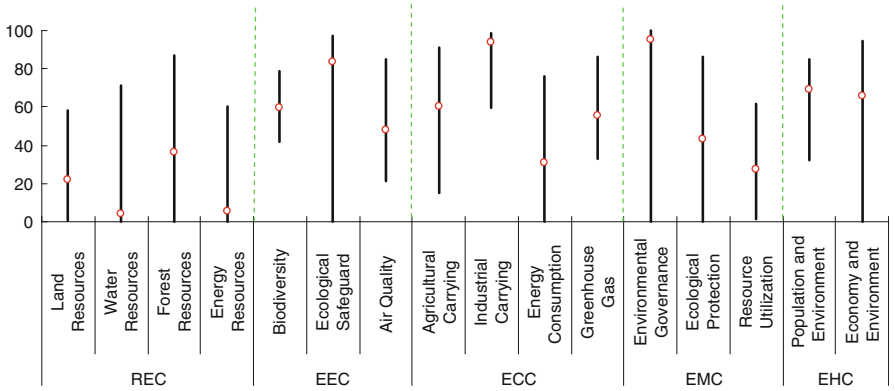

Fig. 30.3 Score and rank of the pillars of GEC

Table 30.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	14.59	92	Groundwater	0.39	116
1.1 Land Resources	22.09	26	Total internal renewable water resources	0.21	124
Land area per capita	50.29	5	1.3 Forest Resources	36.55	38
Percentage of arable land to total land area	0.60	130	Growing stock in forest and other wooded land	52.30	48
Arable land per capita	5.97	82	Proportion of land area covered by forest	23.21	78
1.2 Water Resources	3.82	113	Forest area per capita	38.57	6
Surface water	0.20	118	1.4 Energy Resources	5.72	63
Annual precipitation	14.48	108			

(continued)

Table 30.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
Fossil energy	0.00	64	Energy consumption per unit of land area	100.00	3
Energy production	0.55	76	Ratio of clean energy consumption	0.01	114
Proportion of combustible renewable and waste to total energy consumption	23.08	39	Elasticity of energy consumption	13.61	88
Net energy imports of the energy consumption	6.06	90	Elasticity of electric power consumption	10.83	57
2 Ecological Environment Competitiveness	62.24	12	3.4 Greenhouse Gas	55.82	111
2.1 Biodiversity	59.61	21	Growth rate of CO_2 emissions	44.92	91
Threatened fish species	99.06	6	Growth rate of Methane emissions	43.29	124
Threatened mammal species	96.20	37	CO_2 emissions per unit of land area	99.99	15
Threatened plant species	100.00	1	CO_2 emissions per unit of energy consumption	45.96	55
GEF benefits index for biodiversity	1.40	76	4 Environment Management Competitiveness	53.96	47
2.2 Ecological Safeguard	83.70	2	4.1 Environmental Governance	95.50	42
Terrestrial protected areas	83.70	6	Agricultural chemicals regulation	N/A	N/A
Marine protected areas	N/A	N/A	Percentage of the rural population with access to an improved water source	92.00	53
2.3 Air Quality	48.11	104	Percentage of the urban population with access to an improved water source	99.00	51
Inhalable particles (PM10)	53.28	114	4.2 Ecological Protection	42.86	31
Particulate matter (PM2.5)	87.60	49	Area of plantation and afforestation	0.00	116
Index of indoor air pollution	11.90	88	Biome protect	100.00	1
Nitrogen oxides emission	68.35	45	Overfishing of fishing resources	N/A	N/A
Sulfur dioxide emission	40.73	60	4.3 Resource Utilization	27.22	110
3 Environment Carrying Competitiveness	63.59	111	Utilization rate of water resources	0.06	101
3.1 Agricultural Carrying	60.34	116	Percentage of total internal renewable water resources to total water resources	19.45	115
Cereal yield per unit of arable land	1.93	128	Percentage of agricultural land to total land area	53.92	60
Fertilizer consumption per unit of arable land	99.01	30	Percentage of fossil fuel energy consumption to total energy consumption	35.47	46
Annual freshwater withdrawals for agriculture per unit of arable land	99.53	45			
3.2 Industrial Carrying	93.68	37			
Net exports of goods as a percentage of GDP	78.52	80			
Electric power consumption per unit of value added of industry	97.06	16			
SO_2 emissions per unit of value added of industry	99.64	89			
Annual freshwater withdrawals for industry per value added of industry	99.49	21			
3.3 Energy Consumption	31.11	105			

(continued)

Table 30.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
5 Environment Harmony Competitiveness	67.53	66	CO_2 emissions per capita	93.89	59
5.1 Population and Environment	69.50	73	Energy consumption per capita	92.21	54
Percentage of population with access to Improved sanitation facilities	60.00	91	5.2 Economy and Environment	65.55	63
Motor vehicles per 1,000 people	86.30	57	Land resource utilization efficiency	0.01	117
Renewable internal freshwater resources per capita	1.43	94	Sulfur dioxide emissions per unit of GDP	80.33	113
SO_2 emissions per capita	80.76	113	Carbon dioxide emissions per unit of GDP	90.25	50
			Energy consumption per unit of GDP	91.61	33

Table 30.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	1	1	3	4	5
Ecological Environment Competitiveness	11	4	1	3	1	2
Environment Carrying Competitiveness	15	1	3	1	4	6
Environment Management Competitiveness	10	1	0	4	0	4
Environment Harmony Competitiveness	10	0	0	3	4	3
Total	60	7	5	14	13	20

Chapter 31
Report on Global Environment Competitiveness of Brazil

Score: 57.46
Rank: 5

Brazil is the largest country in South America and in the Latin America region. Bounded by the Atlantic Ocean on the east. It is bordered on the north by Venezuela, Guyana, Suriname and the French overseas region of French Guiana; on the northwest by Colombia; on the west by Bolivia and Peru; on the southwest by Argentina and Paraguay and on the south by Uruguay. It covers 8,459.4 thousand of square kilometres. It had a population of 196.66 million and domestic production the gross (GDP) of USD 2476.65 billion in 2011. Through the evaluation of global environment competitiveness, we can know that the environment competitiveness index of Brazil ranks at 5 among 133 countries.

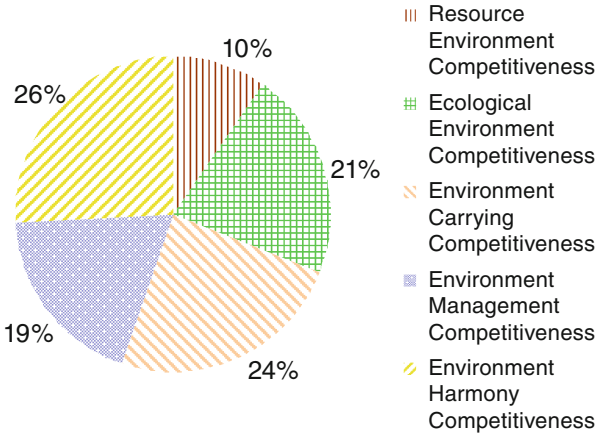

Fig. 31.1 Contribution of sub-index to GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_31,

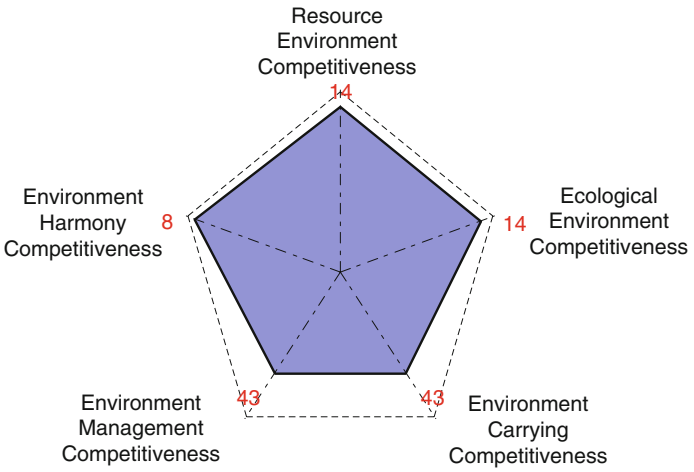

Fig. 31.2 Rank of sub-index of GEC

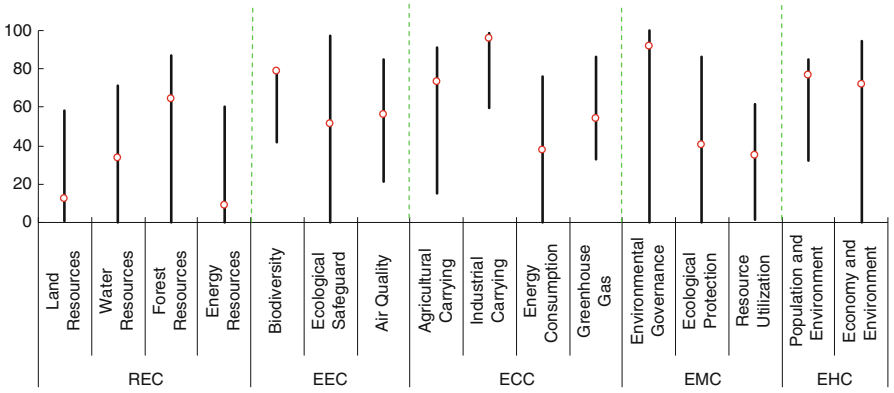

Fig. 31.3 Score and rank of the pillars of GEC

Table 31.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	28.18	14	Groundwater	31.88	24
1.1 Land Resources	12.51	67	Total internal renewable water resources	32.30	37
Land area per capita	7.73	31	1.3 Forest Resources	64.15	4
Percentage of arable land to total land area	14.29	88	Growing stock in forest and other wooded land	100.00	1
Arable land per capita	17.12	27	Proportion of land area covered by forest	71.63	10
1.2 Water Resources	33.88	28	Forest area per capita	18.35	15
Surface water	10.50	30	1.4 Energy Resources	8.93	47
Annual precipitation	60.82	18			

(continued)

Table 31.1 (continued)

Indicators	Score	Rank
Fossil energy	0.54	38
Energy production	1.28	54
Proportion of combustible renewable and waste to total energy consumption	32.80	30
Net energy imports of the energy consumption	11.75	46
2 Ecological Environment Competitiveness	61.40	14
2.1 Biodiversity	78.73	2
Threatened fish species	60.38	122
Threatened mammal species	55.98	130
Threatened plant species	77.30	131
GEF benefits index for biodiversity	100.00	1
2.2 Ecological Safeguard	51.43	14
Terrestrial protected areas	71.20	11
Marine protected areas	21.78	15
2.3 Air Quality	55.87	78
Inhalable particles (PM10)	86.86	30
Particulate matter (PM2.5)	93.79	19
Index of indoor air pollution	38.30	56
Nitrogen oxides emission	18.50	130
Sulfur dioxide emission	36.51	116
3 Environment Carrying Competitiveness	69.21	43
3.1 Agricultural Carrying	73.40	29
Cereal yield per unit of arable land	41.57	38
Fertilizer consumption per unit of arable land	89.90	86
Annual freshwater withdrawals for agriculture per unit of arable land	99.33	53
3.2 Industrial Carrying	96.23	7
Net exports of goods as a percentage of GDP	93.51	8
Electric power consumption per unit of value added of industry	93.62	45
SO_2 emissions per unit of value added of industry	99.92	35
Annual freshwater withdrawals for industry per value added of industry	97.86	62
3.3 Energy Consumption	37.73	32
Energy consumption per unit of land area	99.94	33
Ratio of clean energy consumption	26.65	27
Elasticity of energy consumption	13.71	79
Elasticity of electric power consumption	10.61	72
3.4 Greenhouse Gas	53.87	119
Growth rate of CO_2 emissions	26.58	125
Growth rate of Methane emissions	53.71	95
CO_2 emissions per unit of land area	99.95	39
CO_2 emissions per unit of energy consumption	62.52	32
4 Environment Management Competitiveness	54.18	43
4.1 Environmental Governance	91.69	60
Agricultural chemicals regulation	90.48	37
Percentage of the rural population with access to an improved water source	85.00	72
Percentage of the urban population with access to an improved water source	100.00	1
4.2 Ecological Protection	40.40	43
Area of plantation and afforestation	9.61	7
Biome protect	82.70	41
Overfishing of fishing resources	39.14	74
4.3 Resource Utilization	35.06	74
Utilization rate of water resources	0.02	119
Percentage of total internal renewable water resources to total water resources	53.61	85
Percentage of agricultural land to total land area	36.96	95
Percentage of fossil fuel energy consumption to total energy consumption	49.64	36

(continued)

Table 31.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
5 Environment Harmony Competitiveness	74.36	8	CO_2 emissions per capita	94.72	54
5.1 Population and Environment	76.93	32	Energy consumption per capita	90.36	62
Percentage of population with access to Improved sanitation facilities	80.00	78	5.2 Economy and Environment	71.79	20
Motor vehicles per 1,000 people	68.27	87	Land resource utilization efficiency	0.08	73
Renewable internal freshwater resources per capita	33.34	13	Sulfur dioxide emissions per unit of GDP	97.82	30
SO_2 emissions per capita	96.74	58	Carbon dioxide emissions per unit of GDP	95.40	11
			Energy consumption per unit of GDP	93.85	23

Table 31.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	3	5	4	2	0
Ecological Environment Competitiveness	11	1	4	1	1	4
Environment Carrying Competitiveness	15	2	2	6	3	2
Environment Management Competitiveness	10	1	0	4	4	1
Environment Harmony Competitiveness	10	0	4	3	3	0
Total	60	7	15	18	13	7

Chapter 32
Report on Global Environment Competitiveness of Bulgaria

Bulgaria is a country located in Southeastern Europe, bordered by Romania to the north, Serbia and Macedonia to the west, Greece and Turkey to the south and the Black Sea to the east. It covers 108.6 thousand of square kilometres. It had a population of 7.35 million and domestic production the gross (GDP) of USD 53.51 billion in 2011. Through the evaluation of global environment competitiveness, we can know that the environment competitiveness index of Bulgaria ranks at 85 among 133 countries.

Score: 48.24
Rank: 85

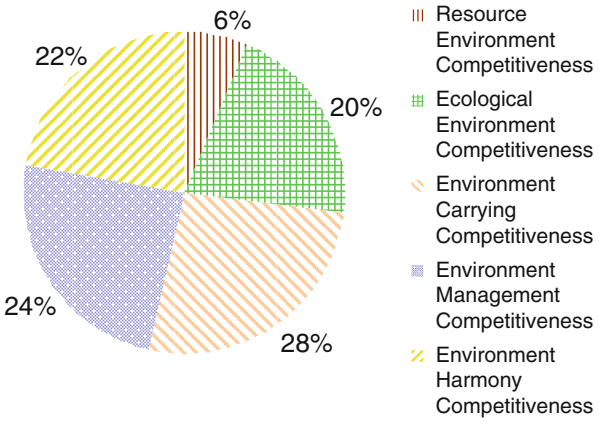

Fig. 32.1 Contribution of sub-index to GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_32,

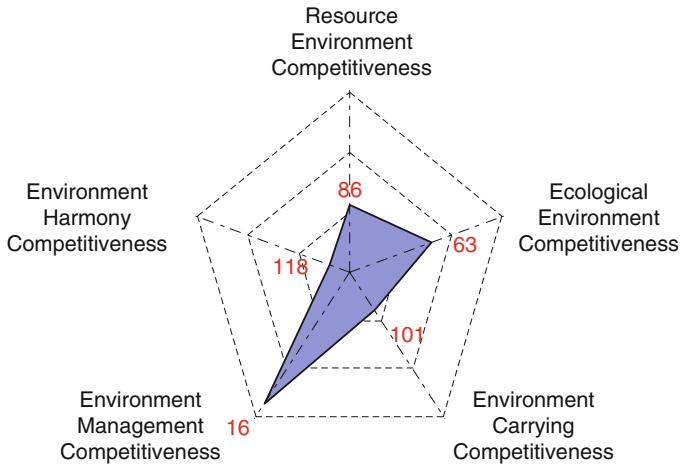

Fig. 32.2 Rank of sub-index of GEC

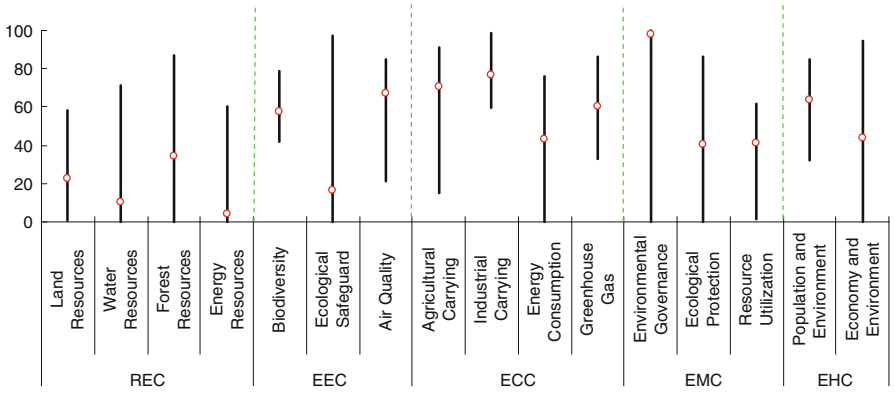

Fig. 32.3 Score and rank of the pillars of GEC

Table 32.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	15.58	86	Groundwater	8.45	73
1.1 Land Resources	22.49	25	Total internal renewable water resources	9.76	80
Land area per capita	2.64	59	1.3 Forest Resources	33.92	47
Percentage of arable land to total land area	50.74	22	Growing stock in forest and other wooded land	51.99	51
Arable land per capita	20.70	19	Proportion of land area covered by forest	42.96	44
1.2 Water Resources	10.33	92	Forest area per capita	3.78	48
Surface water	2.03	91	1.4 Energy Resources	4.00	81

(continued)

Table 32.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
Fossil energy	4.30	19	Energy consumption per unit of land area	99.65	86
Energy production	1.42	50	Ratio of clean energy consumption	42.47	15
Proportion of combustible renewable and waste to total energy consumption	5.48	79	Elasticity of energy consumption	15.44	18
Net energy imports of the energy consumption	7.44	76	Elasticity of electric power consumption	14.24	17
2 Ecological Environment Competitiveness	49.12	63	3.4 Greenhouse Gas	60.16	78
2.1 Biodiversity	57.71	71	Growth rate of CO_2 emissions	51.61	69
Threatened fish species	91.04	47	Growth rate of Methane emissions	64.28	25
Threatened mammal species	96.20	37	CO_2 emissions per unit of land area	99.55	92
Threatened plant species	99.71	47	CO_2 emissions per unit of energy consumption	33.78	93
GEF benefits index for biodiversity	0.80	88	4 Environment Management Competitiveness	57.83	16
2.2 Ecological Safeguard	16.48	80	4.1 Environmental Governance	98.10	24
Terrestrial protected areas	24.73	71	Agricultural chemicals regulation	95.24	20
Marine protected areas	4.12	47	Percentage of the rural population with access to an improved water source	100.00	1
2.3 Air Quality	67.16	50	Percentage of the urban population with access to an improved water source	100.00	1
Inhalable particles (PM10)	70.80	87	4.2 Ecological Protection	40.38	44
Particulate matter (PM2.5)	84.50	68	Area of plantation and afforestation	1.06	40
Index of indoor air pollution	N/A	N/A	Biome protect	53.20	71
Nitrogen oxides emission	68.11	54	Overfishing of fishing resources	80.00	6
Sulfur dioxide emission	38.22	109	4.3 Resource Utilization	40.84	48
3 Environment Carrying Competitiveness	64.86	101	Utilization rate of water resources	1.16	31
3.1 Agricultural Carrying	70.66	42	Percentage of total internal renewable water resources to total water resources	78.36	44
Cereal yield per unit of arable land	37.16	49	Percentage of agricultural land to total land area	54.77	59
Fertilizer consumption per unit of arable land	86.46	95	Percentage of fossil fuel energy consumption to total energy consumption	29.05	56
Annual freshwater withdrawals for agriculture per unit of arable land	99.54	44			
3.2 Industrial Carrying	76.78	128			
Net exports of goods as a percentage of GDP	66.65	108			
Electric power consumption per unit of value added of industry	78.16	113			
SO_2 emissions per unit of value added of industry	97.72	126			
Annual freshwater withdrawals for industry per value added of industry	64.58	127			
3.3 Energy Consumption	42.95	18			

(continued)

Table 32.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
5 Environment Harmony Competitiveness	53.81	118	CO_2 emissions per capita	84.35	89
5.1 Population and Environment	63.46	108	Energy consumption per capita	82.39	81
Percentage of population with access to Improved sanitation facilities	100.00	1	5.2 Economy and Environment	44.16	119
Motor vehicles per 1,000 people	53.95	99	Land resource utilization efficiency	0.14	55
Renewable internal freshwater resources per capita	3.46	67	Sulfur dioxide emissions per unit of GDP	37.06	127
SO_2 emissions per capita	47.62	125	Carbon dioxide emissions per unit of GDP	65.68	111
			Energy consumption per unit of GDP	73.75	94

Table 32.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	0	3	5	6	0
Ecological Environment Competitiveness	11	0	0	5	5	0
Environment Carrying Competitiveness	15	0	4	2	5	4
Environment Management Competitiveness	10	1	2	6	1	0
Environment Harmony Competitiveness	10	1	0	1	3	5
Total	60	2	9	19	20	9

Chapter 33
Report on Global Environment Competitiveness of Cambodia

Score: 52.01
Rank: 44

Cambodia is a country located in the southern portion of the Indochina Peninsula in Southeast Asia. It bordered by Thailand to the northwest, Laos to the northeast, Vietnam to the east and the Gulf of Thailand to the southwest. Its total area is 176.5 thousand of square kilometers. the gross population was 14.81 million, with GDP reaching USD 12.83 billion in 2011. Based on the index system of global environment competitiveness, comprehensive analysis on factors and indictors indicates that environment competitiveness index of Cambodia ranks at 44 among 133 countries.

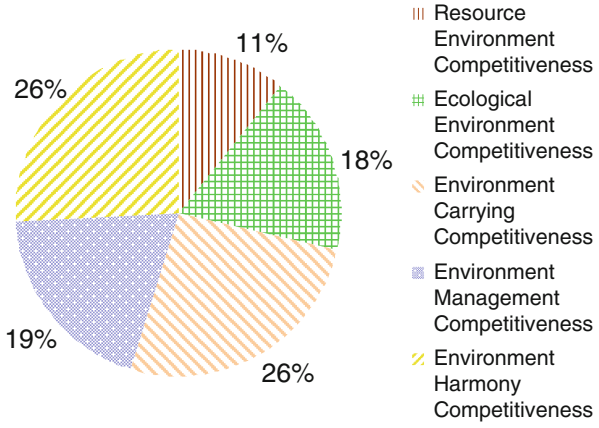

Fig. 33.1 Contribution of sub-index to GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_33,

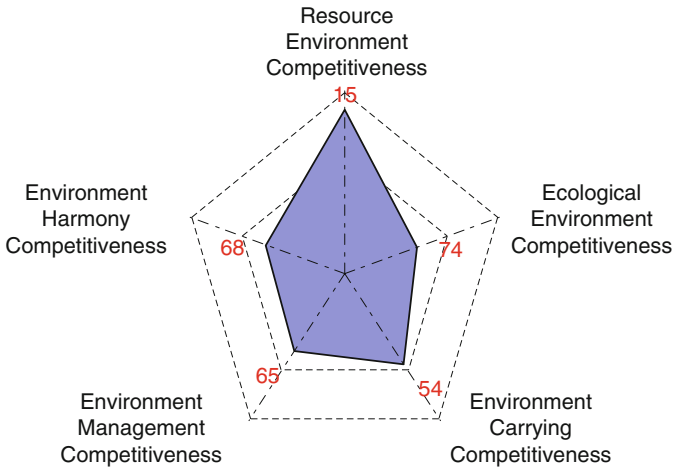

Fig. 33.2 Rank of sub-index of GEC

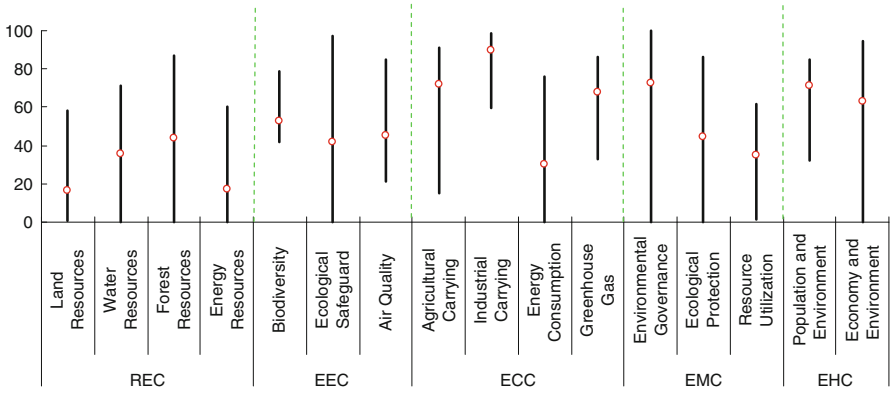

Fig. 33.3 Score and rank of the pillars of GEC

Table 33.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	27.87	15	Groundwater	14.33	51
1.1 Land Resources	16.32	45	Total internal renewable water resources	34.46	32
Land area per capita	2.20	72	1.3 Forest Resources	43.78	20
Percentage of arable land to total land area	38.37	36	Growing stock in forest and other wooded land	52.91	43
Arable land per capita	13.09	38	Proportion of land area covered by forest	66.13	11
1.2 Water Resources	35.96	26	Forest area per capita	4.86	36
Surface water	28.83	4	1.4 Energy Resources	16.89	26
Annual precipitation	66.21	16			

(continued)

Table 33.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
Fossil energy	0.00	64	Energy consumption per unit of land area	99.94	30
Energy production	0.26	107	Ratio of clean energy consumption	0.13	110
Proportion of combustible renewable and waste to total energy consumption	77.16	12	Elasticity of energy consumption	13.84	72
Net energy imports of the energy consumption	9.10	67	Elasticity of electric power consumption	6.59	116
2 Ecological Environment Competitiveness	46.67	74	3.4 Greenhouse Gas	67.96	29
2.1 Biodiversity	53.08	119	Growth rate of CO_2 emissions	53.37	58
Threatened fish species	80.19	95	Growth rate of Methane emissions	50.01	113
Threatened mammal species	79.89	115	CO_2 emissions per unit of land area	99.98	25
Threatened plant species	98.31	88	CO_2 emissions per unit of energy consumption	83.08	13
GEF benefits index for biodiversity	3.50	55	4 Environment Management Competitiveness	50.01	65
2.2 Ecological Safeguard	42.06	22	4.1 Environmental Governance	72.50	101
Terrestrial protected areas	69.84	13	Agricultural chemicals regulation	N/A	N/A
Marine protected areas	0.40	79	Percentage of the rural population with access to an improved water source	58.00	99
2.3 Air Quality	45.33	111	Percentage of the urban population with access to an improved water source	87.00	114
Inhalable particles (PM10)	69.34	89	4.2 Ecological Protection	44.27	26
Particulate matter (PM2.5)	73.65	102	Area of plantation and afforestation	0.09	89
Index of indoor air pollution	1.40	118	Biome protect	100.00	1
Nitrogen oxides emission	67.77	65	Overfishing of fishing resources	47.44	59
Sulfur dioxide emission	40.96	13	4.3 Resource Utilization	35.17	73
3 Environment Carrying Competitiveness	68.10	54	Utilization rate of water resources	0.01	125
3.1 Agricultural Carrying	71.95	36	Percentage of total internal renewable water resources to total water resources	24.66	110
Cereal yield per unit of arable land	30.88	63	Percentage of agricultural land to total land area	37.20	93
Fertilizer consumption per unit of arable land	99.43	20	Percentage of fossil fuel energy consumption to total energy consumption	78.82	12
Annual freshwater withdrawals for agriculture per unit of arable land	99.22	55			
3.2 Industrial Carrying	89.65	85			
Net exports of goods as a percentage of GDP	66.89	106			
Electric power consumption per unit of value added of industry	93.42	50			
SO_2 emissions per unit of value added of industry	99.82	64			
Annual freshwater withdrawals for industry per value added of industry	98.48	52			
3.3 Energy Consumption	30.12	120			

(continued)

Table 33.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
5 Environment Harmony Competitiveness	67.38	68	CO_2 emissions per capita	99.39	15
5.1 Population and Environment	71.45	60	Energy consumption per capita	98.31	9
Percentage of population with access to Improved sanitation facilities	29.00	115	5.2 Economy and Environment	63.30	79
Motor vehicles per 1,000 people	97.65	22	Land resource utilization efficiency	0.02	104
Renewable internal freshwater resources per capita	10.20	38	Sulfur dioxide emissions per unit of GDP	96.05	55
SO_2 emissions per capita	99.59	11	Carbon dioxide emissions per unit of GDP	89.23	59
			Energy consumption per unit of GDP	67.91	103

Table 33.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	1	6	4	2	1
Ecological Environment Competitiveness	11	0	2	0	4	5
Environment Carrying Competitiveness	15	0	4	3	4	4
Environment Management Competitiveness	10	1	1	0	4	3
Environment Harmony Competitiveness	10	0	3	4	1	2
Total	60	2	16	11	15	15

Chapter 34
Report on Global Environment Competitiveness of Cameroon

Score: 49.22
Rank: 75

Cameroon is a country in the Midwest of Africa. It is bordered by Nigeria to the west; Chad to the northeast; the Central African Republic to the east; and Equatorial Guinea, Gabon, and the Republic of the Congo to the south. Its total area is 472.7 thousand of square kilometers. The gross population was 20.03 million, with GDP reaching USD 25.24 billion in 2011. Based on the index system of global environment competitiveness, comprehensive analysis on factors and indictors indicates that environment competitiveness index of Cameroon ranks at 75 among 133 countries.

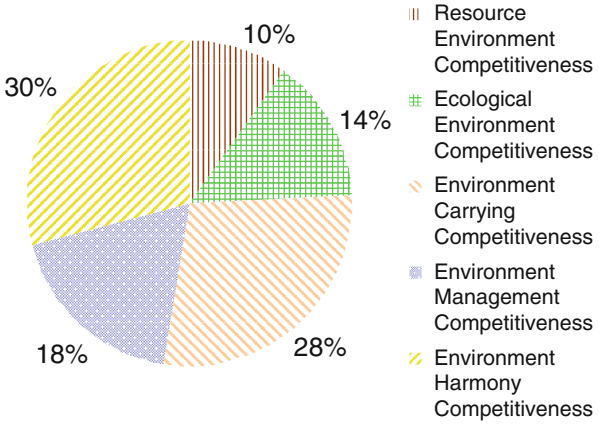

Fig. 34.1 Contribution of sub-index to GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_34,

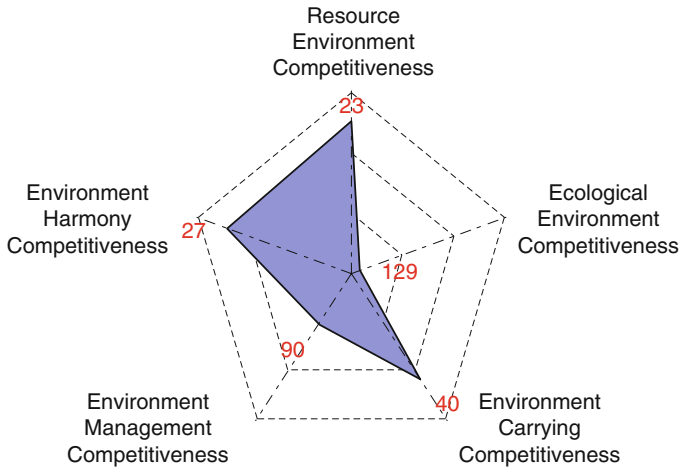

Fig. 34.2 Rank of sub-index of GEC

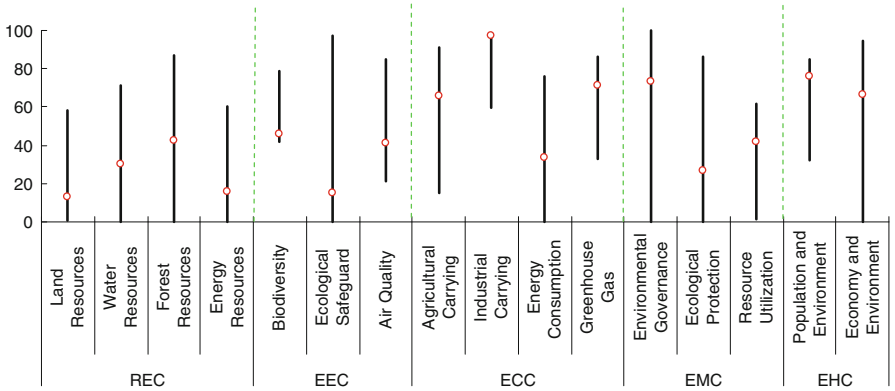

Fig. 34.3 Score and rank of the pillars of GEC

Table 34.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	24.74	23	Groundwater	30.44	27
1.1 Land Resources	12.68	66	Total internal renewable water resources	29.13	42
Land area per capita	4.23	43	1.3 Forest Resources	42.16	23
Percentage of arable land to total land area	22.13	63	Growing stock in forest and other wooded land	68.61	8
Arable land per capita	14.49	32	Proportion of land area covered by forest	48.80	32
1.2 Water Resources	30.17	34	Forest area per capita	6.86	25
Surface water	6.40	51	1.4 Energy Resources	15.76	29
Annual precipitation	54.70	29			

(continued)

Table 34.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
Fossil energy	0.00	64	Energy consumption per unit of land area	99.97	15
Energy production	0.43	92	Ratio of clean energy consumption	8.52	58
Proportion of combustible renewable and waste to total energy consumption	66.75	17	Elasticity of energy consumption	11.35	121
Net energy imports of the energy consumption	15.02	38	Elasticity of electric power consumption	13.37	21
2 Ecological Environment Competitiveness	34.82	129	3.4 Greenhouse Gas	71.31	17
2.1 Biodiversity	45.89	129	Growth rate of CO_2 emissions	49.24	78
Threatened fish species	47.17	127	Growth rate of Methane emissions	73.84	7
Threatened mammal species	79.35	117	CO_2 emissions per unit of land area	99.99	17
Threatened plant species	77.95	129	CO_2 emissions per unit of energy consumption	84.23	12
GEF benefits index for biodiversity	12.50	24	4 Environment Management Competitiveness	45.30	90
2.2 Ecological Safeguard	15.00	83	4.1 Environmental Governance	73.50	98
Terrestrial protected areas	24.73	71	Agricultural chemicals regulation	N/A	N/A
Marine protected areas	0.40	79	Percentage of the rural population with access to an improved water source	52.00	104
2.3 Air Quality	41.39	123	Percentage of the urban population with access to an improved water source	95.00	93
Inhalable particles (PM10)	56.93	110	4.2 Ecological Protection	26.86	88
Particulate matter (PM2.5)	64.42	117	Area of plantation and afforestation	0.11	84
Index of indoor air pollution	3.10	112	Biome protect	53.90	69
Nitrogen oxides emission	67.06	85	Overfishing of fishing resources	35.48	81
Sulfur dioxide emission	40.90	33	4.3 Resource Utilization	41.69	43
3 Environment Carrying Competitiveness	69.78	40	Utilization rate of water resources	0.01	127
3.1 Agricultural Carrying	65.81	73	Percentage of total internal renewable water resources to total water resources	71.75	58
Cereal yield per unit of arable land	15.11	97	Percentage of agricultural land to total land area	23.41	114
Fertilizer consumption per unit of arable land	99.41	21	Percentage of fossil fuel energy consumption to total energy consumption	71.58	17
Annual freshwater withdrawals for agriculture per unit of arable land	99.83	29			
3.2 Industrial Carrying	97.04	4			
Net exports of goods as a percentage of GDP	94.91	5			
Electric power consumption per unit of value added of industry	94.43	41			
SO_2 emissions per unit of value added of industry	99.86	55			
Annual freshwater withdrawals for industry per value added of industry	98.95	41			
3.3 Energy Consumption	33.30	66			

(continued)

Table 34.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
5 Environment Harmony Competitiveness	71.45	27	CO_2 emissions per capita	99.42	14
5.1 Population and Environment	76.12	35	Energy consumption per capita	98.25	10
Percentage of population with access to Improved sanitation facilities	47.00	102	5.2 Economy and Environment	66.78	53
Motor vehicles per 1,000 people	98.52	16	Land resource utilization efficiency	0.01	113
Renewable internal freshwater resources per capita	16.49	26	Sulfur dioxide emissions per unit of GDP	95.10	64
SO_2 emissions per capita	99.26	20	Carbon dioxide emissions per unit of GDP	93.66	29
			Energy consumption per unit of GDP	78.34	84

Table 34.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	1	5	4	4	0
Ecological Environment Competitiveness	11	0	0	0	3	8
Environment Carrying Competitiveness	15	3	4	3	4	1
Environment Management Competitiveness	10	0	0	2	4	3
Environment Harmony Competitiveness	10	0	5	2	1	2
Total	60	4	14	11	16	14

Chapter 35
Report on Global Environment Competitiveness of Canada

Canada is a North American country consisting of ten provinces and three territories. Canada stretches from the Atlantic Ocean in the east to the Pacific Ocean in the west; to the north lies the Arctic Ocean. Greenland is to the northeast, while Saint Pierre and Miquelon is south of Newfoundland. It covers 9,093.5 thousand of square kilometers and has a population of 34.48 million. Its GDP reaches $1,736.05 billion in 2011. Through the index system and evaluation model, the environment competitiveness index of Canada ranks at 18 in 133 countries.

Score: 54.97
Rank: 18

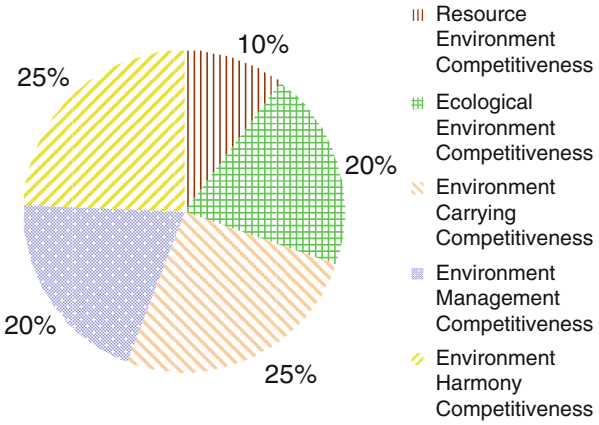

Fig. 35.1 Contribution of sub-index to GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_35,

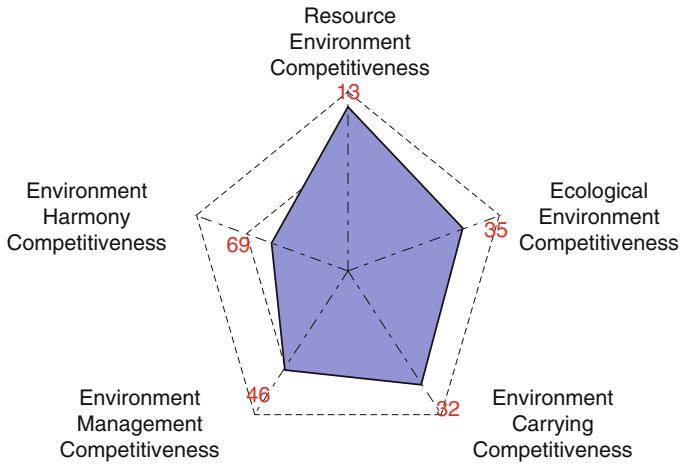

Fig. 35.2 Rank of sub-index of GEC

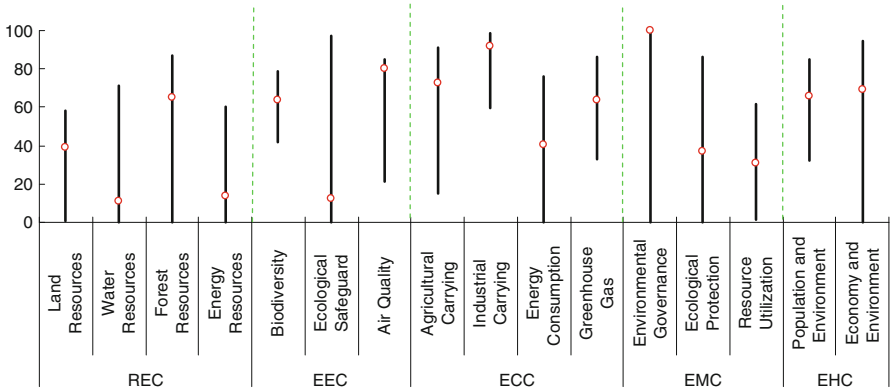

Fig. 35.3 Score and rank of the pillars of GEC

Table 35.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	28.25	13	Groundwater	5.82	83
1.1 Land Resources	38.87	4	Total internal renewable water resources	15.81	60
Land area per capita	47.52	7	1.3 Forest Resources	64.79	3
Percentage of arable land to total land area	7.86	105	Growing stock in forest and other wooded land	100.00	1
Arable land per capita	58.34	3	Proportion of land area covered by forest	39.94	48
1.2 Water Resources	11.26	85	Forest area per capita	62.72	2
Surface water	3.43	68	1.4 Energy Resources	13.80	33

(continued)

Table 35.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
Fossil energy	18.79	8	Energy consumption per unit of land area	99.95	28
Energy production	11.78	10	Ratio of clean energy consumption	37.10	19
Proportion of combustible renewable and waste to total energy consumption	5.12	81	Elasticity of energy consumption	14.15	46
Net energy imports of the energy consumption	20.13	29	Elasticity of electric power consumption	11.33	41
2 Ecological Environment Competitiveness	55.00	35	3.4 Greenhouse Gas	63.68	52
2.1 Biodiversity	63.98	7	Growth rate of CO_2 emissions	55.94	49
Threatened fish species	83.49	82	Growth rate of Methane emissions	63.44	31
Threatened mammal species	93.48	72	CO_2 emissions per unit of land area	99.93	43
Threatened plant species	99.94	22	CO_2 emissions per unit of energy consumption	43.13	64
GEF benefits index for biodiversity	21.50	16	4 Environment Management Competitiveness	53.97	46
2.2 Ecological Safeguard	12.65	89	4.1 Environmental Governance	99.70	15
Terrestrial protected areas	20.11	78	Agricultural chemicals regulation	100.00	1
Marine protected areas	1.46	70	Percentage of the rural population with access to an improved water source	99.00	30
2.3 Air Quality	80.03	24	Percentage of the urban population with access to an improved water source	100.00	1
Inhalable particles (PM10)	89.05	16	4.2 Ecological Protection	36.89	53
Particulate matter (PM2.5)	89.80	36	Area of plantation and afforestation	11.62	5
Index of indoor air pollution	100.00	1	Biome protect	44.50	79
Nitrogen oxides emission	60.41	120	Overfishing of fishing resources	62.96	30
Sulfur dioxide emission	34.63	121	4.3 Resource Utilization	31.02	90
3 Environment Carrying Competitiveness	70.25	32	Utilization rate of water resources	0.06	102
3.1 Agricultural Carrying	72.88	32	Percentage of total internal renewable water resources to total water resources	87.37	21
Cereal yield per unit of arable land	35.19	51	Percentage of agricultural land to total land area	8.79	127
Fertilizer consumption per unit of arable land	96.22	55	Percentage of fossil fuel energy consumption to total energy consumption	27.88	60
Annual freshwater withdrawals for agriculture per unit of arable land	99.81	31			
3.2 Industrial Carrying	91.74	65			
Net exports of goods as a percentage of GDP	83.60	53			
Electric power consumption per unit of value added of industry	91.44	67			
SO_2 emissions per unit of value added of industry	99.86	51			
Annual freshwater withdrawals for industry per value added of industry	92.05	107			
3.3 Energy Consumption	40.63	23			

(continued)

Table 35.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
5 Environment Harmony Competitiveness	67.37	69	CO_2 emissions per capita	57.43	125
5.1 Population and Environment	65.80	93	Energy consumption per capita	42.82	122
Percentage of population with access to Improved sanitation facilities	100.00	1	5.2 Economy and Environment	68.93	39
Motor vehicles per 1,000 people	23.70	126	Land resource utilization efficiency	0.05	88
Renewable internal freshwater resources per capita	100.00	1	Sulfur dioxide emissions per unit of GDP	95.72	58
SO_2 emissions per capita	73.47	120	Carbon dioxide emissions per unit of GDP	88.98	63
			Energy consumption per unit of GDP	90.98	38

Table 35.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	6	0	2	5	1
Ecological Environment Competitiveness	11	2	3	1	4	1
Environment Carrying Competitiveness	15	0	3	10	2	0
Environment Management Competitiveness	10	2	3	1	2	2
Environment Harmony Competitiveness	10	2	0	2	3	3
Total	60	12	9	16	16	7

Chapter 36
Report on Global Environment Competitiveness of Chile

Score: 54.25
Rank: 24

Chile is a country in South America occupying a long, narrow strip of land between the Andes mountains to the east and the Pacific Ocean to the west. It borders Peru to the north, Bolivia to the northeast, Argentina to the east, and the Drake Passage in the far south. It covers 743.5 thousand of square kilometers and has a population of 17.27 million. Its GDP reaches $248.59 billion in 2011. Through the index system and evaluation model, the environment competitiveness index of Chile ranks at 24 in 133 countries.

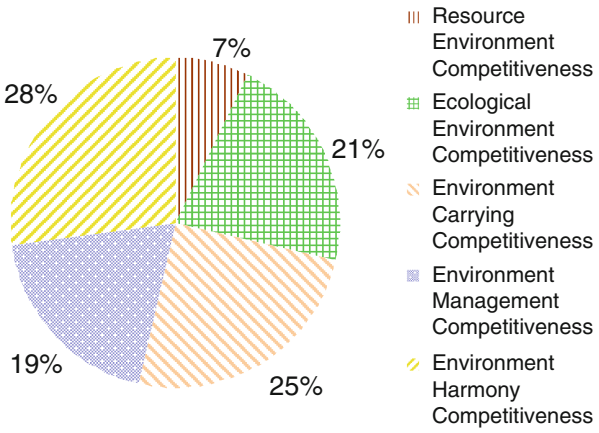

Fig. 36.1 Contribution of sub-index to GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_36,

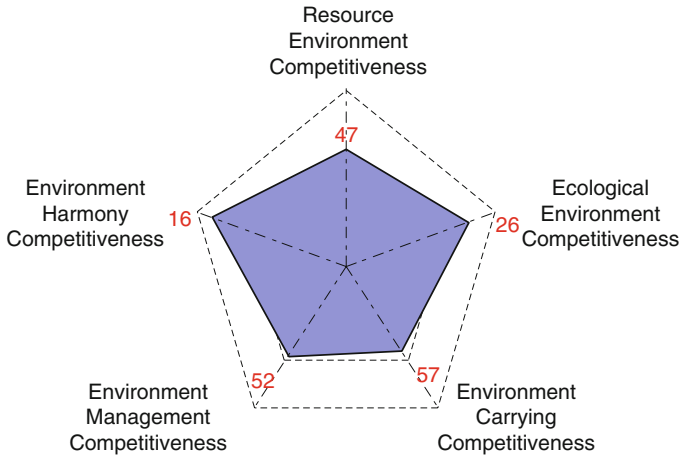

Fig. 36.2 Rank of sub-index of GEC

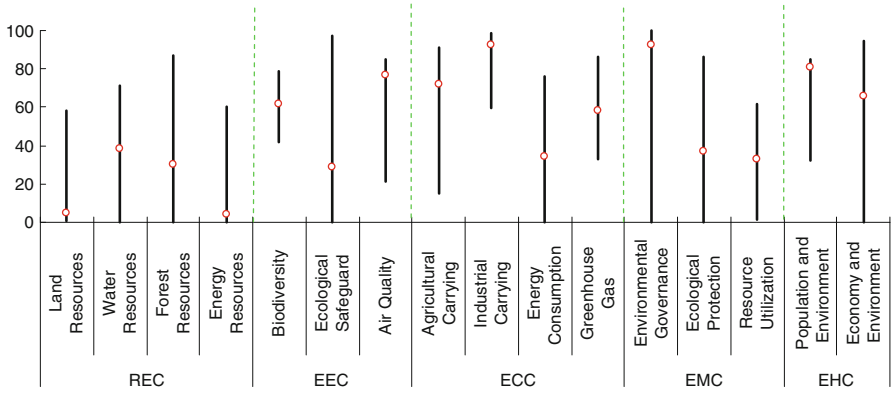

Fig. 36.3 Score and rank of the pillars of GEC

Table 36.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	19.70	47	Groundwater	27.09	30
1.1 Land Resources	5.02	121	Total internal renewable water resources	59.96	13
Land area per capita	7.74	30	1.3 Forest Resources	29.95	66
Percentage of arable land to total land area	2.84	120	Growing stock in forest and other wooded land	59.08	17
Arable land per capita	3.57	108	Proportion of land area covered by forest	25.63	75
1.2 Water Resources	38.23	24	Forest area per capita	6.57	27
Surface water	13.38	21	1.4 Energy Resources	4.14	78
Annual precipitation	52.49	32			

(continued)

Table 36.1 (continued)

Indicators	Score	Rank
Fossil energy	0.00	64
Energy production	0.54	77
Proportion of combustible renewable and waste to total energy consumption	16.99	48
Net energy imports of the energy consumption	3.67	105
2 Ecological Environment Competitiveness	57.72	26
2.1 Biodiversity	61.66	14
threatened fish species	90.57	53
threatened mammal species	89.13	99
threatened plant species	98.02	89
GEF benefits index for biodiversity	15.30	21
2.2 Ecological Safeguard	28.81	50
Terrestrial protected areas	44.84	38
Marine protected areas	4.78	42
2.3 Air Quality	76.43	39
Inhalable particles (PM10)	66.42	94
Particulate matter (PM2.5)	87.25	51
Index of indoor air pollution	100.00	1
Nitrogen oxides emission	67.27	82
Sulfur dioxide emission	37.37	112
3 Environment Carrying Competitiveness	67.94	57
3.1 Agricultural Carrying	71.89	37
Cereal yield per unit of arable land	72.81	9
Fertilizer consumption per unit of arable land	51.80	125
Annual freshwater withdrawals for agriculture per unit of arable land	90.76	109
3.2 Industrial Carrying	92.68	50
Net exports of goods as a percentage of GDP	79.28	75
Electric power consumption per unit of value added of industry	95.06	34
SO_2 emissions per unit of value added of industry	99.57	99
Annual freshwater withdrawals for industry per value added of industry	96.82	73
3.3 Energy Consumption	34.52	53
Energy consumption per unit of land area	99.92	40
Ratio of clean energy consumption	12.94	43
Elasticity of energy consumption	13.92	66
Elasticity of electric power consumption	11.30	43
3.4 Greenhouse Gas	58.31	95
Growth rate of CO_2 emissions	45.53	89
Growth rate of Methane emissions	61.05	46
CO_2 emissions per unit of land area	99.90	49
CO_2 emissions per unit of energy consumption	39.55	74
4 Environment Management Competitiveness	52.33	52
4.1 Environmental Governance	92.20	57
Agricultural chemicals regulation	100.00	1
Percentage of the rural population with access to an improved water source	75.00	85
Percentage of the urban population with access to an improved water source	99.00	51
4.2 Ecological Protection	36.81	54
Area of plantation and afforestation	3.09	19
Biome protect	59.90	66
Overfishing of fishing resources	58.67	38
4.3 Resource Utilization	33.17	81
Utilization rate of water resources	0.05	111
Percentage of total internal renewable water resources to total water resources	83.24	29
Percentage of agricultural land to total land area	25.03	111
Percentage of fossil fuel energy consumption to total energy consumption	24.37	67

(continued)

Table 36.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
5 Environment Harmony Competitiveness	73.56	16	CO_2 emissions per capita	89.05	77
5.1 Population and Environment	81.11	11	Energy consumption per capita	86.85	72
Percentage of population with access to Improved sanitation facilities	96.00	42	5.2 Economy and Environment	66.02	59
Motor vehicles per 1,000 people	78.77	80	Land resource utilization efficiency	0.10	68
Renewable internal freshwater resources per capita	61.94	7	Sulfur dioxide emissions per unit of GDP	81.93	108
SO_2 emissions per capita	69.90	122	Carbon dioxide emissions per unit of GDP	89.71	57
			Energy consumption per unit of GDP	92.33	29

Table 36.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	0	5	2	5	2
Ecological Environment Competitiveness	11	1	1	5	4	0
Environment Carrying Competitiveness	15	1	0	8	5	1
Environment Management Competitiveness	10	1	2	2	3	2
Environment Harmony Competitiveness	10	1	1	3	3	2
Total	60	4	9	20	20	7

Chapter 37
Report on Global Environment Competitiveness of China

China is situated in the eastern part of the Eurasian continent, bordered by the DPRK to the east, Afghanistan and Pakistan to the west, Russia and Mongolia to the north, Myanmar, Laos and Vietnam to the south, India, Nepal and Bhutan to the south and southwest, and Kazakhstan, Kyrgyzstan, Tajikistan to the northwest. It covers 9326 thousand of square kilometers and has a population of 1344.13 million. Its GDP reaches $7318.5 billion in 2011. Through the index system and evaluation model, the environment competitiveness index of China ranks at 87 in 133 countries.

Score: 48.03
Rank: 87

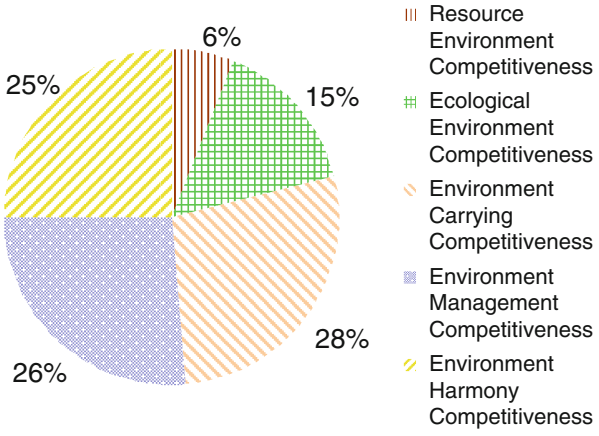

Fig. 37.1 Contribution of sub-index to GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_37,

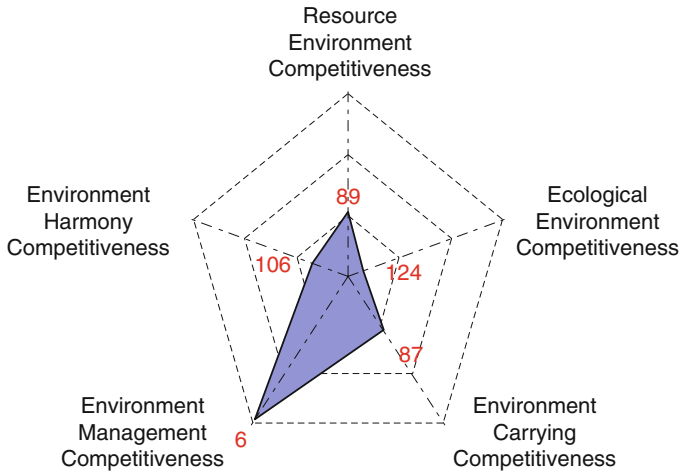

Fig. 37.2 Rank of sub-index of GEC

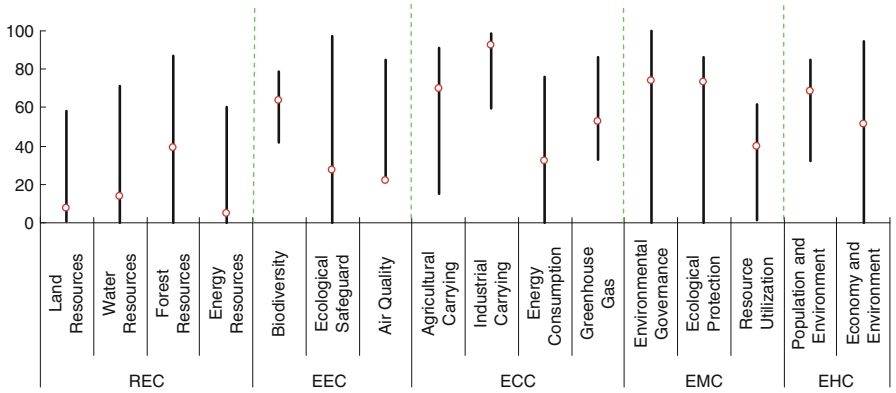

Fig. 37.3 Score and rank of the pillars of GEC

Table 37.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	14.76	89	Groundwater	12.76	56
1.1 Land Resources	7.71	105	Total internal renewable water resources	15.21	63
Land area per capita	1.23	106	1.3 Forest Resources	39.20	28
Percentage of arable land to total land area	20.17	67	Growing stock in forest and other wooded land	94.49	5
Arable land per capita	3.88	103	Proportion of land area covered by forest	26.32	73
1.2 Water Resources	13.41	71	Forest area per capita	1.09	84
Surface water	3.17	72	1.4 Energy Resources	4.50	76
Annual precipitation	22.51	83			

(continued)

Table 37.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
Fossil energy	1.20	32	Energy consumption per unit of land area	99.45	101
Energy production	1.67	43	Ratio of clean energy consumption	6.24	65
Proportion of combustible renewable and waste to total energy consumption	9.12	65	Elasticity of energy consumption	13.67	82
Net energy imports of the energy consumption	11.58	49	Elasticity of electric power consumption	9.52	104
2 Ecological Environment Competitiveness	36.09	124	3.4 Greenhouse Gas	52.42	123
2.1 Biodiversity	63.46	8	Growth rate of CO_2 emissions	46.81	83
threatened fish species	46.70	128	Growth rate of Methane emissions	51.41	106
threatened mammal species	59.24	129	CO_2 emissions per unit of land area	99.13	111
threatened plant species	78.18	128	CO_2 emissions per unit of energy consumption	17.94	118
GEF benefits index for biodiversity	66.60	6	4 Environment Management Competitiveness	63.60	6
2.2 Ecological Safeguard	27.54	54	4.1 Environmental Governance	73.95	95
Terrestrial protected areas	44.84	38	Agricultural chemicals regulation	47.62	79
Marine protected areas	1.59	67	Percentage of the rural population with access to an improved water source	85.00	72
2.3 Air Quality	21.97	132	Percentage of the urban population with access to an improved water source	98.00	70
Inhalable particles (PM10)	56.93	110	4.2 Ecological Protection	73.50	4
Particulate matter (PM2.5)	37.02	130	Area of plantation and afforestation	100.00	1
Index of indoor air pollution	10.60	90	Biome protect	64.40	60
Nitrogen oxides emission	0.00	132	Overfishing of fishing resources	47.25	60
Sulfur dioxide emission	0.00	131	4.3 Resource Utilization	40.06	53
3 Environment Carrying Competitiveness	65.59	87	Utilization rate of water resources	0.79	42
3.1 Agricultural Carrying	69.92	45	Percentage of total internal renewable water resources to total water resources	78.84	43
Cereal yield per unit of arable land	58.11	19	Percentage of agricultural land to total land area	66.44	39
Fertilizer consumption per unit of arable land	60.49	122	Percentage of fossil fuel energy consumption to total energy consumption	14.17	84
Annual freshwater withdrawals for agriculture per unit of arable land	95.10	92			
3.2 Industrial Carrying	92.29	57			
Net exports of goods as a percentage of GDP	83.34	54			
Electric power consumption per unit of value added of industry	90.42	79			
SO_2 emissions per unit of value added of industry	99.68	81			
Annual freshwater withdrawals for industry per value added of industry	95.73	85			
3.3 Energy Consumption	32.22	79			

(continued)

Table 37.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
5 Environment Harmony Competitiveness	60.13	106	CO_2 emissions per capita	85.47	86
5.1 Population and Environment	68.64	76	Energy consumption per capita	86.84	73
Percentage of population with access to Improved sanitation facilities	55.00	93	5.2 Economy and Environment	51.62	110
Motor vehicles per 1,000 people	90.00	49	Land resource utilization efficiency	0.23	43
Renewable internal freshwater resources per capita	2.53	78	Sulfur dioxide emissions per unit of GDP	81.83	109
SO_2 emissions per capita	89.39	96	Carbon dioxide emissions per unit of GDP	53.37	124
			Energy consumption per unit of GDP	71.07	99

Table 37.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	1	1	3	7	2
Ecological Environment Competitiveness	11	1	0	2	1	7
Environment Carrying Competitiveness	15	0	1	3	6	5
Environment Management Competitiveness	10	2	0	5	3	0
Environment Harmony Competitiveness	10	0	0	2	5	3
Total	60	4	2	15	22	17

Chapter 38
Report on Global Environment Competitiveness of Colombia

Score: 54.89
Rank: 20

Colombia is located in northwestern South America, bordered to the northwest by Panama; to the north by the Caribbean Sea; to the east by Venezuela and Brazil; to the south by Ecuador and Peru; and to the west by the Pacific Ocean. It covers 1,109.5 thousand of square kilometers and has a population of 46.93 million. Its GDP reaches $333.37 billion in 2011. Through the index system and evaluation model, the environment competitiveness index of Colombia ranks at 20 in 133 countries.

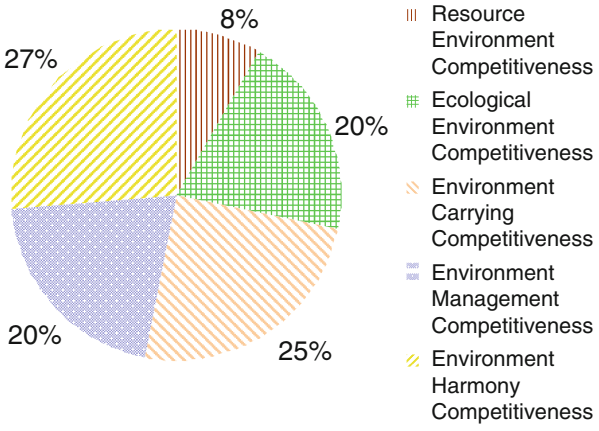

Fig. 38.1 Contribution of sub-index to GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_38,

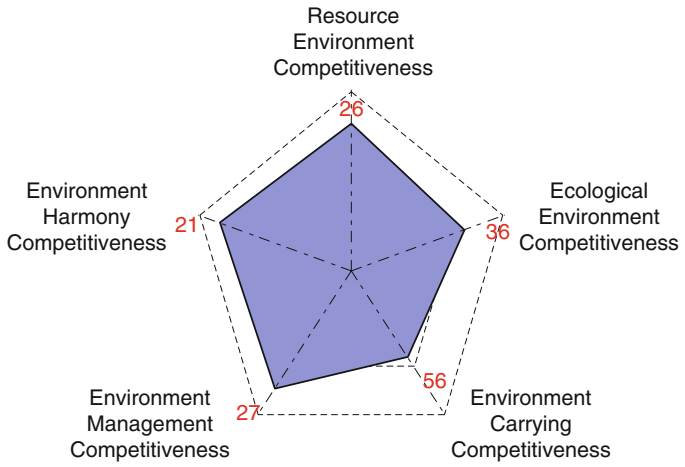

Fig. 38.2 Rank of sub-index of GEC

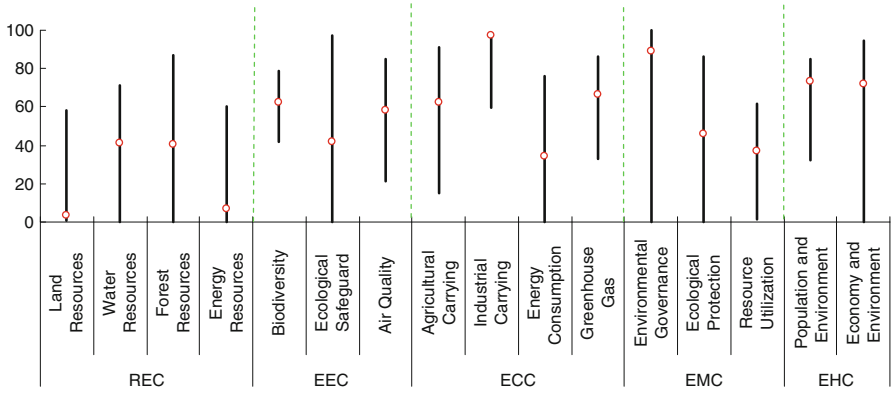

Fig. 38.3 Score and rank of the pillars of GEC

Table 38.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	23.07	26	Groundwater	34.07	19
1.1 Land Resources	3.17	127	Total internal renewable water resources	50.94	17
Land area per capita	4.23	42	1.3 Forest Resources	40.54	24
Percentage of arable land to total land area	2.87	118	Growing stock in forest and other wooded land	58.35	20
Arable land per capita	2.07	121	Proportion of land area covered by forest	51.30	26
1.2 Water Resources	41.23	21	Forest area per capita	8.36	23
Surface water	19.11	7	1.4 Energy Resources	6.54	60
Annual precipitation	60.82	18			

(continued)

Table 38.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
Fossil energy	2.05	25	Energy consumption per unit of land area	99.94	31
Energy production	2.10	34	Ratio of clean energy consumption	10.95	51
Proportion of combustible renewable and waste to total energy consumption	10.57	60	Elasticity of energy consumption	13.89	68
Net energy imports of the energy consumption	20.51	27	Elasticity of electric power consumption	11.69	34
2 Ecological Environment Competitiveness	54.68	36	3.4 Greenhouse Gas	66.17	39
2.1 Biodiversity	62.35	11	Growth rate of CO_2 emissions	58.45	42
Threatened fish species	74.06	108	Growth rate of Methane emissions	52.82	101
Threatened mammal species	70.65	122	CO_2 emissions per unit of land area	99.93	42
Threatened plant species	87.22	121	CO_2 emissions per unit of energy consumption	50.13	46
GEF benefits index for biodiversity	39.90	7	4 Environment Management Competitiveness	56.21	27
2.2 Ecological Safeguard	41.99	23	4.1 Environmental Governance	89.10	64
Terrestrial protected areas	56.52	24	Agricultural chemicals regulation	95.24	19
Marine protected areas	20.19	16	Percentage of the rural population with access to an improved water source	71.00	88
2.3 Air Quality	58.46	64	Percentage of the urban population with access to an improved water source	99.00	50
Inhalable particles (PM10)	86.13	36	4.2 Ecological Protection	46.09	21
Particulate matter (PM2.5)	86.00	63	Area of plantation and afforestation	0.52	54
Index of indoor air pollution	27.60	67	Biome protect	88.80	27
Nitrogen oxides emission	64.44	100	Overfishing of fishing resources	64.15	26
Sulfur dioxide emission	40.59	70	4.3 Resource Utilization	36.81	67
3 Environment Carrying Competitiveness	67.96	56	Utilization rate of water resources	0.02	122
3.1 Agricultural Carrying	62.43	101	Percentage of total internal renewable water resources to total water resources	79.60	40
Cereal yield per unit of arable land	39.34	43	Percentage of agricultural land to total land area	45.06	82
Fertilizer consumption per unit of arable land	59.32	123	Percentage of fossil fuel energy consumption to total energy consumption	22.55	70
Annual freshwater withdrawals for agriculture per unit of arable land	96.34	83			
3.2 Industrial Carrying	97.25	3			
Net exports of goods as a percentage of GDP	89.02	26			
Electric power consumption per unit of value added of industry	99.99	2			
SO_2 emissions per unit of value added of industry	100.00	2			
Annual freshwater withdrawals for industry per value added of industry	100.00	2			
3.3 Energy Consumption	34.12	59			

(continued)

Table 38.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
5 Environment Harmony Competitiveness	72.51	21	CO_2 emissions per capita	94.17	56
5.1 Population and Environment	73.36	48	Energy consumption per capita	93.91	48
Percentage of population with access to Improved sanitation facilities	51.00	98	5.2 Economy and Environment	71.66	21
Motor vehicles per 1,000 people	85.43	61	Land resource utilization efficiency	0.09	71
Renewable internal freshwater resources per capita	21.19	22	Sulfur dioxide emissions per unit of GDP	98.42	23
SO_2 emissions per capita	97.91	42	Carbon dioxide emissions per unit of GDP	94.15	25
			Energy consumption per unit of GDP	93.98	21

Table 38.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	1	7	4	0	2
Ecological Environment Competitiveness	11	0	3	1	4	3
Environment Carrying Competitiveness	15	3	1	7	1	3
Environment Management Competitiveness	10	0	3	2	4	1
Environment Harmony Competitiveness	10	0	4	3	3	0
Total	60	4	18	17	12	9

Chapter 39
Report on Global Environment Competitiveness of Congo, Rep.

Score: 50.92
Rank: 57

Congo is a country located in Central Africa. It is bordered by Gabon, Cameroon, the Central African Republic, the Democratic Republic of the Congo, and the Angolan exclave of Cabaña.It covers 341.5 thousand of square kilometers and has a population of 4.14 million. Its GDP reaches $14.43 billion in 2011. Through the index system and evaluation model, the environment competitiveness index of Congo, Rep. ranks at 57 in 133 countries.

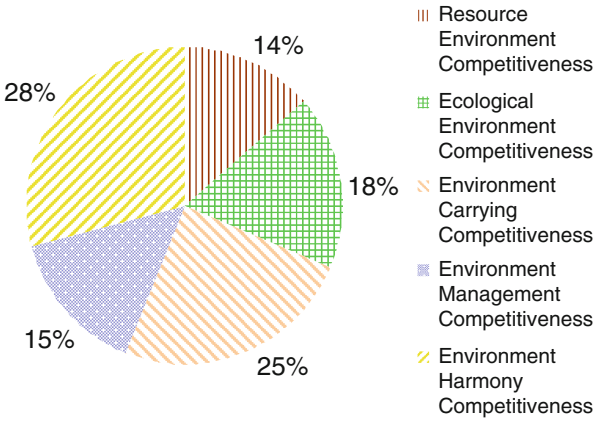

Fig. 39.1 Contribution of sub-index to GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_39,

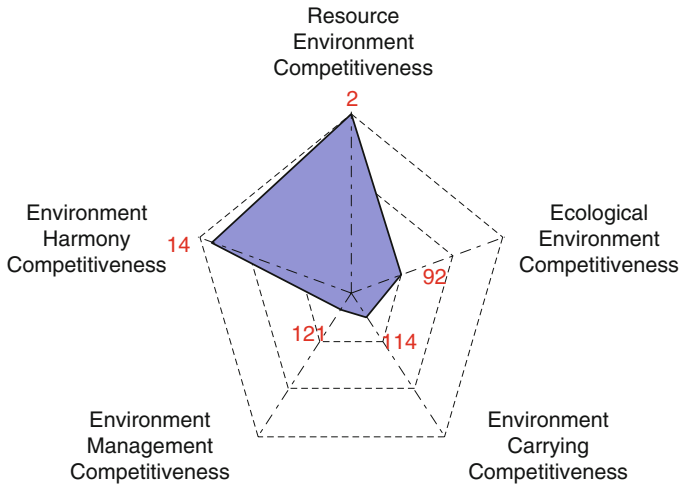

Fig. 39.2 Rank of sub-index of GEC

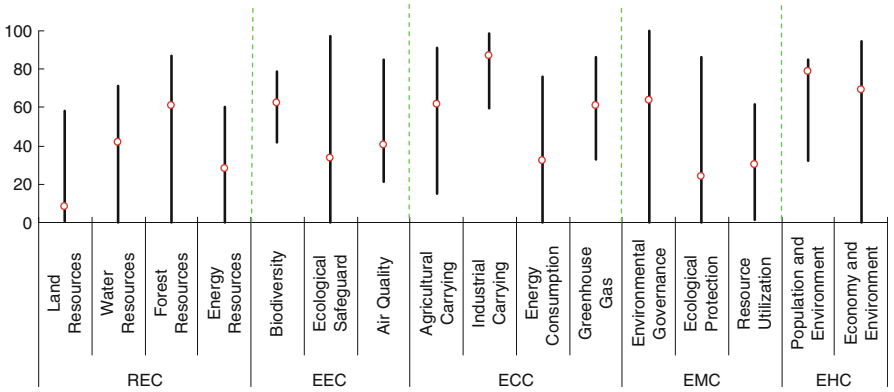

Fig. 39.3 Score and rank of the pillars of GEC

Table 39.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	34.79	2	Groundwater	51.44	9
1.1 Land Resources	8.33	95	Total internal renewable water resources	32.79	36
Land area per capita	14.85	14	1.3 Forest Resources	61.17	5
Percentage of arable land to total land area	2.31	121	Growing stock in forest and other wooded land	63.75	10
Arable land per capita	5.65	89	Proportion of land area covered by forest	76.82	6
1.2 Water Resources	41.60	20	Forest area per capita	37.73	7
Surface water	26.30	5	1.4 Energy Resources	28.03	5

(continued)

Table 39.1 (continued)

Indicators	Score	Rank
Fossil energy	1.45	29
Energy production	4.33	21
Proportion of combustible renewable and waste to total energy consumption	55.40	22
Net energy imports of the energy consumption	100.00	1
2 Ecological Environment Competitiveness	44.81	92
2.1 Biodiversity	61.99	12
Threatened fish species	78.30	102
Threatened mammal species	94.02	64
Threatened plant species	97.84	92
GEF benefits index for biodiversity	19.90	19
2.2 Ecological Safeguard	33.51	35
Terrestrial protected areas	26.90	70
Marine protected areas	43.43	5
2.3 Air Quality	40.40	125
Inhalable particles (PM10)	58.39	106
Particulate matter (PM2.5)	58.02	125
Index of indoor air pollution	2.50	115
Nitrogen oxides emission	68.25	51
Sulfur dioxide emission	40.83	46
3 Environment Carrying Competitiveness	63.30	114
3.1 Agricultural Carrying	61.84	105
Cereal yield per unit of arable land	4.66	124
Fertilizer consumption per unit of arable land	99.92	5
Annual freshwater withdrawals for agriculture per unit of arable land	99.99	3
3.2 Industrial Carrying	87.12	101
Net exports of goods as a percentage of GDP	48.73	128
Electric power consumption per unit of value added of industry	100.00	1
SO_2 emissions per unit of value added of industry	99.84	62
Annual freshwater withdrawals for industry per value added of industry	99.90	9
3.3 Energy Consumption	32.32	75
Energy consumption per unit of land area	99.99	4
Ratio of clean energy consumption	3.45	77
Elasticity of energy consumption	13.98	60
Elasticity of electric power consumption	11.86	33
3.4 Greenhouse Gas	60.74	75
Growth rate of CO_2 emissions	39.19	112
Growth rate of Methane emissions	53.28	98
CO_2 emissions per unit of land area	100.00	8
CO_2 emissions per unit of energy consumption	72.02	21
4 Environment Management Competitiveness	37.76	121
4.1 Environmental Governance	63.50	115
Agricultural chemicals regulation	N/A	N/A
Percentage of the rural population with access to an improved water source	32.00	120
Percentage of the urban population with access to an improved water source	95.00	93
4.2 Ecological Protection	24.15	95
Area of plantation and afforestation	0.08	92
Biome protect	55.40	68
Overfishing of fishing resources	25.00	93
4.3 Resource Utilization	30.16	97
Utilization rate of water resources	0.02	123
Percentage of total internal renewable water resources to total water resources	23.27	112
Percentage of agricultural land to total land area	36.55	96
Percentage of fossil fuel energy consumption to total energy consumption	60.79	23

(continued)

Table 39.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
5 Environment Harmony Competitiveness	73.95	14	CO_2 emissions per capita	99.00	23
5.1 Population and Environment	78.85	22	Energy consumption per capita	98.25	11
Percentage of population with access to Improved sanitation facilities	30.00	114	5.2 Economy and Environment	69.05	36
Motor vehicles per 1,000 people	97.04	26	Land resource utilization efficiency	0.01	115
Renewable internal freshwater resources per capita	64.89	6	Sulfur dioxide emissions per unit of GDP	85.08	104
SO_2 emissions per capita	94.16	78	Carbon dioxide emissions per unit of GDP	97.12	6
			Energy consumption per unit of GDP	93.98	22

Table 39.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	6	6	0	1	1
Ecological Environment Competitiveness	11	0	1	2	3	5
Environment Carrying Competitiveness	15	4	0	1	5	5
Environment Management Competitiveness	10	0	0	0	5	4
Environment Harmony Competitiveness	10	2	3	1	1	3
Total	60	12	10	4	15	18

Chapter 40
Report on Global Environment Competitiveness of Costa Rica

Costa Rica is a country in Central America, bordered by Nicaragua to the north, Panama to the southeast, the Pacific Ocean to the west, and the Caribbean Sea to the east. It covers 51.1 thousand of square kilometers and has a population of 4.73 million. Its GDP reaches $40.87 billion in 2011. Through the index system and evaluation model, the environment competitiveness index of Costa Rica ranks at 7 in 133 countries.

Score: 57.20
Rank: 7

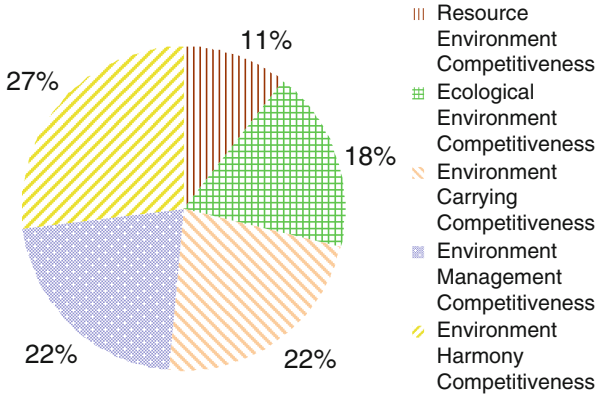

Fig. 40.1 Contribution of sub-index to GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_40,

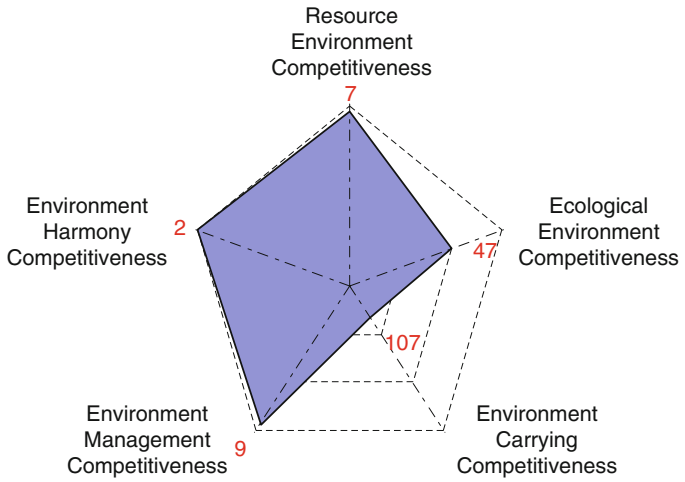

Fig. 40.2 Rank of sub-index of GEC

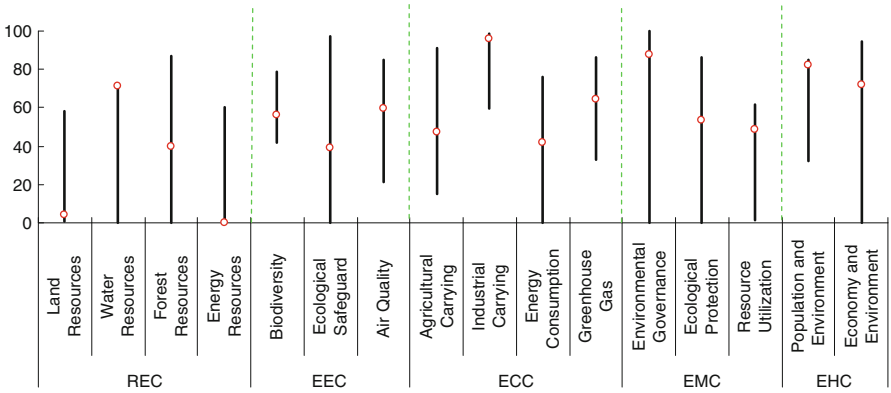

Fig. 40.3 Score and rank of the pillars of GEC

Table 40.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	30.08	7	Groundwater	100.00	1
1.1 Land Resources	3.84	125	Total internal renewable water resources	100.00	1
Land area per capita	1.92	80	1.3 Forest Resources	39.52	27
Percentage of arable land to total land area	7.86	104	Growing stock in forest and other wooded land	50.80	76
Arable land per capita	2.39	117	Proportion of land area covered by forest	57.87	18
1.2 Water Resources	71.34	1	Forest area per capita	3.78	47
Surface water	15.83	16	1.4 Energy Resources	0.00	125
Annual precipitation	69.55	11			

(continued)

Table 40.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
Fossil energy	0.00	64	Energy consumption per unit of land area	99.81	61
Energy production	0.51	82	Ratio of clean energy consumption	42.71	13
Proportion of combustible renewable and waste to total energy consumption	18.26	45	Elasticity of energy consumption	14.05	52
Net energy imports of the energy consumption	6.48	84	Elasticity of electric power consumption	11.06	47
2 Ecological Environment Competitiveness	52.46	47	3.4 Greenhouse Gas	64.19	47
2.1 Biodiversity	56.46	93	Growth rate of CO_2 emissions	51.06	71
Threatened fish species	76.42	105	Growth rate of Methane emissions	54.12	92
Threatened mammal species	95.11	48	CO_2 emissions per unit of land area	99.86	58
Threatened plant species	93.17	108	CO_2 emissions per unit of energy consumption	63.59	30
GEF benefits index for biodiversity	8.80	30	4 Environment Management Competitiveness	62.37	9
2.2 Ecological Safeguard	38.78	24	4.1 Environmental Governance	87.78	72
Terrestrial protected areas	55.16	25	Agricultural chemicals regulation	76.19	61
Marine protected areas	14.21	20	Percentage of the rural population with access to an improved water source	91.00	58
2.3 Air Quality	59.73	62	Percentage of the urban population with access to an improved water source	100.00	1
Inhalable particles (PM10)	80.29	57	4.2 Ecological Protection	53.36	12
Particulate matter (PM2.5)	94.70	14	Area of plantation and afforestation	0.31	64
Index of indoor air pollution	27.60	66	Biome protect	91.90	21
Nitrogen oxides emission	68.72	28	Overfishing of fishing resources	85.56	4
Sulfur dioxide emission	40.95	16	4.3 Resource Utilization	48.97	15
3 Environment Carrying Competitiveness	64.13	107	Utilization rate of water resources	0.08	93
3.1 Agricultural Carrying	47.02	128	Percentage of total internal renewable water resources to total water resources	100.00	1
Cereal yield per unit of arable land	37.16	48	Percentage of agricultural land to total land area	41.35	85
Fertilizer consumption per unit of arable land	16.43	127	Percentage of fossil fuel energy consumption to total energy consumption	54.44	28
Annual freshwater withdrawals for agriculture per unit of arable land	90.76	108			
3.2 Industrial Carrying	96.03	8			
Net exports of goods as a percentage of GDP	84.19	49			
Electric power consumption per unit of value added of industry	99.95	3			
SO_2 emissions per unit of value added of industry	99.99	6			
Annual freshwater withdrawals for industry per value added of industry	99.98	4			
3.3 Energy Consumption	41.91	20			

(continued)

Table 40.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
5 Environment Harmony Competitiveness	76.97	2	CO_2 emissions per capita	96.27	43
5.1 Population and Environment	82.06	8	Energy consumption per capita	92.72	51
Percentage of population with access to Improved sanitation facilities	95.00	46	5.2 Economy and Environment	71.88	18
Motor vehicles per 1,000 people	79.75	77	Land resource utilization efficiency	0.23	42
Renewable internal freshwater resources per capita	26.75	15	Sulfur dioxide emissions per unit of GDP	98.42	22
SO_2 emissions per capita	98.31	31	Carbon dioxide emissions per unit of GDP	95.40	10
			Energy consumption per unit of GDP	93.48	25

Table 40.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	2	4	1	4	3
Ecological Environment Competitiveness	11	0	4	2	3	2
Environment Carrying Competitiveness	15	3	2	5	3	2
Environment Management Competitiveness	10	1	3	1	5	0
Environment Harmony Competitiveness	10	2	3	4	1	0
Total	60	8	16	13	16	7

Chapter 41
Report on Global Environment Competitiveness of Cote d'Ivoire

Cote d'Ivoire is a country in West Africa. It borders the countries Liberia, Guinea, Mali, Burkina Faso and Ghana; its southern boundary is along the Gulf of Guinea. It covers 318.0 thousand of square kilometers and has a population of 20.15 million. Its GDP reaches $24.07 billion in 2011. Through the index system and evaluation model, the environment competitiveness index of Cote d'Ivoire ranks at 102 in 133 countries.

Score: 46.51
Rank: 102

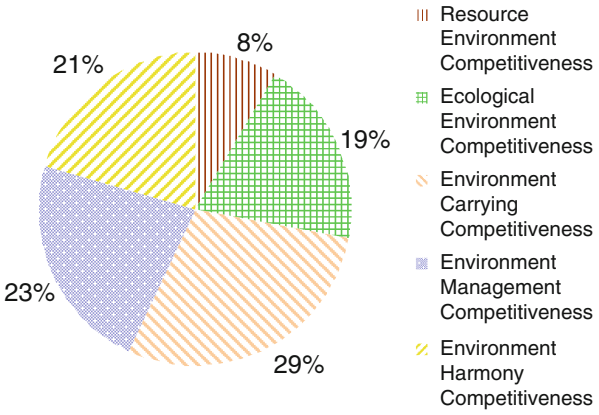

Fig. 41.1 Contribution of sub-index to GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_41,

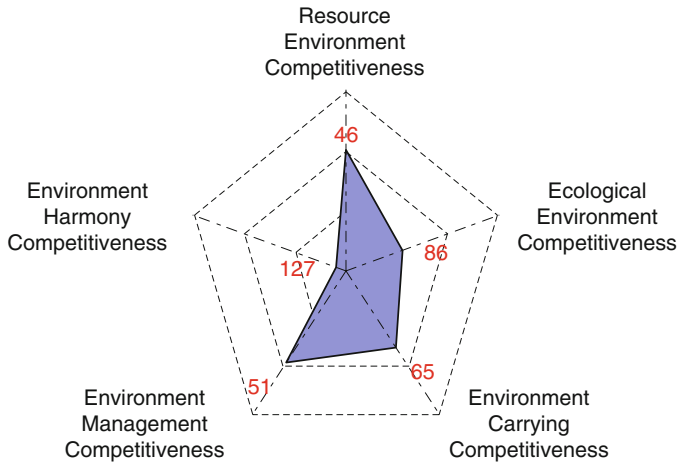

Fig. 41.2 Rank of sub-index of GEC

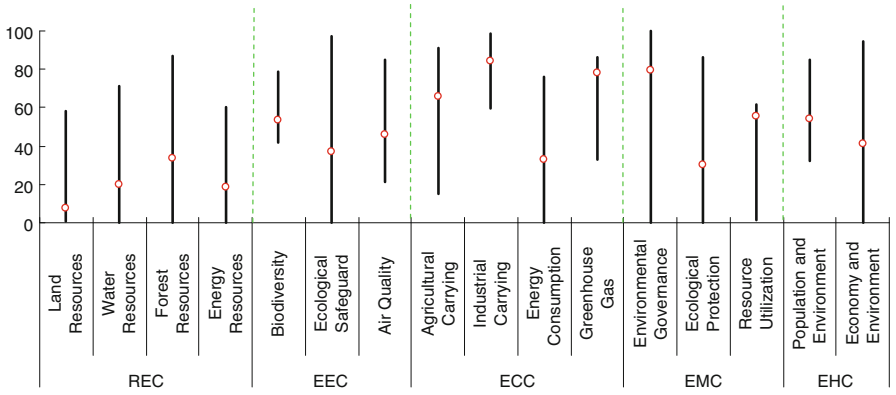

Fig. 41.3 Score and rank of the pillars of GEC

Table 41.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	19.73	46	Groundwater	17.11	46
1.1 Land Resources	7.75	103	Total internal renewable water resources	12.19	73
Land area per capita	2.82	55	1.3 Forest Resources	33.80	49
Percentage of arable land to total land area	15.34	84	Growing stock in forest and other wooded land	57.98	22
Arable land per capita	6.73	77	Proportion of land area covered by forest	38.31	53
1.2 Water Resources	19.58	53	Forest area per capita	3.60	51
Surface water	2.66	80	1.4 Energy Resources	18.49	20
Annual precipitation	46.35	40			

(continued)

Table 41.1 (continued)

Indicators	Score	Rank
Fossil energy	0.00	64
Energy production	0.53	79
Proportion of combustible renewable and waste to total energy consumption	81.12	9
Net energy imports of the energy consumption	13.86	41
2 Ecological Environment Competitiveness	45.29	86
2.1 Biodiversity	53.38	118
threatened fish species	78.77	100
threatened mammal species	87.50	102
threatened plant species	93.82	106
GEF benefits index for biodiversity	3.40	58
2.2 Ecological Safeguard	36.68	28
Terrestrial protected areas	61.14	20
Marine protected areas	0.00	90
2.3 Air Quality	45.67	110
Inhalable particles (PM10)	78.10	69
Particulate matter (PM2.5)	76.05	96
Index of indoor air pollution	2.20	117
Nitrogen oxides emission	67.44	78
Sulfur dioxide emission	27.11	127
3 Environment Carrying Competitiveness	67.11	65
3.1 Agricultural Carrying	65.59	76
Cereal yield per unit of arable land	15.17	96
Fertilizer consumption per unit of arable land	98.72	35
Annual freshwater withdrawals for agriculture per unit of arable land	99.69	38
3.2 Industrial Carrying	84.15	114
Net exports of goods as a percentage of GDP	70.96	96
Electric power consumption per unit of value added of industry	94.82	38
SO_2 emissions per unit of value added of industry	76.41	130
Annual freshwater withdrawals for industry per value added of industry	94.41	94
3.3 Energy Consumption	32.75	71
Energy consumption per unit of land area	99.94	32
Ratio of clean energy consumption	3.00	80
Elasticity of energy consumption	16.74	10
Elasticity of electric power consumption	11.31	42
3.4 Greenhouse Gas	78.18	6
Growth rate of CO_2 emissions	78.92	4
Growth rate of Methane emissions	46.78	122
CO_2 emissions per unit of land area	99.98	23
CO_2 emissions per unit of energy consumption	86.29	10
4 Environment Management Competitiveness	52.57	51
4.1 Environmental Governance	79.50	87
Agricultural chemicals regulation	N/A	N/A
Percentage of the rural population with access to an improved water source	68.00	92
Percentage of the urban population with access to an improved water source	91.00	106
4.2 Ecological Protection	30.00	80
Area of plantation and afforestation	N/A	N/A
Biome protect	100.00	1
Overfishing of fishing resources	N/A	N/A
4.3 Resource Utilization	55.74	6
Utilization rate of water resources	0.07	97
Percentage of total internal renewable water resources to total water resources	66.16	62
Percentage of agricultural land to total land area	75.46	22
Percentage of fossil fuel energy consumption to total energy consumption	81.29	11

(continued)

Table 41.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
5 Environment Harmony Competitiveness	47.85	127	CO_2 emissions per capita	99.25	19
5.1 Population and Environment	54.33	124	Energy consumption per capita	97.29	22
Percentage of population with access to Improved sanitation facilities	23.00	119	5.2 Economy and Environment	41.37	121
Motor vehicles per 1,000 people	97.78	20	Land resource utilization efficiency	0.02	102
Renewable internal freshwater resources per capita	4.61	56	Sulfur dioxide emissions per unit of GDP	3.23	130
SO_2 emissions per capita	0.00	131	Carbon dioxide emissions per unit of GDP	91.99	40
			Energy consumption per unit of GDP	70.26	102

Table 41.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	1	2	6	4	1
Ecological Environment Competitiveness	11	0	2	0	4	5
Environment Carrying Competitiveness	15	3	1	3	5	3
Environment Management Competitiveness	10	2	1	0	5	0
Environment Harmony Competitiveness	10	0	2	2	0	6
Total	60	6	8	11	18	15

Chapter 42
Report on Global Environment Competitiveness of Croatia

Score: 51.38
Rank: 53

Croatia is a unitary democratic parliamentary republic in Europe at the crossroads of Central Europe, the Balkans, and the Mediterranean. Most of Croatia has a moderately warm and rainy continental climate as defined by the Köppen climate classification. It covers 56.0 thousand of square kilometers and has a population of 4.40 million. Its GDP reaches $62.49 billion in 2011. Through the index system and evaluation model, the environment competitiveness index of Croatia ranks at 53 in 133 countries.

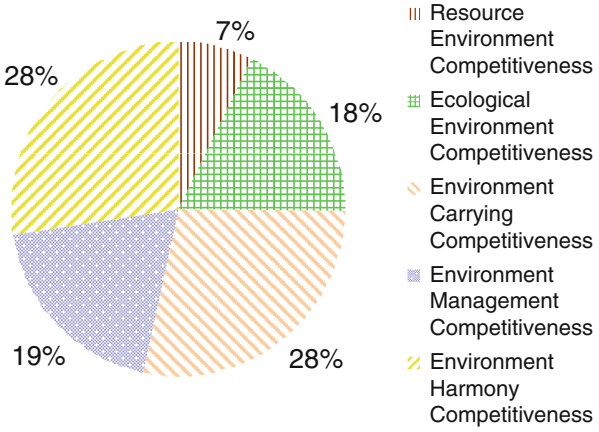

Fig. 42.1 Contribution of sub-index to GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_42,

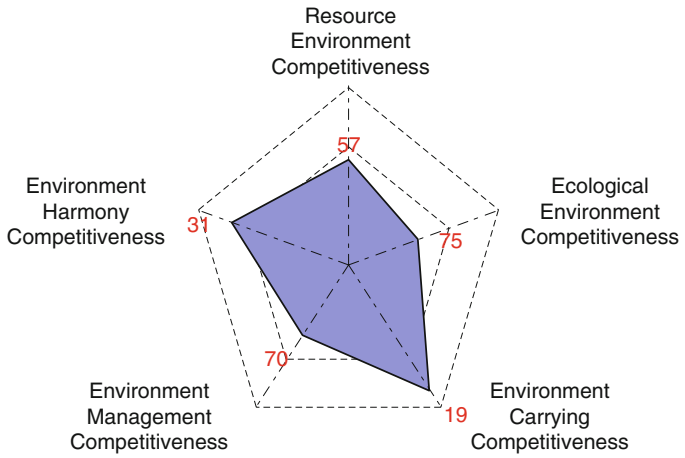

Fig. 42.2 Rank of sub-index of GEC

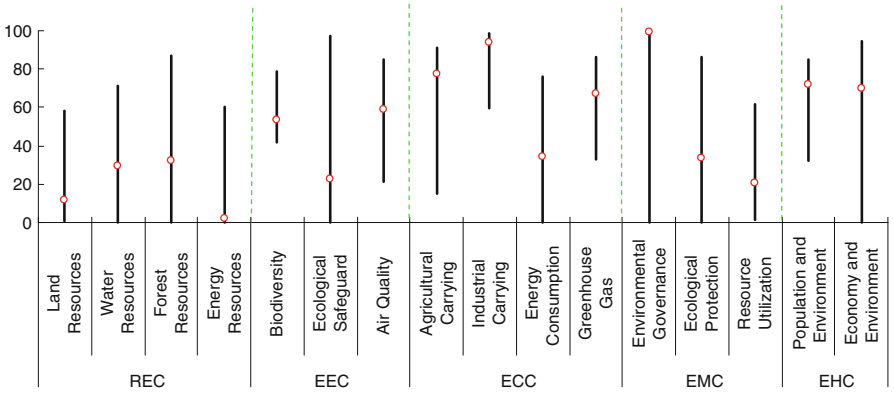

Fig. 42.3 Score and rank of the pillars of GEC

Table 42.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	18.44	57	Groundwater	28.28	28
1.1 Land Resources	11.89	73	Total internal renewable water resources	33.98	33
Land area per capita	2.27	70	1.3 Forest Resources	32.39	55
Percentage of arable land to total land area	27.08	53	Growing stock in forest and other wooded land	51.24	69
Arable land per capita	9.53	66	Proportion of land area covered by forest	40.26	47
1.2 Water Resources	29.69	35	Forest area per capita	3.05	55
Surface water	18.32	11	1.4 Energy Resources	2.27	104
Annual precipitation	38.16	54			

(continued)

Table 42.1 (continued)

Indicators	Score	Rank
Fossil energy	0.00	64
Energy production	0.96	62
Proportion of combustible renewable and waste to total energy consumption	5.01	84
Net energy imports of the energy consumption	6.19	87
2 Ecological Environment Competitiveness	46.64	75
2.1 Biodiversity	53.76	115
Threatened fish species	71.70	111
Threatened mammal species	96.20	37
Threatened plant species	99.71	47
GEF benefits index for biodiversity	0.60	95
2.2 Ecological Safeguard	22.79	63
Terrestrial protected areas	35.05	56
Marine protected areas	4.38	44
2.3 Air Quality	59.19	63
Inhalable particles (PM10)	83.94	47
Particulate matter (PM2.5)	84.82	67
Index of indoor air pollution	30.20	65
Nitrogen oxides emission	68.40	42
Sulfur dioxide emission	40.80	50
3 Environment Carrying Competitiveness	71.66	19
3.1 Agricultural Carrying	77.09	17
Cereal yield per unit of arable land	57.72	20
Fertilizer consumption per unit of arable land	80.03	113
Annual freshwater withdrawals for agriculture per unit of arable land	99.99	6
3.2 Industrial Carrying	94.02	31
Net exports of goods as a percentage of GDP	86.49	37
Electric power consumption per unit of value added of industry	90.48	77
SO_2 emissions per unit of value added of industry	99.85	57
Annual freshwater withdrawals for industry per value added of industry	99.25	29
3.3 Energy Consumption	34.55	52
Energy consumption per unit of land area	99.68	84
Ratio of clean energy consumption	11.59	48
Elasticity of energy consumption	13.77	77
Elasticity of electric power consumption	13.17	24
3.4 Greenhouse Gas	67.07	34
Growth rate of CO_2 emissions	69.83	16
Growth rate of Methane emissions	55.78	86
CO_2 emissions per unit of land area	99.62	88
CO_2 emissions per unit of energy consumption	40.28	70
4 Environment Management Competitiveness	49.27	70
4.1 Environmental Governance	99.10	20
Agricultural chemicals regulation	100.00	1
Percentage of the rural population with access to an improved water source	97.00	43
Percentage of the urban population with access to an improved water source	100.00	1
4.2 Ecological Protection	33.28	68
Area of plantation and afforestation	0.09	87
Biome protect	70.80	54
Overfishing of fishing resources	40.00	73
4.3 Resource Utilization	20.78	125
Utilization rate of water resources	0.02	121
Percentage of total internal renewable water resources to total water resources	35.57	105
Percentage of agricultural land to total land area	27.46	109
Percentage of fossil fuel energy consumption to total energy consumption	20.08	76

(continued)

Table 42.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
5 Environment Harmony Competitiveness	70.90	31	CO_2 emissions per capita	88.44	79
5.1 Population and Environment	72.10	57	Energy consumption per capita	85.86	75
Percentage of population with access to Improved sanitation facilities	99.00	31	5.2 Economy and Environment	69.71	29
Motor vehicles per 1,000 people	52.84	101	Land resource utilization efficiency	0.32	35
Renewable internal freshwater resources per capita	10.36	37	Sulfur dioxide emissions per unit of GDP	96.42	51
SO_2 emissions per capita	93.53	82	Carbon dioxide emissions per unit of GDP	89.80	55
			Energy consumption per unit of GDP	92.28	30

Table 42.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	0	2	5	6	1
Ecological Environment Competitiveness	11	0	0	5	4	2
Environment Carrying Competitiveness	15	0	3	6	5	1
Environment Management Competitiveness	10	1	1	2	2	4
Environment Harmony Competitiveness	10	0	1	6	2	1
Total	60	1	7	24	19	9

Chapter 43
Report on Global Environment Competitiveness of Cuba

Score: 51.57
Rank: 49

Cuba is an island country in the Caribbean. The nation of Cuba consists of the main island of Cuba, the Isla de la Juventud, and several archipelagos. With most of the island south of the Tropic of Cancer, the local climate is tropical, moderated by northeasterly trade winds that blow year-round. It covers 106.4 thousand of square kilometers and has a population of 11.25 million. Its GDP reaches $68.71 billion in 2011. Through the index system and evaluation model, the environment competitiveness index of Cuba ranks at 49 in 133 countries.

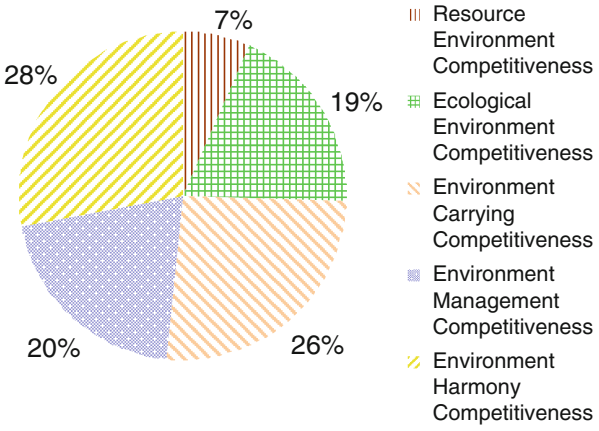

Fig. 43.1 Contribution of sub-index to GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_43,

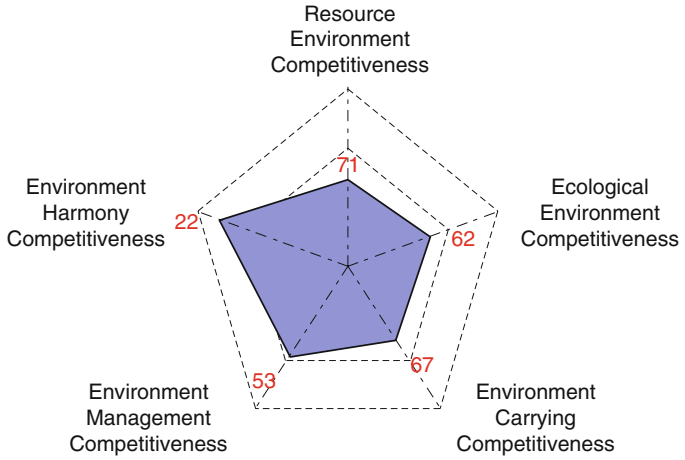

Fig. 43.2 Rank of sub-index of GEC

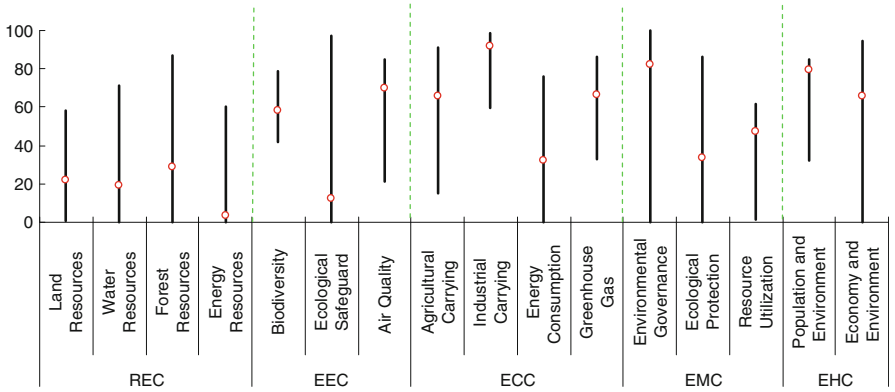

Fig. 43.3 Score and rank of the pillars of GEC

Table 43.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	16.95	71	Groundwater	8.73	71
1.1 Land Resources	22.07	27	Total internal renewable water resources	18.06	56
Land area per capita	1.68	87	1.3 Forest Resources	28.56	71
Percentage of arable land to total land area	56.55	18	Growing stock in forest and other wooded land	50.78	78
Arable land per capita	14.77	31	Proportion of land area covered by forest	31.96	66
1.2 Water Resources	19.18	54	Forest area per capita	1.80	65
Surface water	3.21	71	1.4 Energy Resources	3.55	86
Annual precipitation	46.73	39			

(continued)

Table 43.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
Fossil energy	0.00	64	Energy consumption per unit of land area	99.78	65
Energy production	0.47	87	Ratio of clean energy consumption	0.20	109
Proportion of combustible renewable and waste to total energy consumption	12.42	57	Elasticity of energy consumption	16.03	13
Net energy imports of the energy consumption	6.02	92	Elasticity of electric power consumption	13.19	23
2 Ecological Environment Competitiveness	49.13	62	3.4 Greenhouse Gas	66.48	38
2.1 Biodiversity	58.46	50	Growth rate of CO_2 emissions	72.75	13
Threatened fish species	83.96	79	Growth rate of Methane emissions	61.50	42
Threatened mammal species	92.39	81	CO_2 emissions per unit of land area	99.69	79
Threatened plant species	90.96	113	CO_2 emissions per unit of energy consumption	25.68	109
GEF benefits index for biodiversity	12.50	24	4 Environment Management Competitiveness	52.23	53
2.2 Ecological Safeguard	12.56	90	4.1 Environmental Governance	82.17	84
Terrestrial protected areas	17.12	87	Agricultural chemicals regulation	66.67	65
Marine protected areas	5.71	36	Percentage of the rural population with access to an improved water source	89.00	65
2.3 Air Quality	69.57	46	Percentage of the urban population with access to an improved water source	96.00	89
Inhalable particles (PM10)	89.05	16	4.2 Ecological Protection	33.70	66
Particulate matter (PM2.5)	94.02	18	Area of plantation and afforestation	0.63	50
Index of indoor air pollution	55.90	52	Biome protect	37.20	88
Nitrogen oxides emission	67.65	72	Overfishing of fishing resources	74.29	12
Sulfur dioxide emission	40.28	85	4.3 Resource Utilization	47.01	23
3 Environment Carrying Competitiveness	67.02	67	Utilization rate of water resources	0.80	41
3.1 Agricultural Carrying	66.01	72	Percentage of total internal renewable water resources to total water resources	100.00	3
Cereal yield per unit of arable land	17.70	91	Percentage of agricultural land to total land area	73.90	27
Fertilizer consumption per unit of arable land	98.86	32	Percentage of fossil fuel energy consumption to total energy consumption	13.32	87
Annual freshwater withdrawals for agriculture per unit of arable land	97.58	76			
3.2 Industrial Carrying	91.55	68			
Net exports of goods as a percentage of GDP	87.40	32			
Electric power consumption per unit of value added of industry	88.57	89			
SO_2 emissions per unit of value added of industry	99.27	112			
Annual freshwater withdrawals for industry per value added of industry	90.94	114			
3.3 Energy Consumption	32.30	77			

(continued)

Table 43.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
5 Environment Harmony Competitiveness	72.51	22	CO_2 emissions per capita	92.88	61
5.1 Population and Environment	79.50	18	Energy consumption per capita	93.41	50
Percentage of population with access to Improved sanitation facilities	91.00	58	5.2 Economy and Environment	65.51	64
Motor vehicles per 1,000 people	95.56	34	Land resource utilization efficiency	0.19	49
Renewable internal freshwater resources per capita	4.10	61	Sulfur dioxide emissions per unit of GDP	87.89	95
SO_2 emissions per capita	90.86	92	Carbon dioxide emissions per unit of GDP	83.88	79
			Energy consumption per unit of GDP	90.10	42

Table 43.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	0	2	3	9	0
Ecological Environment Competitiveness	11	0	2	3	5	1
Environment Carrying Competitiveness	15	0	2	4	7	2
Environment Management Competitiveness	10	1	2	2	5	0
Environment Harmony Competitiveness	10	0	1	3	6	0
Total	60	1	9	15	32	3

Chapter 44
Report on Global Environment Competitiveness of Cyprus

Cyprus is an island country in the Eastern Mediterranean Sea, east of Greece, south of Turkey, west of Syria, Lebanon, northwest of Israel and north of Egypt. Cyprus has a subtropical climate – Mediterranean and Semi-arid type. It covers 9.2 thousand of square kilometers and has a population of 1.12 million. Its GDP reaches $24.69 billion in 2011. Through the index system and evaluation model, the environment competitiveness index of Cyprus ranks at 72 in 133 countries.

Score: 49.38
Rank: 72

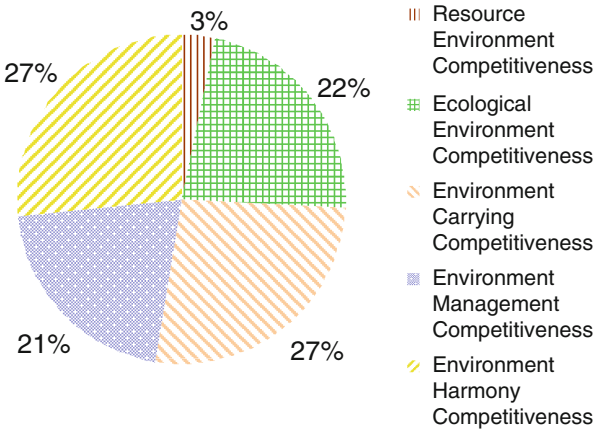

Fig. 44.1 Contribution of sub-index to GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_44,

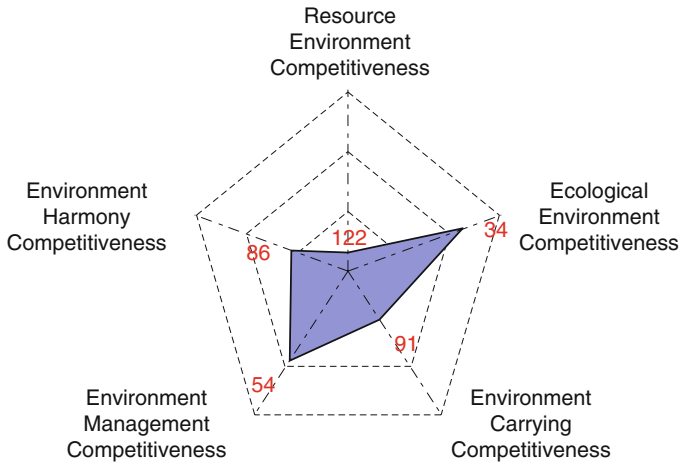

Fig. 44.2 Rank of sub-index of GEC

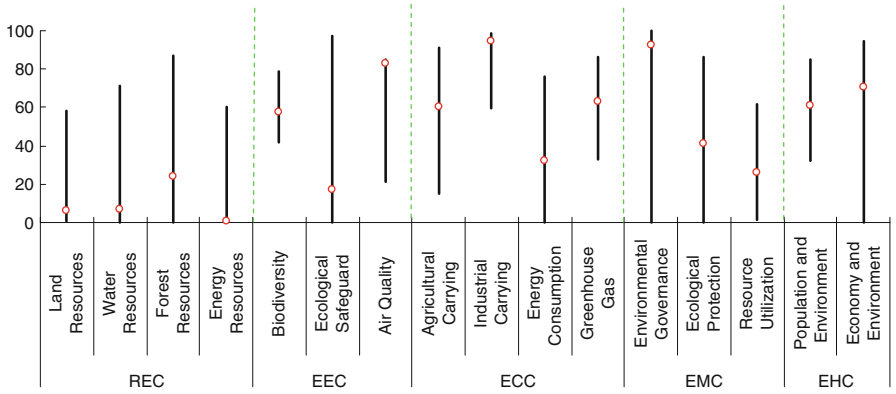

Fig. 44.3 Score and rank of the pillars of GEC

Table 44.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	8.32	122	Groundwater	6.35	79
1.1 Land Resources	6.21	115	Total internal renewable water resources	4.26	99
Land area per capita	1.47	99	1.3 Forest Resources	24.12	85
Percentage of arable land to total land area	15.25	86	Growing stock in forest and other wooded land	50.03	108
Arable land per capita	3.51	109	Proportion of land area covered by forest	21.96	80
1.2 Water Resources	7.04	101	Forest area per capita	1.08	86
Surface water	0.65	106	1.4 Energy Resources	0.47	121
Annual precipitation	16.90	101			

(continued)

Table 44.1 (continued)

Indicators	Score	Rank
Fossil energy	0.00	64
Energy production	0.08	121
Proportion of combustible renewable and waste to total energy consumption	1.98	99
Net energy imports of the energy consumption	0.32	123
2 Ecological Environment Competitiveness	55.48	34
2.1 Biodiversity	57.68	73
Threatened fish species	91.04	47
Threatened mammal species	97.28	22
Threatened plant species	99.07	74
GEF benefits index for biodiversity	0.50	99
2.2 Ecological Safeguard	17.22	77
Terrestrial protected areas	28.26	68
Marine protected areas	0.66	77
2.3 Air Quality	82.54	12
Inhalable particles (PM10)	80.29	58
Particulate matter (PM2.5)	100.00	1
Index of indoor air pollution	100.00	1
Nitrogen oxides emission	68.95	7
Sulfur dioxide emission	40.90	35
3 Environment Carrying Competitiveness	65.52	91
3.1 Agricultural Carrying	60.24	118
Cereal yield per unit of arable land	13.79	103
Fertilizer consumption per unit of arable land	85.29	99
Annual freshwater withdrawals for agriculture per unit of arable land	97.11	81
3.2 Industrial Carrying	94.72	22
Net exports of goods as a percentage of GDP	95.11	4
Electric power consumption per unit of value added of industry	84.44	106
SO_2 emissions per unit of value added of industry	99.60	92
Annual freshwater withdrawals for industry per value added of industry	99.73	12
3.3 Energy Consumption	32.20	80
Energy consumption per unit of land area	99.44	102
Ratio of clean energy consumption	4.22	71
Elasticity of energy consumption	11.99	118
Elasticity of electric power consumption	13.15	25
3.4 Greenhouse Gas	62.99	58
Growth rate of CO_2 emissions	68.50	21
Growth rate of Methane emissions	59.48	65
CO_2 emissions per unit of land area	99.13	112
CO_2 emissions per unit of energy consumption	19.34	116
4 Environment Management Competitiveness	52.02	54
4.1 Environmental Governance	92.38	54
Agricultural chemicals regulation	80.95	53
Percentage of the rural population with access to an improved water source	100.00	1
Percentage of the urban population with access to an improved water source	100.00	1
4.2 Ecological Protection	41.40	38
Area of plantation and afforestation	0.04	100
Biome protect	100.00	1
Overfishing of fishing resources	37.95	78
4.3 Resource Utilization	25.80	116
Utilization rate of water resources	0.78	44
Percentage of total internal renewable water resources to total water resources	80.41	37
Percentage of agricultural land to total land area	15.99	119
Percentage of fossil fuel energy consumption to total energy consumption	6.04	107

(continued)

Table 44.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
5 Environment Harmony Competitiveness	65.57	86	CO_2 emissions per capita	75.71	112
5.1 Population and Environment	60.79	117	Energy consumption per capita	83.62	80
Percentage of population with access to Improved sanitation facilities	100.00	1	5.2 Economy and Environment	70.36	27
Motor vehicles per 1,000 people	18.89	128	Land resource utilization efficiency	0.78	23
Renewable internal freshwater resources per capita	0.85	108	Sulfur dioxide emissions per unit of GDP	95.21	62
SO_2 emissions per capita	86.59	104	Carbon dioxide emissions per unit of GDP	90.11	51
			Energy consumption per unit of GDP	95.32	17

Table 44.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	0	0	0	7	7
Ecological Environment Competitiveness	11	3	2	2	4	0
Environment Carrying Competitiveness	15	1	2	1	5	6
Environment Management Competitiveness	10	2	0	5	1	2
Environment Harmony Competitiveness	10	1	2	1	1	5
Total	60	7	6	9	18	20

Chapter 45
Report on Global Environment Competitiveness of Czech Republic

Score: 51.68
Rank: 47

Czech is a landlocked country in Central Europe. The country is bordered by Poland to the north, Germany to the west, Austria to the south and Slovakia to the east. The Czech Republic has a temperate continental climate, with relatively hot summers and cold, cloudy and snowy winters. It covers 77.3 thousand of square kilometers and has a population of 10.50 million. Its GDP reaches $217.03 billion in 2011. Through the index system and evaluation model, the environment competitiveness index of Czech Republic ranks at 47 in 133 countries.

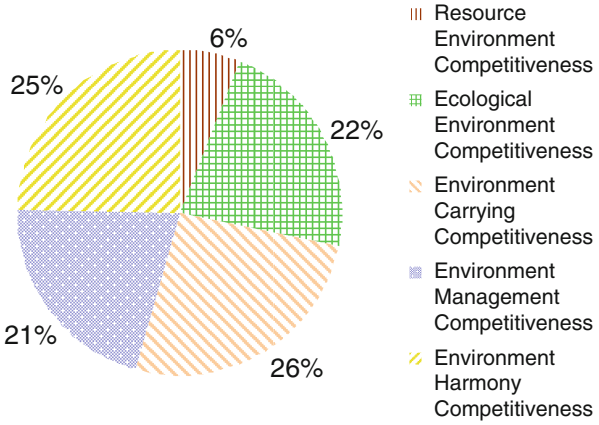

Fig. 45.1 Contribution of sub-index to GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_45,

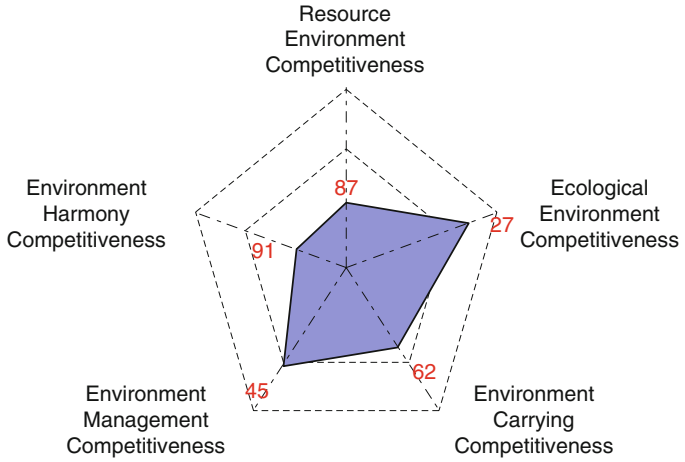

Fig. 45.2 Rank of sub-index of GEC

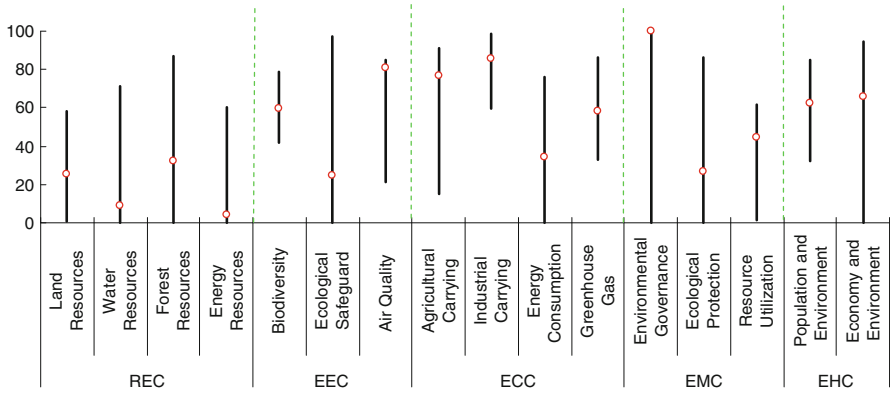

Fig. 45.3 Score and rank of the pillars of GEC

Table 45.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	15.57	87	Groundwater	2.63	98
1.1 Land Resources	25.60	16	Total internal renewable water resources	8.59	85
Land area per capita	1.30	103	1.3 Forest Resources	32.36	56
Percentage of arable land to total land area	69.50	8	Growing stock in forest and other wooded land	52.33	47
Arable land per capita	14.11	34	Proportion of land area covered by forest	40.32	46
1.2 Water Resources	9.12	96	Forest area per capita	1.77	66
Surface water	1.84	95	1.4 Energy Resources	4.14	79
Annual precipitation	23.43	76			

(continued)

Table 45.1 (continued)

Indicators	Score	Rank
Fossil energy	1.43	30
Energy production	3.04	32
Proportion of combustible renewable and waste to total energy consumption	6.44	72
Net energy imports of the energy consumption	9.05	68
2 Ecological Environment Competitiveness	57.61	27
2.1 Biodiversity	59.54	22
threatened fish species	99.06	6
threatened mammal species	98.91	6
threatened plant species	99.53	56
GEF benefits index for biodiversity	0.10	122
2.2 Ecological Safeguard	24.46	59
Terrestrial protected areas	40.76	44
Marine protected areas	N/A	N/A
2.3 Air Quality	81.03	19
Inhalable particles (PM10)	88.32	23
Particulate matter (PM2.5)	86.26	61
Index of indoor air pollution	100.00	1
Nitrogen oxides emission	67.11	83
Sulfur dioxide emission	40.33	83
3 Environment Carrying Competitiveness	67.19	62
3.1 Agricultural Carrying	76.51	21
Cereal yield per unit of arable land	48.75	31
Fertilizer consumption per unit of arable land	90.03	85
Annual freshwater withdrawals for agriculture per unit of arable land	99.99	4
3.2 Industrial Carrying	85.95	106
Net exports of goods as a percentage of GDP	52.57	123
Electric power consumption per unit of value added of industry	92.89	55
SO_2 emissions per unit of value added of industry	99.91	38
Annual freshwater withdrawals for industry per value added of industry	98.43	53
3.3 Energy Consumption	34.22	58
Energy consumption per unit of land area	98.78	111
Ratio of clean energy consumption	29.91	23
Elasticity of energy consumption	8.19	125
Elasticity of electric power consumption	0.00	124
3.4 Greenhouse Gas	58.07	98
Growth rate of CO_2 emissions	51.67	67
Growth rate of Methane emissions	58.95	68
CO_2 emissions per unit of land area	98.35	118
CO_2 emissions per unit of energy consumption	29.71	102
4 Environment Management Competitiveness	54.00	45
4.1 Environmental Governance	100.00	1
Agricultural chemicals regulation	100.00	1
Percentage of the rural population with access to an improved water source	100.00	1
Percentage of the urban population with access to an improved water source	100.00	1
4.2 Ecological Protection	26.60	90
Area of plantation and afforestation	3.42	18
Biome protect	84.10	38
Overfishing of fishing resources	N/A	N/A
4.3 Resource Utilization	44.55	31
Utilization rate of water resources	0.60	53
Percentage of total internal renewable water resources to total water resources	90.19	14
Percentage of agricultural land to total land area	64.86	42
Percentage of fossil fuel energy consumption to total energy consumption	22.55	71

(continued)

Table 45.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
5 Environment Harmony Competitiveness	64.01	91	CO_2 emissions per capita	70.58	116
5.1 Population and Environment	62.33	113	Energy consumption per capita	67.99	107
Percentage of population with access to Improved sanitation facilities	98.00	33	5.2 Economy and Environment	65.69	62
Motor vehicles per 1,000 people	40.37	106	Land resource utilization efficiency	0.82	22
Renewable internal freshwater resources per capita	1.52	92	Sulfur dioxide emissions per unit of GDP	96.45	48
SO_2 emissions per capita	90.96	91	Carbon dioxide emissions per unit of GDP	79.50	94
			Energy consumption per unit of GDP	86.00	61

Table 45.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	1	2	4	6	1
Ecological Environment Competitiveness	11	3	3	3	2	0
Environment Carrying Competitiveness	15	0	2	4	4	5
Environment Management Competitiveness	10	3	2	4	1	0
Environment Harmony Competitiveness	10	0	1	2	4	3
Total	60	7	10	17	17	9

Chapter 46
Report on Global Environment Competitiveness of Denmark

Denmark located southwest of Sweden, with which it is connected by a bridge-tunnel, and south of Norway, and bordered to the south by Germany; Denmark is a constitutional monarchy. It covers 42.4 thousand of square kilometers and has a population of 5.57 million. Its GDP reaches $333.62 billion in 2011. Through the index system and evaluation model, the environment competitiveness index of Denmark ranks at 30 in 133 countries.

Score: 53.14
Rank: 30

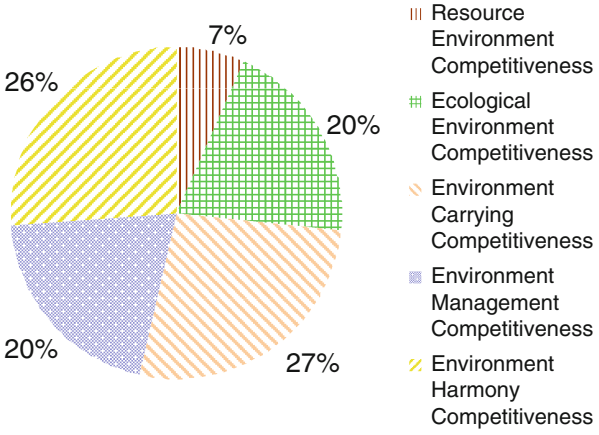

Fig. 46.1 Contribution of sub-index to GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_46,

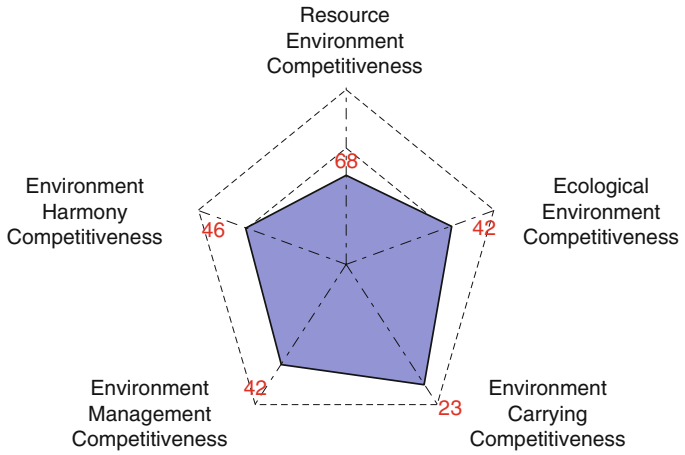

Fig. 46.2 Rank of sub-index of GEC

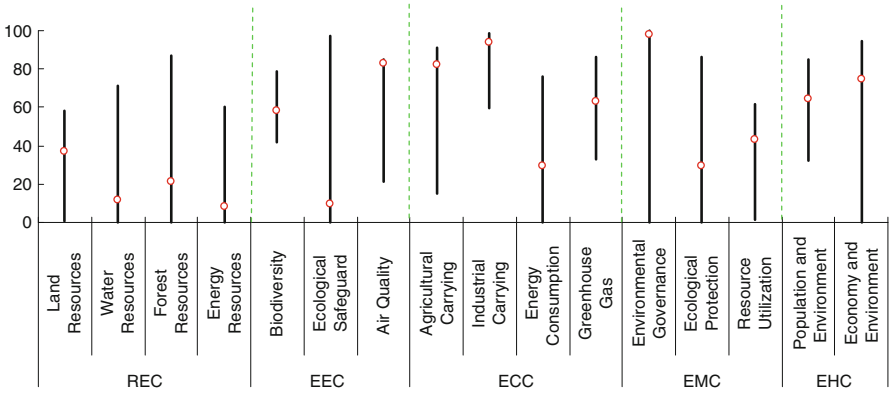

Fig. 46.3 Score and rank of the pillars of GEC

Table 46.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	17.51	68	Groundwater	14.56	50
1.1 Land Resources	36.84	5	Total internal renewable water resources	7.13	86
Land area per capita	1.35	101	1.3 Forest Resources	21.33	90
Percentage of arable land to total land area	100.00	1	Growing stock in forest and other wooded land	50.33	91
Arable land per capita	21.00	18	Proportion of land area covered by forest	15.07	87
1.2 Water Resources	11.71	80	Forest area per capita	0.68	97
Surface water	0.94	100	1.4 Energy Resources	7.89	50

(continued)

Table 46.1 (continued)

Indicators	Score	Rank
Fossil energy	0.35	44
Energy production	4.25	23
Proportion of combustible renewable and waste to total energy consumption	19.94	42
Net energy imports of the energy consumption	15.40	35
2 Ecological Environment Competitiveness	53.43	42
2.1 Biodiversity	58.44	51
Threatened fish species	92.92	44
Threatened mammal species	98.91	6
Threatened plant species	99.94	22
GEF benefits index for biodiversity	0.20	109
2.2 Ecological Safeguard	9.47	100
Terrestrial protected areas	13.04	100
Marine protected areas	4.12	47
2.3 Air Quality	82.63	11
Inhalable particles (PM10)	89.05	16
Particulate matter (PM2.5)	92.66	24
Index of indoor air pollution	100.00	1
Nitrogen oxides emission	67.67	71
Sulfur dioxide emission	40.93	20
3 Environment Carrying Competitiveness	71.32	23
3.1 Agricultural Carrying	82.37	7
Cereal yield per unit of arable land	62.28	15
Fertilizer consumption per unit of arable land	91.65	79
Annual freshwater withdrawals for agriculture per unit of arable land	99.86	25
3.2 Industrial Carrying	93.59	40
Net exports of goods as a percentage of GDP	78.50	81
Electric power consumption per unit of value added of industry	95.94	26
SO_2 emissions per unit of value added of industry	99.99	10
Annual freshwater withdrawals for industry per value added of industry	99.94	7
3.3 Energy Consumption	29.70	123
Energy consumption per unit of land area	99.03	109
Ratio of clean energy consumption	5.55	67
Elasticity of energy consumption	8.38	124
Elasticity of electric power consumption	5.83	118
3.4 Greenhouse Gas	62.96	59
Growth rate of CO_2 emissions	59.45	38
Growth rate of Methane emissions	62.98	34
CO_2 emissions per unit of land area	98.77	116
CO_2 emissions per unit of energy consumption	34.14	91
4 Environment Management Competitiveness	54.20	42
4.1 Environmental Governance	98.10	24
Agricultural chemicals regulation	95.24	20
Percentage of the rural population with access to an improved water source	100.00	1
Percentage of the urban population with access to an improved water source	100.00	1
4.2 Ecological Protection	29.56	83
Area of plantation and afforestation	0.53	53
Biome protect	30.10	95
Overfishing of fishing resources	67.74	21
4.3 Resource Utilization	43.16	36
Utilization rate of water resources	0.43	60
Percentage of total internal renewable water resources to total water resources	75.00	49
Percentage of agricultural land to total land area	73.38	29
Percentage of fossil fuel energy consumption to total energy consumption	23.85	69

(continued)

Table 46.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
5 Environment Harmony Competitiveness	69.24	46	CO_2 emissions per capita	77.11	108
5.1 Population and Environment	64.06	104	Energy consumption per capita	73.70	99
Percentage of population with access to Improved sanitation facilities	100.00	1	5.2 Economy and Environment	74.42	4
Motor vehicles per 1,000 people	32.47	115	Land resource utilization efficiency	2.30	13
Renewable internal freshwater resources per capita	1.30	101	Sulfur dioxide emissions per unit of GDP	99.86	4
SO_2 emissions per capita	98.31	33	Carbon dioxide emissions per unit of GDP	96.65	8
			Energy consumption per unit of GDP	98.88	2

Table 46.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1-10	Rank 11-30	Rank 31-60	Rank 61-100	Rank 101-133
Resource Environment Competitiveness	14	2	1	4	6	1
Ecological Environment Competitiveness	11	2	4	2	3	0
Environment Carrying Competitiveness	15	2	2	4	3	4
Environment Management Competitiveness	10	1	3	4	2	0
Environment Harmony Competitiveness	10	4	1	1	0	4
Total	60	11	11	15	14	9

Chapter 47
Report on Global Environment Competitiveness of Dominican Republic

Score: 50.59
Rank: 60

Dominicans is a nation on the island of Hispaniola, part of the Greater Antilles archipelago in the Caribbean region. The climate of the Dominican Republic is mostly tropical. It covers 48.3 thousand of square kilometers and has a population of 10.06 million. Its GDP reaches $55.61 billion in 2011. Through the index system and evaluation model, the environment competitiveness index of Dominican Republic ranks at 60 in 133 countries.

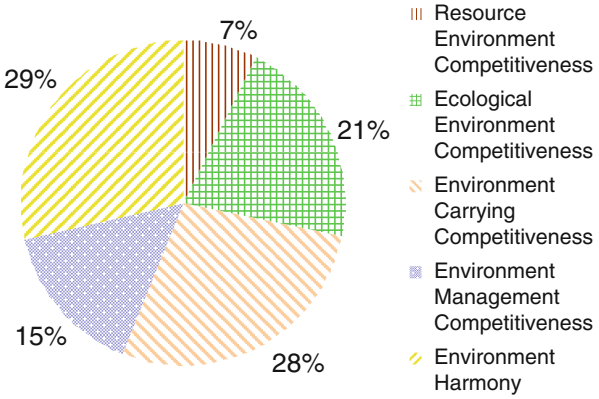

Fig. 47.1 Contribution of sub-index to GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_47,

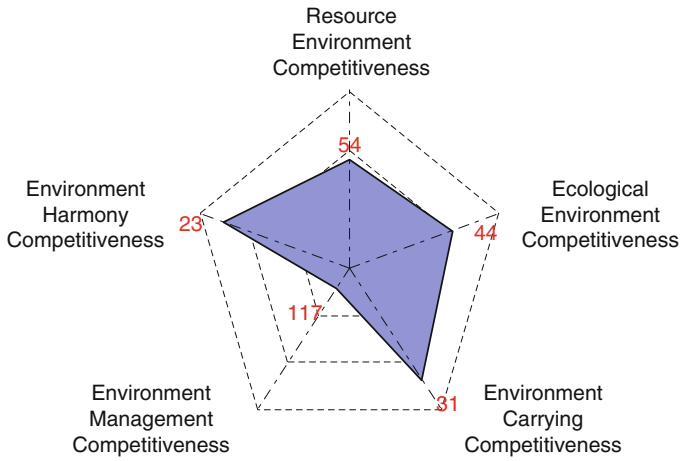

Fig. 47.2 Rank of sub-index of GEC

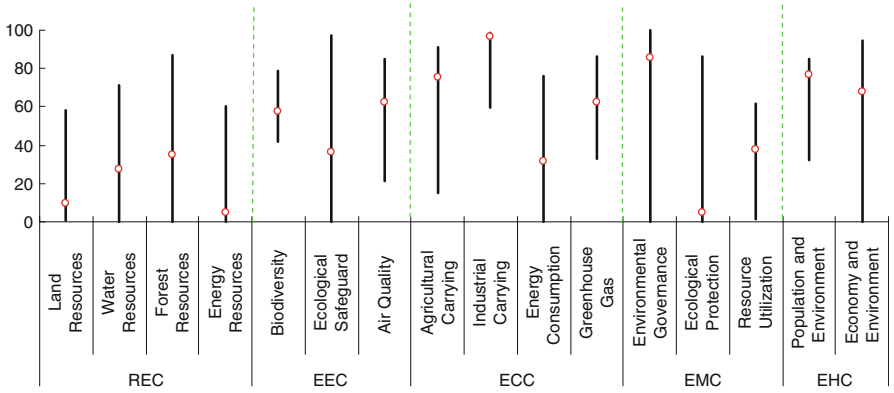

Fig. 47.3 Score and rank of the pillars of GEC

Table 47.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	18.64	54	Surface water	4.69	58
1.1 Land Resources	9.85	85	Annual precipitation	48.15	38
Land area per capita	0.84	113	Groundwater	34.85	18
Percentage of arable land to total land area	27.98	48	Total internal renewable water resources	21.92	49
Arable land per capita	3.72	105	1.3 Forest Resources	34.64	45
1.2 Water Resources	27.40	37	Growing stock in forest and other wooded land	50.37	89

(continued)

Table 47.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
Proportion of land area covered by forest	47.80	33	SO_2 emissions per unit of value added of industry	99.78	71
Forest area per capita	1.37	74	Annual freshwater withdrawals for industry per value added of industry	99.56	16
1.4 Energy Resources	5.08	69	3.3 Energy Consumption	31.43	96
Fossil energy	0.00	64	Energy consumption per unit of land area	99.64	87
Energy production	0.20	114	Ratio of clean energy consumption	2.65	87
Proportion of combustible renewable and waste to total energy consumption	22.92	40	Elasticity of energy consumption	13.82	75
Net energy imports of the energy consumption	2.83	109	Elasticity of electric power consumption	9.59	102
2 Ecological Environment Competitiveness	52.86	44	3.4 Greenhouse Gas	62.09	62
2.1 Biodiversity	57.41	78	Growth rate of CO_2 emissions	54.61	51
Threatened fish species	90.09	58	Growth rate of Methane emissions	61.23	44
Threatened mammal species	96.74	30	CO_2 emissions per unit of land area	99.57	90
Threatened plant species	98.42	84	CO_2 emissions per unit of energy consumption	40.41	68
GEF benefits index for biodiversity	0.90	84	4 Environment Management Competitiveness	38.95	117
2.2 Ecological Safeguard	36.03	30	4.1 Environmental Governance	85.50	76
Terrestrial protected areas	60.05	22	Agricultural chemicals regulation	N/A	N/A
Marine protected areas	0.00	90	Percentage of the rural population with access to an improved water source	84.00	75
2.3 Air Quality	62.07	57	Percentage of the urban population with access to an improved water source	87.00	114
Inhalable particles (PM10)	85.40	39	4.2 Ecological Protection	5.00	129
Particulate matter (PM2.5)	93.27	20	Area of plantation and afforestation	N/A	N/A
Index of indoor air pollution	33.20	60	Biome protect	0.00	133
Nitrogen oxides emission	68.53	37	Overfishing of fishing resources	16.67	98
Sulfur dioxide emission	40.63	68	4.3 Resource Utilization	37.66	64
3 Environment Carrying Competitiveness	70.29	31	Utilization rate of water resources	0.67	48
3.1 Agricultural Carrying	75.49	25			
Cereal yield per unit of arable land	43.59	35			
Fertilizer consumption per unit of arable land	97.80	42			
Annual freshwater withdrawals for agriculture per unit of arable land	95.73	89			
3.2 Industrial Carrying	96.48	5			
Net exports of goods as a percentage of GDP	93.07	11			
Electric power consumption per unit of value added of industry	93.50	48			

(continued)

Table 47.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
Percentage of total internal renewable water resources to total water resources	64.22	66	Renewable internal freshwater resources per capita	2.53	79
Percentage of agricultural land to total land area	60.35	49	SO_2 emissions per capita	94.73	75
Percentage of fossil fuel energy consumption to total energy consumption	25.40	65	CO_2 emissions per capita	95.04	52
5 Environment Harmony Competitiveness	72.22	23	Energy consumption per capita	94.48	45
5.1 Population and Environment	76.51	33	5.2 Economy and Environment	67.92	45
Percentage of population with access to Improved sanitation facilities	83.00	73	Land resource utilization efficiency	0.33	34
Motor vehicles per 1,000 people	84.44	65	Sulfur dioxide emissions per unit of GDP	92.34	75
			Carbon dioxide emissions per unit of GDP	88.20	64
			Energy consumption per unit of GDP	90.82	39

Table 47.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	0	1	7	4	2
Ecological Environment Competitiveness	11	0	4	5	2	0
Environment Carrying Competitiveness	15	1	2	5	7	0
Environment Management Competitiveness	10	0	0	2	4	2
Environment Harmony Competitiveness	10	0	0	4	6	0
Total	60	1	7	23	23	4

Chapter 48
Report on Global Environment Competitiveness of Ecuador

Ecuador a representative democratic republic in South America, bordered by Colombia on the north, Peru on the east and south, and by the Pacific Ocean to the west. It is one of only two countries in South America, along with Chile, that do not have a border with Brazil. It covers 248.4 thousand of square kilometers and has a population of 14.67 million. Its GDP reaches $65.95 billion in 2011. Through the index system and evaluation model, the environment competitiveness index of Ecuador ranks at 11 in 133 countries.

Score: 55.89
Rank: 11

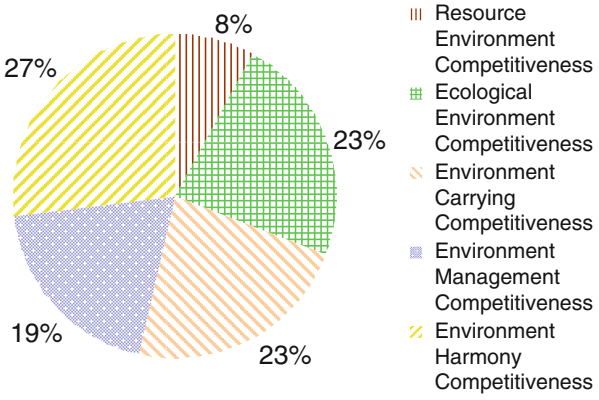

Fig. 48.1 Contribution of sub-index to GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_48,

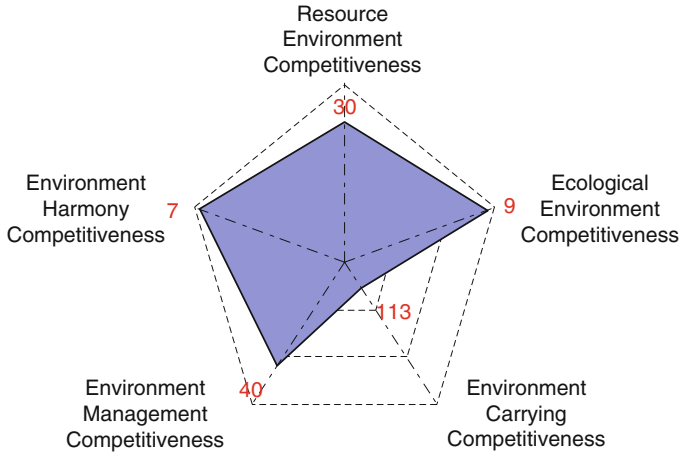

Fig. 48.2 Rank of sub-index of GEC

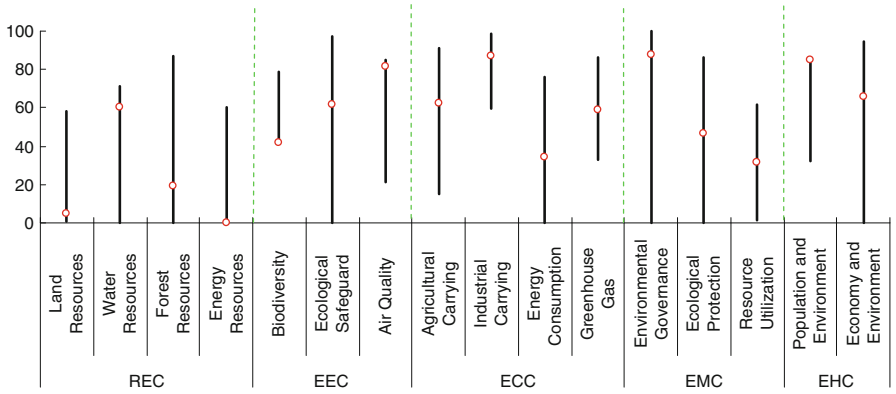

Fig. 48.3 Score and rank of the pillars of GEC

Table 48.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	22.78	30	Groundwater	70.61	5
1.1 Land Resources	4.49	123	Total internal renewable water resources	81.02	4
Land area per capita	2.82	54	1.3 Forest Resources	19.09	104
Percentage of arable land to total land area	7.60	106	Growing stock in forest and other wooded land	N/A	N/A
Arable land per capita	3.61	106	Proportion of land area covered by forest	44.30	39
1.2 Water Resources	60.20	9	Forest area per capita	4.56	38
Surface water	18.59	9	1.4 Energy Resources	0.00	125
Annual precipitation	70.57	9			

(continued)

Table 48.1 (continued)

Indicators	Score	Rank
Fossil energy	1.20	31
Energy production	1.83	38
Proportion of combustible renewable and waste to total energy consumption	5.72	75
Net energy imports of the energy consumption	27.74	20
2 Ecological Environment Competitiveness	63.60	9
2.1 Biodiversity	41.79	133
Threatened fish species	75.00	106
Threatened mammal species	75.54	120
Threatened plant species	0.00	133
GEF benefits index for biodiversity	29.20	13
2.2 Ecological Safeguard	61.79	11
Terrestrial protected areas	67.39	14
Marine protected areas	53.39	1
2.3 Air Quality	81.32	17
Inhalable particles (PM10)	86.13	36
Particulate matter (PM2.5)	88.91	39
Index of indoor air pollution	100.00	1
Nitrogen oxides emission	68.03	58
Sulfur dioxide emission	40.71	61
3 Environment Carrying Competitiveness	63.37	113
3.1 Agricultural Carrying	62.13	102
Cereal yield per unit of arable land	30.88	62
Fertilizer consumption per unit of arable land	84.67	100
Annual freshwater withdrawals for agriculture per unit of arable land	81.24	120
3.2 Industrial Carrying	86.90	103
Net exports of goods as a percentage of GDP	78.52	79
Electric power consumption per unit of value added of industry	81.80	109
SO_2 emissions per unit of value added of industry	91.30	129
Annual freshwater withdrawals for industry per value added of industry	95.97	82
3.3 Energy Consumption	34.37	55
Energy consumption per unit of land area	99.90	44
Ratio of clean energy consumption	11.59	47
Elasticity of energy consumption	13.60	89
Elasticity of electric power consumption	12.38	29
3.4 Greenhouse Gas	58.94	90
Growth rate of CO_2 emissions	53.77	56
Growth rate of Methane emissions	54.12	91
CO_2 emissions per unit of land area	99.86	57
CO_2 emissions per unit of energy consumption	32.18	96
4 Environment Management Competitiveness	54.41	40
4.1 Environmental Governance	87.88	70
Agricultural chemicals regulation	80.95	52
Percentage of the rural population with access to an improved water source	89.00	64
Percentage of the urban population with access to an improved water source	96.00	88
4.2 Ecological Protection	46.65	20
Area of plantation and afforestation	0.19	75
Biome protect	91.10	22
Overfishing of fishing resources	64.15	26
4.3 Resource Utilization	31.27	88
Utilization rate of water resources	0.13	85
Percentage of total internal renewable water resources to total water resources	76.18	46
Percentage of agricultural land to total land area	35.46	97
Percentage of fossil fuel energy consumption to total energy consumption	13.32	86

(continued)

Table 48.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
5 Environment Harmony Competitiveness	75.31	7	CO_2 emissions per capita	94.17	56
5.1 Population and Environment	84.78	1	Energy consumption per capita	94.48	44
Percentage of population with access to Improved sanitation facilities	92.00	56	5.2 Economy and Environment	65.83	60
Motor vehicles per 1,000 people	92.47	42	Land resource utilization efficiency	0.07	82
Renewable internal freshwater resources per capita	33.34	12	Sulfur dioxide emissions per unit of GDP	94.81	65
SO_2 emissions per capita	97.25	50	Carbon dioxide emissions per unit of GDP	81.42	88
			Energy consumption per unit of GDP	87.04	56

Table 48.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	4	0	4	1	4
Ecological Environment Competitiveness	11	1	3	3	0	4
Environment Carrying Competitiveness	15	0	0	5	6	4
Environment Management Competitiveness	10	0	2	2	6	0
Environment Harmony Competitiveness	10	1	1	5	3	0
Total	60	6	6	19	16	12

Chapter 49
Report on Global Environment Competitiveness of Egypt

Score: 46.11
Rank: 107

Egypt is a country situated mainly within North Africa, with its Sinai Peninsula forming a land bridge in Southwest Asia, making it a transcontinental state. It is bordered by the Mediterranean Sea to the north, the Gaza Strip and Israel to the northeast, the Red Sea to the east, Sudan to the south and Libya to the west. It covers 995.5 thousand of square kilometers and has a population of 82.54 million. Its GDP reaches $229.53 billion in 2011.Through the index system and evaluation model, the environment competitiveness index of Egypt ranks at 107 in 133 countries.

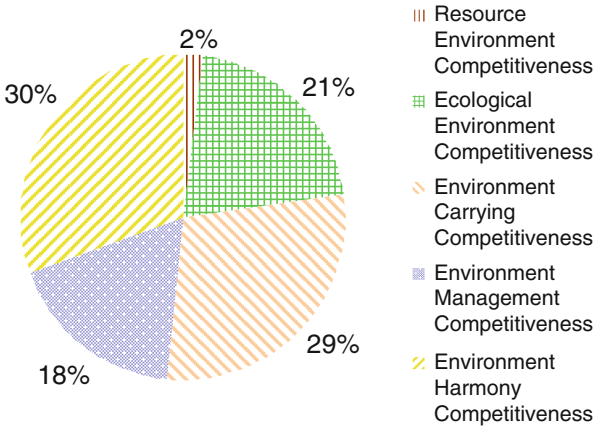

Fig. 49.1 Contribution of sub-index to GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_49,

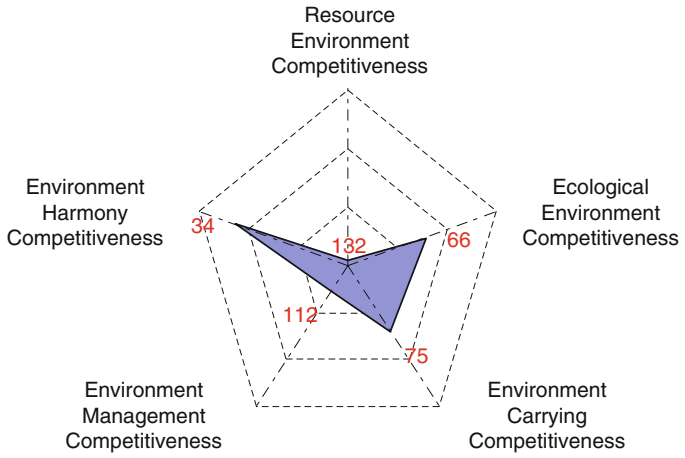

Fig. 49.2 Rank of sub-index of GEC

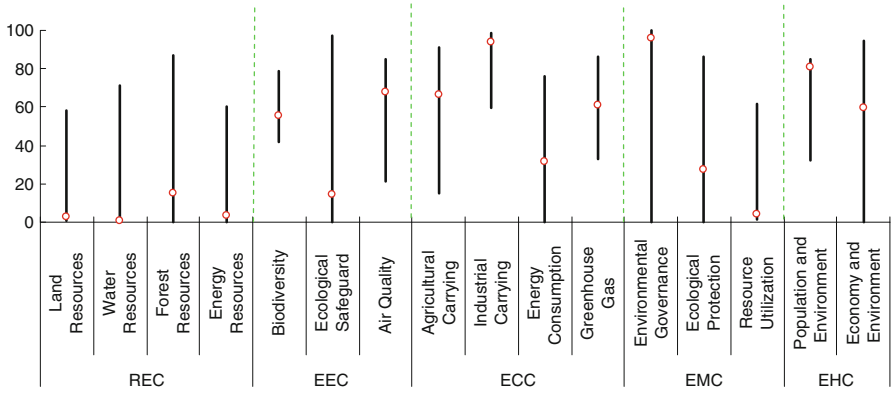

Fig. 49.3 Score and rank of the pillars of GEC

Table 49.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	4.73	132	Groundwater	0.15	122
1.1 Land Resources	2.77	128	Total internal renewable water resources	0.09	128
Land area per capita	2.15	75	1.3 Forest Resources	15.04	124
Percentage of arable land to total land area	4.73	113	Growing stock in forest and other wooded land	50.02	109
Arable land per capita	1.62	124	Proportion of land area covered by forest	0.08	129
1.2 Water Resources	0.72	130	Forest area per capita	0.01	129
Surface water	0.92	101	1.4 Energy Resources	3.19	95
Annual precipitation	1.74	130			

(continued)

Table 49.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
Fossil energy	0.14	55	Annual freshwater withdrawals for industry per value added of industry	94.68	93
Energy production	1.10	59			
Proportion of combustible renewable and waste to total energy consumption	2.29	97	3.3 Energy Consumption	31.83	89
			Energy consumption per unit of land area	99.85	52
Net energy imports of the energy consumption	15.33	36	Ratio of clean energy consumption	2.85	84
2 Ecological Environment Competitiveness	48.07	66	Elasticity of energy consumption	13.97	61
2.1 Biodiversity	55.61	104	Elasticity of electric power consumption	10.65	70
Threatened fish species	81.60	90			
Threatened mammal species	90.76	96	3.4 Greenhouse Gas	61.30	68
			Growth rate of CO_2 emissions	54.24	53
Threatened plant species	99.88	30	Growth rate of Methane emissions	63.56	30
GEF benefits index for biodiversity	2.90	64			
2.2 Ecological Safeguard	14.34	87	CO_2 emissions per unit of land area	99.80	66
Terrestrial protected areas	15.76	91			
Marine protected areas	12.22	26	CO_2 emissions per unit of energy consumption	34.66	89
2.3 Air Quality	67.72	49			
Inhalable particles (PM10)	43.07	121	4 Environment Management Competitiveness	41.02	112
Particulate matter (PM2.5)	67.32	114			
Index of Indoor air pollution	100.00	1	4.1 Environmental Governance	95.89	38
Nitrogen oxides emission	64.95	99	Agricultural chemicals regulation	90.48	37
Sulfur dioxide emission	39.34	98			
3 Environment Carrying Competitiveness	66.59	75	Percentage of the rural population with access to an improved water source	99.00	30
3.1 Agricultural Carrying	66.23	67			
Cereal yield per unit of arable land	69.63	11	Percentage of the urban population with access to an improved water source	100.00	1
Fertilizer consumption per unit of arable land	59.32	124			
Annual freshwater withdrawals for agriculture per unit of arable land	68.60	127	4.2 Ecological Protection	27.59	87
			Area of plantation and afforestation	0.09	87
3.2 Industrial Carrying	93.66	38	Biome protect	34.70	91
Net exports of goods as a percentage of GDP	91.40	14	Overfishing of fishing resources	57.14	40
			4.3 Resource Utilization	4.07	132
Electric power consumption per unit of value added of industry	88.75	88	Utilization rate of water resources	4.82	7
			Percentage of total internal renewable water resources to total water resources	2.10	126
SO_2 emissions per unit of value added of industry	99.82	67			

(continued)

Table 49.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
Percentage of agricultural land to total land area	4.38	131	Renewable internal freshwater resources per capita	0.03	131
Percentage of fossil fuel energy consumption to total energy consumption	4.96	109	SO_2 emissions per capita	97.10	54
			CO_2 emissions per capita	94.17	58
			Energy consumption per capita	93.98	47
5 Environment Harmony Competitiveness	70.15	34	5.2 Economy and Environment	59.71	91
5.1 Population and Environment	80.58	15	Land resource utilization efficiency	0.07	84
Percentage of population with access to Improved sanitation facilities	94.00	52	Sulfur dioxide emissions per unit of GDP	91.86	80
			Carbon dioxide emissions per unit of GDP	69.99	109
Motor vehicles per 1,000 people	94.94	37	Energy consumption per unit of GDP	76.92	86

Table 49.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	0	0	2	3	9
Ecological Environment Competitiveness	11	1	1	1	5	3
Environment Carrying Competitiveness	15	0	3	3	8	1
Environment Management Competitiveness	10	1	1	2	3	3
Environment Harmony Competitiveness	10	0	1	4	3	2
Total	60	2	6	12	22	18

Chapter 50
Report on Global Environment Competitiveness of El Salvador

El Salvador is located in Central America. It covers 20,700 square kilometres and borders the Pacific Ocean on the south, and the countries of Guatemala to the west and Honduras to the north and east. It covers 20.7 thousand of square kilometers and has a population of 6.23 million. Its GDP reaches $23.05 billion in 2011. Through the index system and evaluation model, the environment competitiveness index of El Salvador ranks at 59 in 133 countries.

Score: 50.64
Rank: 59

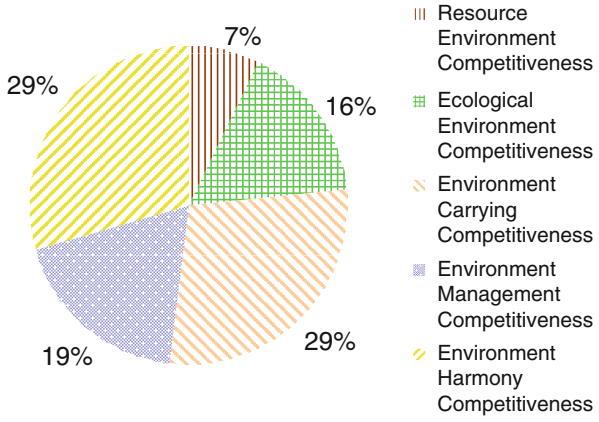

Fig. 50.1 Contribution of sub-index to GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_50,

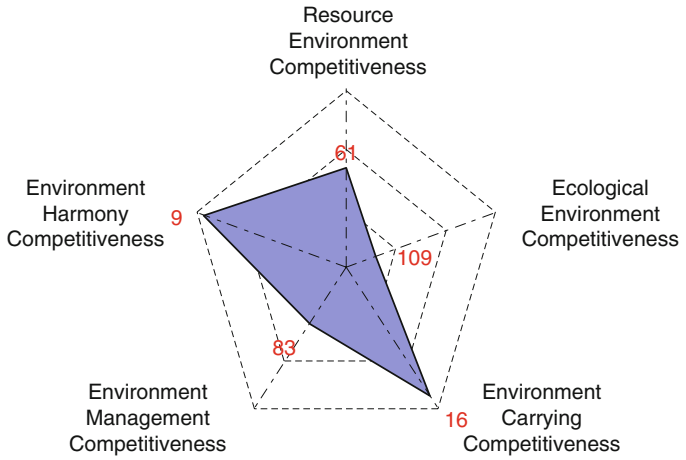

Fig. 50.2 Rank of sub-index of GEC

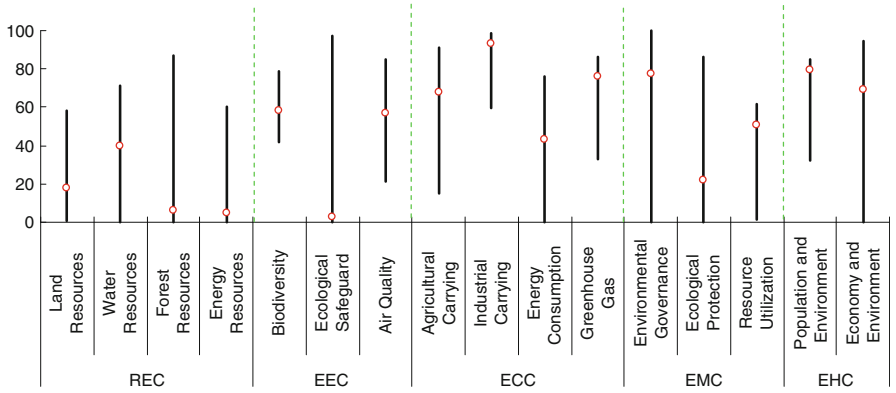

Fig. 50.3 Score and rank of the pillars of GEC

Table 50.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	18.31	61	Total internal renewable water resources	43.20	26
1.1 Land Resources	18.05	37	1.3 Forest Resources	6.48	126
Land area per capita	0.58	120	Growing stock in forest and other wooded land	N/A	N/A
Percentage of arable land to total land area	54.41	19	Proportion of land area covered by forest	15.97	85
Arable land per capita	4.99	95	Forest area per capita	0.32	110
1.2 Water Resources	39.59	22	1.4 Energy Resources	5.08	68
Surface water	13.06	23	Fossil energy	0.00	64
Annual precipitation	59.35	22	Energy production	0.37	99
Groundwater	42.73	14			

(continued)

Table 50.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
Proportion of combustible renewable and waste to total energy consumption	19.70	43	Energy consumption per unit of land area	99.57	90
Net energy imports of the energy consumption	6.77	83	Ratio of clean energy consumption	48.14	10
2 Ecological Environment Competitiveness	41.00	109	Elasticity of energy consumption	14.40	32
2.1 Biodiversity	58.22	62	Elasticity of electric power consumption	10.41	78
Threatened fish species	93.40	41	3.4 Greenhouse Gas	76.09	8
Threatened mammal species	97.28	22	Growth rate of CO_2 emissions	74.59	11
Threatened plant species	98.60	80	Growth rate of Methane emissions	67.32	17
GEF benefits index for biodiversity	0.90	84	CO_2 emissions per unit of land area	99.69	80
2.2 Ecological Safeguard	2.73	120	CO_2 emissions per unit of energy consumption	64.24	29
Terrestrial protected areas	1.90	121	4 Environment Management Competitiveness	47.35	83
Marine protected areas	3.98	49	4.1 Environmental Governance	77.67	90
2.3 Air Quality	56.80	72	Agricultural chemicals regulation	66.67	65
Inhalable particles (PM10)	79.56	66	Percentage of the rural population with access to an improved water source	76.00	84
Particulate matter (PM2.5)	89.35	37	Percentage of the urban population with access to an improved water source	94.00	97
Index of indoor air pollution	21.90	76	4.2 Ecological Protection	22.10	100
Nitrogen oxides emission	68.72	29	Area of plantation and afforestation	0.02	108
Sulfur dioxide emission	40.92	25	Biome protect	4.90	122
3 Environment Carrying Competitiveness	72.25	16	Overfishing of fishing resources	68.75	20
3.1 Agricultural Carrying	67.86	57	4.3 Resource Utilization	50.69	13
Cereal yield per unit of arable land	27.47	68	Utilization rate of water resources	0.22	73
Fertilizer consumption per unit of arable land	91.32	82	Percentage of total internal renewable water resources to total water resources	56.84	80
Annual freshwater withdrawals for agriculture per unit of arable land	98.26	71	Percentage of agricultural land to total land area	88.08	11
3.2 Industrial Carrying	93.48	43	Percentage of fossil fuel energy consumption to total energy consumption	57.64	27
Net exports of goods as a percentage of GDP	85.45	41			
Electric power consumption per unit of value added of industry	93.38	51			
SO_2 emissions per unit of value added of industry	99.87	50			
Annual freshwater withdrawals for industry per value added of industry	95.23	91			
3.3 Energy Consumption	43.13	17			

(continued)

Table 50.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
5 Environment Harmony Competitiveness	74.31	9	CO_2 emissions per capita	97.54	36
5.1 Population and Environment	79.61	16	Energy consumption per capita	95.77	32
Percentage of population with access to Improved sanitation facilities	87.00	67	5.2 Economy and Environment	69.01	38
Motor vehicles per 1,000 people	89.88	50	Land resource utilization efficiency	0.32	36
Renewable internal freshwater resources per capita	3.45	68	Sulfur dioxide emissions per unit of GDP	95.95	56
SO_2 emissions per capita	98.13	38	Carbon dioxide emissions per unit of GDP	91.66	45
			Energy consumption per unit of GDP	88.09	50

Table 50.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	0	5	2	4	2
Ecological Environment Competitiveness	11	0	2	2	5	2
Environment Carrying Competitiveness	15	2	3	6	4	0
Environment Management Competitiveness	10	0	2	0	6	2
Environment Harmony Competitiveness	10	0	1	7	2	0
Total	60	2	13	17	21	6

Chapter 51
Report on Global Environment Competitiveness of Eritrea

Eritrea is a country in the Horn of Africa. It covers 101,000 square kilometres and borders Sudan to the west, Ethiopia to the south and Djibouti to the southeast. It covers 101.0 thousand of square kilometers and has a population of 5.42 million. Its GDP reaches $2.61 billion in 2011. Through the index system and evaluation model, the environment competitiveness index of Eritrea ranks at 121 in 133 countries.

Score: 43.51
Rank: 121

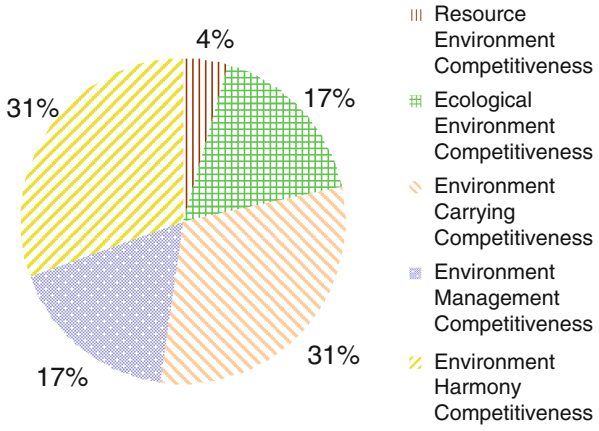

Fig. 51.1 Contribution of sub-index to GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_51,

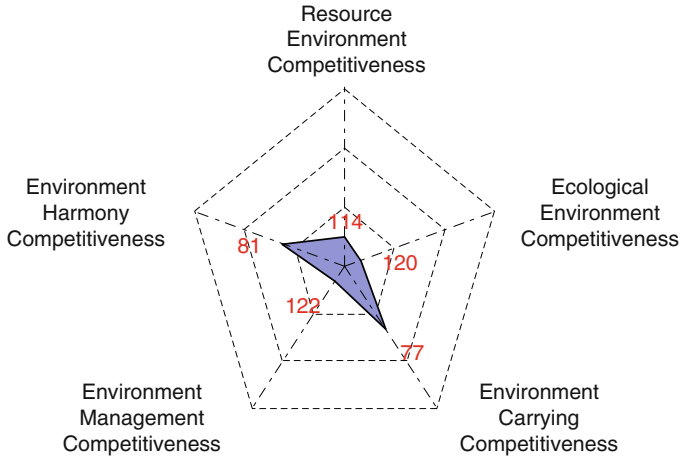

Fig. 51.2 Rank of sub-index of GEC

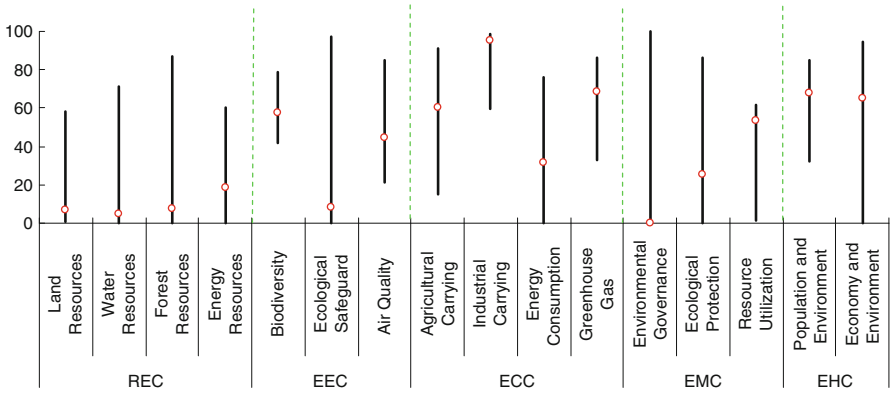

Fig. 51.3 Score and rank of the pillars of GEC

Table 51.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	9.66	114	Groundwater	0.67	112
1.1 Land Resources	6.56	112	Total internal renewable water resources	1.40	114
Land area per capita	3.34	52	1.3 Forest Resources	7.68	125
Percentage of arable land to total land area	11.44	94	Growing stock in forest and other wooded land	0.00	121
Arable land per capita	5.96	83	Proportion of land area covered by forest	17.71	83
1.2 Water Resources	4.47	109	Forest area per capita	1.97	63
Surface water	0.66	105	1.4 Energy Resources	18.23	21
Annual precipitation	15.16	105			

(continued)

Table 51.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
Fossil energy	0.00	64	Energy consumption per unit of land area	99.99	7
Energy production	0.11	120	Ratio of clean energy consumption	0.04	112
Proportion of combustible renewable and waste to total energy consumption	83.57	8	Elasticity of energy consumption	13.95	64
Net energy imports of the energy consumption	9.86	60	Elasticity of electric power consumption	11.03	50
2 Ecological Environment Competitiveness	37.38	120	3.4 Greenhouse Gas	68.61	26
2.1 Biodiversity	57.49	76	Growth rate of CO_2 emissions	49.76	76
Threatened fish species	91.51	45	Growth rate of Methane emissions	57.95	72
Threatened mammal species	94.57	59	CO_2 emissions per unit of land area	100.00	9
Threatened plant species	99.77	43	CO_2 emissions per unit of energy consumption	85.58	11
GEF benefits index for biodiversity	0.80	88	4 Environment Management Competitiveness	37.57	122
2.2 Ecological Safeguard	7.99	106	4.1 Environmental Governance	0.00	131
Terrestrial protected areas	13.32	98	Agricultural chemicals regulation	N/A	N/A
Marine protected areas	N/A	N/A	Percentage of the rural population with access to an improved water source	N/A	N/A
2.3 Air Quality	44.35	114	Percentage of the urban population with access to an improved water source	N/A	N/A
Inhalable particles (PM10)	55.47	113	4.2 Ecological Protection	25.68	92
Particulate matter (PM2.5)	73.91	100	Area of plantation and afforestation	0.04	98
Index of indoor air pollution	6.70	104	Biome protect	30.00	97
Nitrogen oxides emission	68.76	23	Overfishing of fishing resources	55.56	45
Sulfur dioxide emission	40.98	6	4.3 Resource Utilization	53.41	10
3 Environment Carrying Competitiveness	66.55	77	Utilization rate of water resources	0.37	63
3.1 Agricultural Carrying	60.29	117	Percentage of total internal renewable water resources to total water resources	41.79	95
Cereal yield per unit of arable land	1.84	129	Percentage of agricultural land to total land area	88.85	8
Fertilizer consumption per unit of arable land	99.72	14	Percentage of fossil fuel energy consumption to total energy consumption	82.62	10
Annual freshwater withdrawals for agriculture per unit of arable land	98.79	65			
3.2 Industrial Carrying	94.97	20			
Net exports of goods as a percentage of GDP	90.95	16			
Electric power consumption per unit of value added of industry	90.15	83			
SO_2 emissions per unit of value added of industry	99.24	114			
Annual freshwater withdrawals for industry per value added of industry	99.52	18			
3.3 Energy Consumption	31.25	101			

(continued)

Table 51.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
5 Environment Harmony Competitiveness	66.39	81	CO_2 emissions per capita	99.86	5
5.1 Population and Environment	67.59	82	Energy consumption per capita	100.00	1
Percentage of population with access to Improved sanitation facilities	14.00	123	5.2 Economy and Environment	65.20	68
Motor vehicles per 1,000 people	98.89	11	Land resource utilization efficiency	0.01	122
Renewable internal freshwater resources per capita	0.63	113	Sulfur dioxide emissions per unit of GDP	91.92	78
SO_2 emissions per capita	99.58	12	Carbon dioxide emissions per unit of GDP	93.33	33
			Energy consumption per unit of GDP	75.56	89

Table 51.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	1	1	1	3	8
Ecological Environment Competitiveness	11	0	1	3	3	4
Environment Carrying Competitiveness	15	2	4	0	4	5
Environment Management Competitiveness	10	2	0	0	5	1
Environment Harmony Competitiveness	10	1	2	1	3	3
Total	60	6	8	5	18	21

Chapter 52
Report on Global Environment Competitiveness of Estonia

Estonia is a state in the Baltic region of Northern Europe, which covers 42,400 square kilometres. It is bordered to the north by the Gulf of Finland, to the west by the Baltic Sea, to the south by Latvia, and to the east by Lake Peipus and the Russian Federation. It covers 42.4 thousand of square kilometers and has a population of 1.34 million. Its GDP reaches $22.15 billion in 2011. Through the index system and evaluation model, the environment competitiveness index of Estonia ranks at 71 in 133 countries.

Score: 49.46
Rank: 71

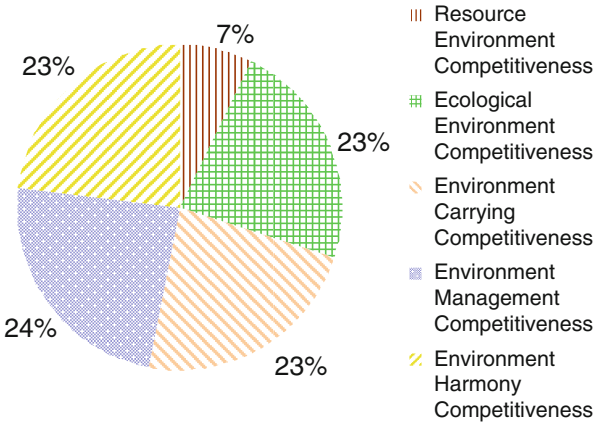

Fig. 52.1 Contribution of sub-index to GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_52,

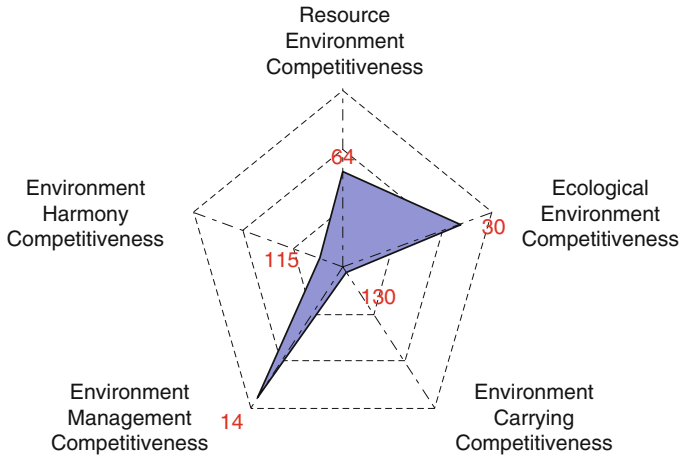

Fig. 52.2 Rank of sub-index of GEC

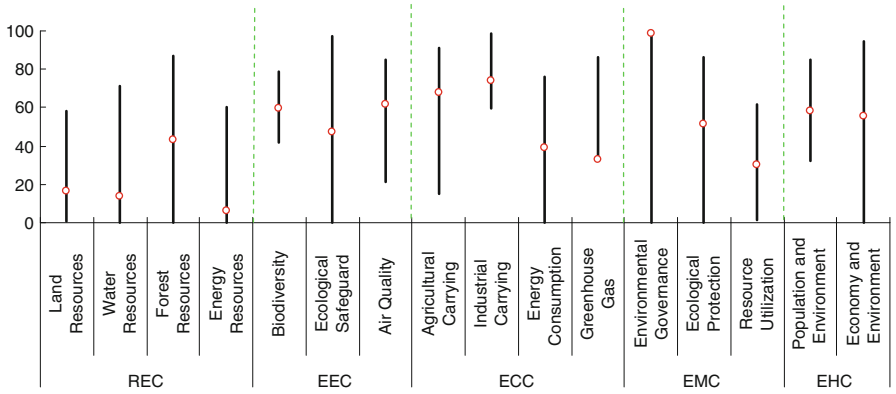

Fig. 52.3 Score and rank of the pillars of GEC

Table 52.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	17.86	64	Total internal renewable water resources	15.12	64
1.1 Land Resources	16.45	44	1.3 Forest Resources	43.28	21
Land area per capita	5.68	34	Growing stock in forest and other wooded land	51.36	65
Percentage of arable land to total land area	25.18	58	Proportion of land area covered by forest	61.06	16
Arable land per capita	22.08	16	Forest area per capita	11.50	19
1.2 Water Resources	13.58	70	1.4 Energy Resources	6.14	61
Surface water	3.01	74	Fossil energy	0.00	64
Annual precipitation	22.64	80	Energy production	3.72	27
Groundwater	13.56	54			

(continued)

Table 52.1 (continued)

Indicators	Score	Rank
Proportion of combustible renewable and waste to total energy consumption	15.78	49
Net energy imports of the energy consumption	11.21	51
2 Ecological Environment Competitiveness	56.58	30
2.1 Biodiversity	59.46	23
Threatened fish species	97.64	14
Threatened mammal species	99.46	2
Threatened plant species	100.00	1
GEF benefits index for biodiversity	0.10	122
2.2 Ecological Safeguard	47.12	18
Terrestrial protected areas	55.16	26
Marine protected areas	35.06	10
2.3 Air Quality	61.52	60
Inhalable particles (PM10)	93.43	4
Particulate matter (PM2.5)	92.94	21
Index of indoor air pollution	26.10	73
Nitrogen oxides emission	68.81	18
Sulfur dioxide emission	40.64	67
3 Environment Carrying Competitiveness	56.96	130
3.1 Agricultural Carrying	67.67	58
Cereal yield per unit of arable land	23.39	81
Fertilizer consumption per unit of arable land	94.38	69
Annual freshwater withdrawals for agriculture per unit of arable land	99.99	7
3.2 Industrial Carrying	74.21	129
Net exports of goods as a percentage of GDP	48.15	130
Electric power consumption per unit of value added of industry	86.39	99
SO_2 emissions per unit of value added of industry	99.27	113
Annual freshwater withdrawals for industry per value added of industry	63.05	129
3.3 Energy Consumption	39.08	28
Energy consumption per unit of land area	99.72	78
Ratio of clean energy consumption	0.70	102
Elasticity of energy consumption	26.89	4
Elasticity of electric power consumption	29.00	5
3.4 Greenhouse Gas	32.92	132
Growth rate of CO_2 emissions	0.00	132
Growth rate of Methane emissions	56.26	85
CO_2 emissions per unit of land area	99.52	95
CO_2 emissions per unit of energy consumption	8.83	125
4 Environment Management Competitiveness	59.09	14
4.1 Environmental Governance	98.80	23
Agricultural chemicals regulation	100.00	1
Percentage of the rural population with access to an improved water source	97.00	43
Percentage of the urban population with access to an improved water source	99.00	51
4.2 Ecological Protection	51.09	13
Area of plantation and afforestation	0.22	74
Biome protect	100.00	1
Overfishing of fishing resources	70.00	17
4.3 Resource Utilization	30.05	100
Utilization rate of water resources	0.56	54
Percentage of total internal renewable water resources to total water resources	80.39	38
Percentage of agricultural land to total land area	25.96	110
Percentage of fossil fuel energy consumption to total energy consumption	13.29	89

(continued)

Table 52.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
5 Environment Harmony Competitiveness	56.80	115	CO_2 emissions per capita	62.71	122
5.1 Population and Environment	57.94	122	Energy consumption per capita	68.30	105
Percentage of population with access to Improved sanitation facilities	95.00	47	5.2 Economy and Environment	55.65	99
Motor vehicles per 1,000 people	41.73	105	Land resource utilization efficiency	0.15	54
Renewable internal freshwater resources per capita	11.48	31	Sulfur dioxide emissions per unit of GDP	79.21	115
SO_2 emissions per capita	61.47	124	Carbon dioxide emissions per unit of GDP	63.18	115
			Energy consumption per unit of GDP	80.08	80

Table 52.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	0	3	5	6	0
Ecological Environment Competitiveness	11	3	6	1	1	0
Environment Carrying Competitiveness	15	1	1	1	6	6
Environment Management Competitiveness	10	2	2	3	2	1
Environment Harmony Competitiveness	10	0	0	3	1	6
Total	60	6	12	13	16	13

Chapter 53
Report on Global Environment Competitiveness of Ethiopia

Ethiopia is located in the Horn of Africa. It covers 1,000,000 square kilometres and it is bordered by Eritrea to the north, Djibouti and Somalia to the east, Sudan and South Sudan to the west, and Kenya to the south. It covers 1,000.0 thousand of square kilometers and has a population of 84.73 million. Its GDP reaches $30.25 billion in 2011. Through the index system and evaluation model, the environment competitiveness index of Ethiopia ranks at 111 in 133 countries.

Score: 45.70
Rank: 111

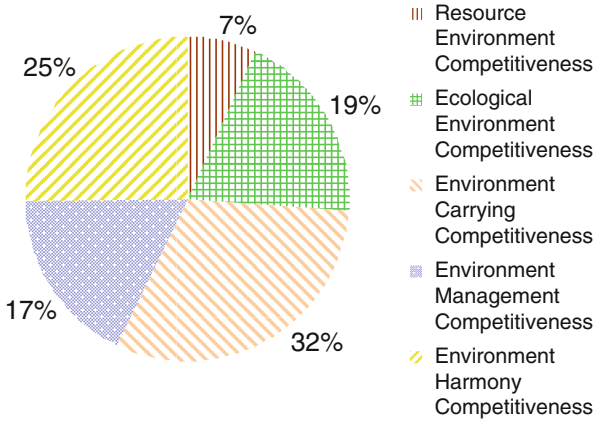

Fig. 53.1 Contribution of sub-index to GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_53,

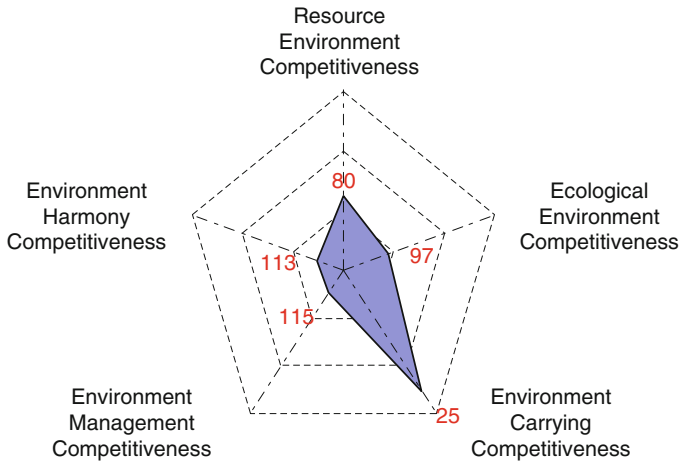

Fig. 53.2 Rank of sub-index of GEC

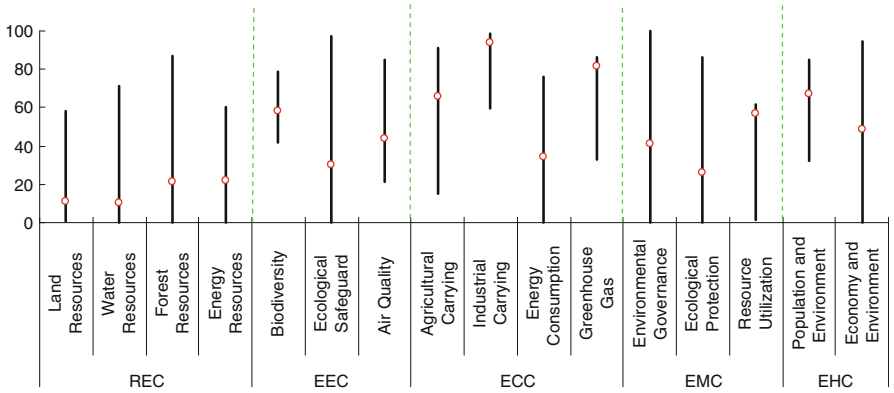

Fig. 53.3 Score and rank of the pillars of GEC

Table 53.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	16.11	80	Groundwater	2.84	96
1.1 Land Resources	10.63	79	Total internal renewable water resources	6.15	90
Land area per capita	2.10	77	1.3 Forest Resources	21.23	91
Percentage of arable land to total land area	24.60	59	Growing stock in forest and other wooded land	50.80	77
Arable land per capita	8.04	70	Proportion of land area covered by forest	14.24	88
1.2 Water Resources	10.51	91	Forest area per capita	1.00	89
Surface water	1.30	97	1.4 Energy Resources	21.93	10
Annual precipitation	31.75	62			

(continued)

Table 53.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
Fossil energy	0.00	64	Energy consumption per unit of land area	99.93	35
Energy production	0.38	96	Ratio of clean energy consumption	1.68	90
Proportion of combustible renewable and waste to total energy consumption	100.00	1	Elasticity of energy consumption	14.57	26
Net energy imports of the energy consumption	12.00	44	Elasticity of electric power consumption	20.91	10
2 Ecological Environment Competitiveness	43.86	97	3.4 Greenhouse Gas	81.17	4
2.1 Biodiversity	58.17	64	Growth rate of CO_2 emissions	75.87	9
Threatened fish species	93.40	41	Growth rate of Methane emissions	54.12	93
Threatened mammal species	82.07	112	CO_2 emissions per unit of land area	99.99	11
Threatened plant species	98.60	80	CO_2 emissions per unit of energy consumption	100.00	1
GEF benefits index for biodiversity	8.40	32	4 Environment Management Competitiveness	39.87	115
2.2 Ecological Safeguard	29.84	45	4.1 Environmental Governance	41.20	128
Terrestrial protected areas	49.73	32	Agricultural chemicals regulation	4.76	85
Marine protected areas	N/A	N/A	Percentage of the rural population with access to an improved water source	34.00	118
2.3 Air Quality	43.64	117	Percentage of the urban population with access to an improved water source	97.00	80
Inhalable particles (PM10)	65.69	95	4.2 Ecological Protection	25.88	91
Particulate matter (PM2.5)	73.93	99	Area of plantation and afforestation	0.66	49
Index of indoor air pollution	0.70	122	Biome protect	85.40	34
Nitrogen oxides emission	62.48	115	Overfishing of fishing resources	N/A	N/A
Sulfur dioxide emission	40.89	37	4.3 Resource Utilization	57.17	4
3 Environment Carrying Competitiveness	70.82	25	Utilization rate of water resources	0.18	80
3.1 Agricultural Carrying	65.52	78	Percentage of total internal renewable water resources to total water resources	87.14	22
Cereal yield per unit of arable land	14.69	100	Percentage of agricultural land to total land area	41.35	86
Fertilizer consumption per unit of arable land	99.37	25	Percentage of fossil fuel energy consumption to total energy consumption	100.00	1
Annual freshwater withdrawals for agriculture per unit of arable land	99.46	47			
3.2 Industrial Carrying	93.58	41			
Net exports of goods as a percentage of GDP	94.58	6			
Electric power consumption per unit of value added of industry	81.48	111			
SO_2 emissions per unit of value added of industry	99.42	106			
Annual freshwater withdrawals for industry per value added of industry	98.86	43			
3.3 Energy Consumption	34.27	57			

(continued)

Table 53.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
5 Environment Harmony Competitiveness	57.84	113	CO_2 emissions per capita	99.94	2
5.1 Population and Environment	67.29	84	Energy consumption per capita	97.96	14
Percentage of population with access to Improved sanitation facilities	12.00	125	5.2 Economy and Environment	48.39	115
Motor vehicles per 1,000 people	99.88	2	Land resource utilization efficiency	0.01	118
Renewable internal freshwater resources per capita	1.74	86	Sulfur dioxide emissions per unit of GDP	95.57	61
SO_2 emissions per capita	99.82	3	Carbon dioxide emissions per unit of GDP	94.56	20
			Energy consumption per unit of GDP	3.44	125

Table 53.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	2	0	1	11	0
Ecological Environment Competitiveness	11	0	0	3	4	4
Environment Carrying Competitiveness	15	3	3	3	4	2
Environment Management Competitiveness	10	1	1	2	4	2
Environment Harmony Competitiveness	10	3	1	0	3	3
Total	60	9	5	9	26	11

Chapter 54
Report on Global Environment Competitiveness of Finland

Finland is located in the Fennoscandian region of Northern Europe. It covers 303,900 square kilometres. It is bordered by Sweden in the west, Norway in the north and Russia in the east, while Estonia lies to its south across the Gulf of Finland. It has a population of 5.39 million and its GDP reaches $263.01 billion in 2011. Through the index system and evaluation model, the environment competitiveness index of Finland ranks at 28 in 133 countries.

Score: 53.24
Rank: 28

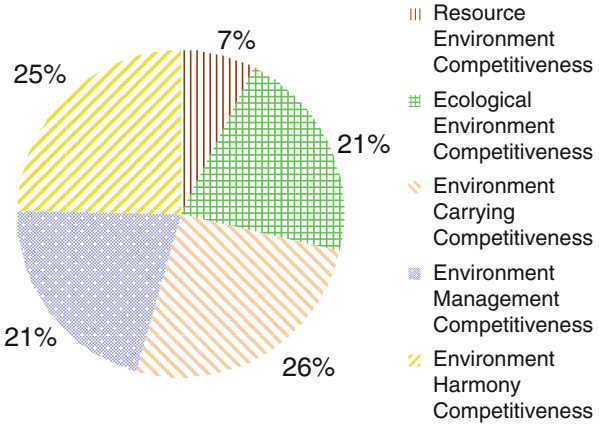

Fig. 54.1 Contribution of sub-index to GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_54,

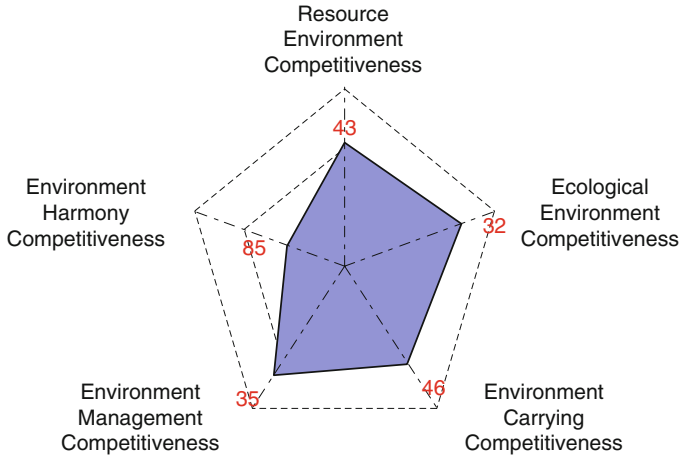

Fig. 54.2 Rank of sub-index of GEC

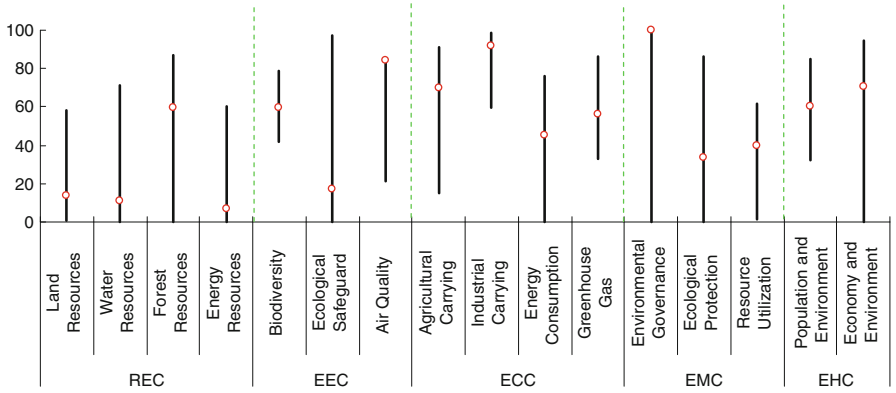

Fig. 54.3 Score and rank of the pillars of GEC

Table 54.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	19.96	43	Total internal renewable water resources	17.76	57
1.1 Land Resources	13.64	64	1.3 Forest Resources	59.75	6
Land area per capita	10.14	25	Growing stock in forest and other wooded land	56.63	26
Percentage of arable land to total land area	12.41	92	Proportion of land area covered by forest	85.40	2
Arable land per capita	19.54	23	Forest area per capita	28.68	8
1.2 Water Resources	10.72	89	1.4 Energy Resources	6.88	58
Surface water	3.90	66	Fossil energy	0.00	64
Annual precipitation	20.24	94	Energy production	3.26	30
Groundwater	1.00	109			

(continued)

Table 54.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
Proportion of combustible renewable and waste to total energy consumption	24.23	38	Ratio of clean energy consumption	37.28	17
Net energy imports of the energy consumption	5.95	95	Elasticity of energy consumption	19.94	7
2 Ecological Environment Competitiveness	56.52	32	Elasticity of electric power consumption	25.09	7
2.1 Biodiversity	59.39	24	3.4 Greenhouse Gas	55.84	110
Threatened fish species	97.17	17	Growth rate of CO_2 emissions	27.19	123
Threatened mammal species	99.46	2	Growth rate of Methane emissions	70.31	11
Threatened plant species	99.94	22	CO_2 emissions per unit of land area	99.77	68
GEF benefits index for biodiversity	0.20	109	CO_2 emissions per unit of energy consumption	54.75	42
2.2 Ecological Safeguard	17.11	79	4 Environment Management Competitiveness	55.35	35
Terrestrial protected areas	24.18	74	4.1 Environmental Governance	100.00	1
Marine protected areas	6.51	34	Agricultural chemicals regulation	100.00	1
2.3 Air Quality	83.91	4	Percentage of the rural population with access to an improved water source	100.00	1
Inhalable particles (PM10)	89.05	16	Percentage of the urban population with access to an improved water source	100.00	1
Particulate matter (PM2.5)	99.28	7	4.2 Ecological Protection	33.56	67
Index of indoor air pollution	100.00	1	Area of plantation and afforestation	7.65	9
Nitrogen oxides emission	67.49	77	Biome protect	49.30	74
Sulfur dioxide emission	40.79	51	Overfishing of fishing resources	52.37	52
3 Environment Carrying Competitiveness	68.75	46	4.3 Resource Utilization	39.74	54
3.1 Agricultural Carrying	69.85	47	Utilization rate of water resources	0.06	105
Cereal yield per unit of arable land	31.19	61	Percentage of total internal renewable water resources to total water resources	95.54	8
Fertilizer consumption per unit of arable land	91.26	83	Percentage of agricultural land to total land area	8.93	125
Annual freshwater withdrawals for agriculture per unit of arable land	99.97	9	Percentage of fossil fuel energy consumption to total energy consumption	54.44	30
3.2 Industrial Carrying	91.75	63			
Net exports of goods as a percentage of GDP	81.07	66			
Electric power consumption per unit of value added of industry	88.37	90			
SO_2 emissions per unit of value added of industry	99.97	24			
Annual freshwater withdrawals for industry per value added of industry	97.60	65			
3.3 Energy Consumption	45.52	10			
Energy consumption per unit of land area	99.75	73			

(continued)

Table 54.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
5 Environment Harmony Competitiveness	65.64	85	CO_2 emissions per capita	68.28	120
5.1 Population and Environment	60.61	118	Energy consumption per capita	47.50	119
Percentage of population with access to Improved sanitation facilities	100.00	1	5.2 Economy and Environment	70.67	24
Motor vehicles per 1,000 people	27.28	124	Land resource utilization efficiency	0.25	40
Renewable internal freshwater resources per capita	24.03	20	Sulfur dioxide emissions per unit of GDP	99.14	17
SO_2 emissions per capita	94.53	76	Carbon dioxide emissions per unit of GDP	91.92	41
			Energy consumption per unit of GDP	91.38	37

Table 54.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	2	3	2	6	1
Ecological Environment Competitiveness	11	4	4	0	3	0
Environment Carrying Competitiveness	15	2	3	1	7	2
Environment Management Competitiveness	10	5	0	1	2	2
Environment Harmony Competitiveness	10	1	3	2	1	3
Total	60	14	13	6	19	8

Chapter 55
Report on Global Environment Competitiveness of France

France is located in Western Europe. It borders Belgium, Luxemburg, Germany, Switzerland, Italy, Monaco, Andorra and Spain. It covers 547.7 thousand of square kilometers and has a population of 65.43 million. Its GDP reaches $2,773.03 billion in 2011. Through the index system and evaluation model, the environment competitiveness index of France ranks at 10 in 133 countries.

Score: 56.28
Rank: 10

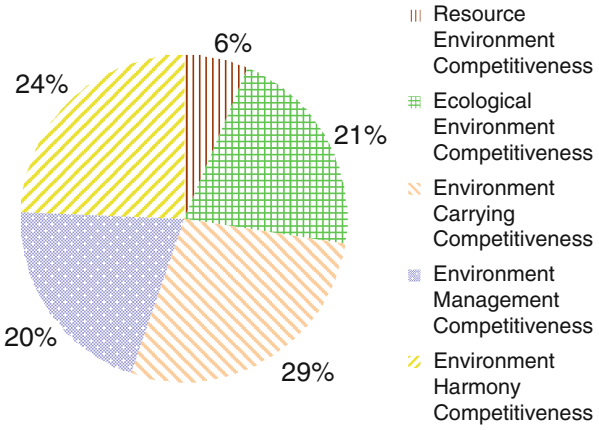

Fig. 55.1 Contribution of sub-index to GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_55,

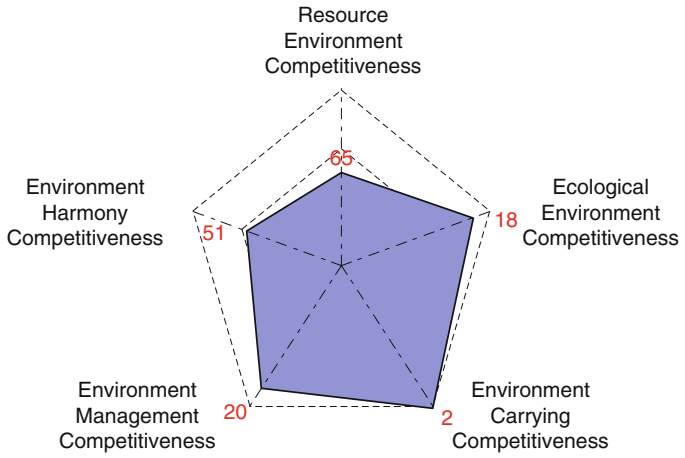

Fig. 55.2 Rank of sub-index of GEC

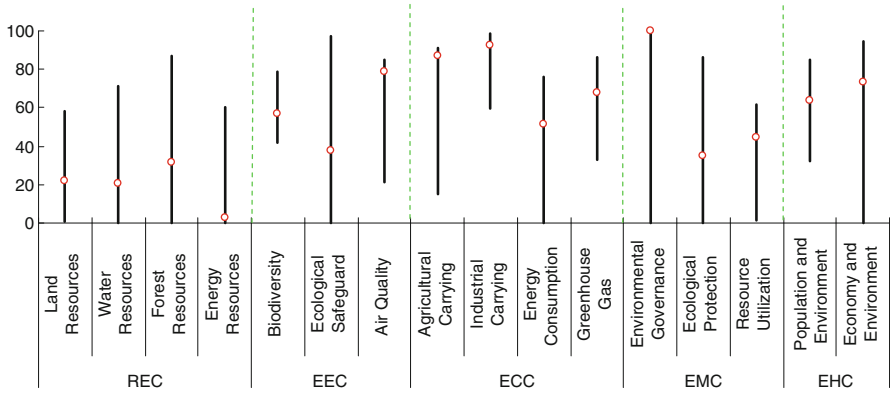

Fig. 55.3 Score and rank of the pillars of GEC

Table 55.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	17.79	65	Groundwater	31.53	25
1.1 Land Resources	21.60	28	Total internal renewable water resources	18.42	55
Land area per capita	1.48	98	1.3 Forest Resources	31.55	59
Percentage of arable land to total land area	56.88	17	Growing stock in forest and other wooded land	57.83	23
Arable land per capita	13.14	37	Proportion of land area covered by forest	34.22	63
1.2 Water Resources	20.89	51	Forest area per capita	1.71	67
Surface water	4.12	65	1.4 Energy Resources	2.99	100
Annual precipitation	29.48	64			

(continued)

Table 55.1 (continued)

Indicators	Score	Rank
Fossil energy	0.00	64
Energy production	2.10	35
Proportion of combustible renewable and waste to total energy consumption	6.43	73
Net energy imports of the energy consumption	6.48	85
2 Ecological Environment Competitiveness	59.97	18
2.1 Biodiversity	56.68	89
Threatened fish species	79.25	97
Threatened mammal species	95.11	49
Threatened plant species	98.42	84
GEF benefits index for biodiversity	5.30	44
2.2 Ecological Safeguard	38.00	26
Terrestrial protected areas	44.57	40
Marine protected areas	28.15	12
2.3 Air Quality	78.91	32
Inhalable particles (PM10)	91.24	9
Particulate matter (PM2.5)	79.91	87
Index of indoor air pollution	100.00	1
Nitrogen oxides emission	58.51	122
Sulfur dioxide emission	39.33	99
3 Environment Carrying Competitiveness	77.58	2
3.1 Agricultural Carrying	86.65	4
Cereal yield per unit of arable land	75.87	6
Fertilizer consumption per unit of arable land	88.01	93
Annual freshwater withdrawals for agriculture per unit of arable land	99.68	40
3.2 Industrial Carrying	92.52	52
Net exports of goods as a percentage of GDP	86.77	35
Electric power consumption per unit of value added of industry	90.15	84
SO_2 emissions per unit of value added of industry	99.96	26
Annual freshwater withdrawals for industry per value added of industry	93.19	102
3.3 Energy Consumption	51.63	4
Energy consumption per unit of land area	98.98	110
Ratio of clean energy consumption	74.98	2
Elasticity of energy consumption	15.51	17
Elasticity of electric power consumption	17.06	15
3.4 Greenhouse Gas	67.51	31
Growth rate of CO_2 emissions	56.67	47
Growth rate of Methane emissions	59.64	59
CO_2 emissions per unit of land area	99.27	106
CO_2 emissions per unit of energy consumption	65.27	28
4 Environment Management Competitiveness	57.36	20
4.1 Environmental Governance	100.00	1
Agricultural chemicals regulation	100.00	1
Percentage of the rural population with access to an improved water source	100.00	1
Percentage of the urban population with access to an improved water source	100.00	1
4.2 Ecological Protection	35.03	64
Area of plantation and afforestation	2.12	27
Biome protect	76.90	49
Overfishing of fishing resources	37.05	79
4.3 Resource Utilization	44.48	33
Utilization rate of water resources	0.60	52
Percentage of total internal renewable water resources to total water resources	60.79	73

(continued)

Table 55.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
Percentage of agricultural land to total land area	63.16	43	Renewable internal freshwater resources per capita	3.70	65
Percentage of fossil fuel energy consumption to total energy consumption	53.37	31	SO_2 emissions per capita	96.36	63
			CO_2 emissions per capita	85.14	87
			Energy consumption per capita	69.28	103
5 Environment Harmony Competitiveness	68.69	51	5.2 Economy and Environment	73.36	10
5.1 Population and Environment	64.02	106	Land resource utilization efficiency	1.48	17
Percentage of population with access to Improved sanitation facilities	100.00	1	Sulfur dioxide emissions per unit of GDP	99.38	14
			Carbon dioxide emissions per unit of GDP	97.04	7
Motor vehicles per 1,000 people	29.26	121	Energy consumption per unit of GDP	95.55	13

Table 55.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	0	4	3	7	0
Ecological Environment Competitiveness	11	2	1	3	4	1
Environment Carrying Competitiveness	15	4	2	5	2	2
Environment Management Competitiveness	10	3	1	4	2	0
Environment Harmony Competitiveness	10	3	2	0	3	2
Total	60	12	10	15	18	5

Chapter 56
Report on Global Environment Competitiveness of Gabon

Gabon is on the west coast of Central Africa. Gabon is bordered by Equatorial Guinea to the northwest, Cameroon to the north, the Republic of the Congo on the east and south, and the Atlantic Ocean's Gulf of Guinea to the west. It covers 257.7 thousand of square kilometers and has a population of 1.53 million. Its GDP reaches $17.05 billion in 2011. Through the index system and evaluation model, the environment competitiveness index of Gabon ranks at 19 in 133 countries.

Score: 54.95
Rank: 19

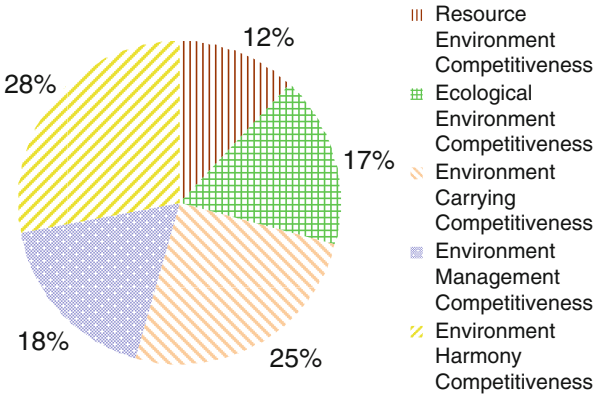

Fig. 56.1 Contribution of sub-index to GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_56,

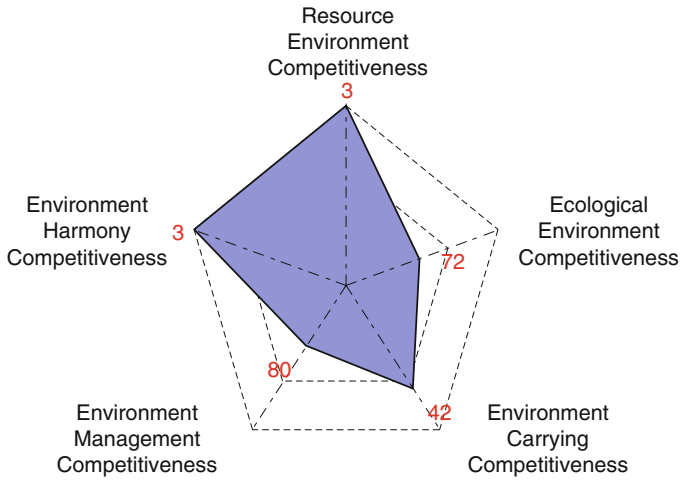

Fig. 56.2 Rank of sub-index of GEC

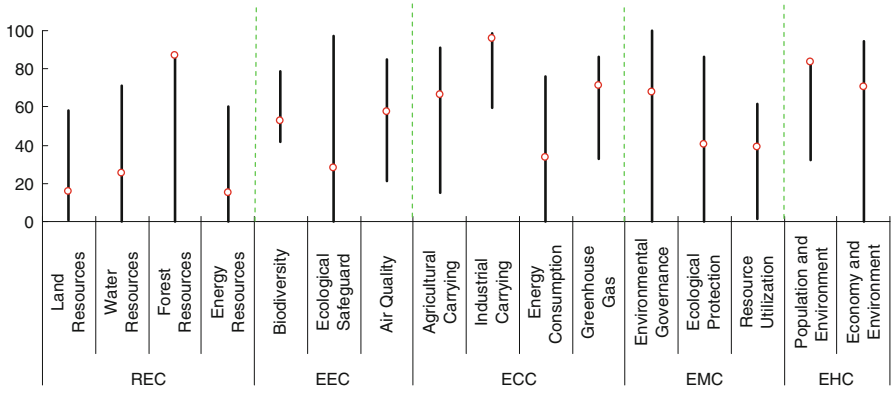

Fig. 56.3 Score and rank of the pillars of GEC

Table 56.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	32.54	3	Groundwater	21.77	34
1.1 Land Resources	15.67	47	Total internal renewable water resources	19.47	53
Land area per capita	30.25	8	1.3 Forest Resources	87.06	1
Percentage of arable land to total land area	1.97	123	Growing stock in forest and other wooded land	56.87	24
Arable land per capita	9.91	62	Proportion of land area covered by forest	100.00	1
1.2 Water Resources	25.06	41	Forest area per capita	100.00	1
Surface water	6.79	47	1.4 Energy Resources	14.90	31
Annual precipitation	52.23	33			

(continued)

Table 56.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
Fossil energy	6.49	16	Annual freshwater withdrawals for industry per value added of industry	99.93	8
Energy production	9.60	12			
Proportion of combustible renewable and waste to total energy consumption	26.10	35	3.3 Energy Consumption	33.22	67
			Energy consumption per unit of land area	99.99	8
Net energy imports of the energy consumption	29.19	18	Ratio of clean energy consumption	7.25	61
2 Ecological Environment Competitiveness	47.29	72	Elasticity of energy consumption	13.95	63
2.1 Biodiversity	52.52	122	Elasticity of electric power consumption	11.69	35
Threatened fish species	71.23	112			
Threatened mammal species	92.39	81	3.4 Greenhouse Gas	71.55	16
			Growth rate of CO_2 emissions	44.47	92
Threatened plant species	93.00	111	Growth rate of Methane emissions	100.00	1
GEF benefits index for biodiversity	3.00	63	CO_2 emissions per unit of land area	99.99	16
2.2 Ecological Safeguard	28.28	52			
Terrestrial protected areas	40.76	44	CO_2 emissions per unit of energy consumption	68.80	26
Marine protected areas	9.56	28			
2.3 Air Quality	57.63	69	4 Environment Management Competitiveness	48.44	80
Inhalable particles (PM10)	94.89	3			
Particulate matter (PM2.5)	82.51	80	4.1 Environmental Governance	68.00	108
Index of indoor air pollution	18.90	80			
			Agricultural chemicals regulation	N/A	N/A
Nitrogen oxides emission	68.91	9			
Sulfur dioxide emission	40.95	15	Percentage of the rural population with access to an improved water source	41.00	114
3 Environment Carrying Competitiveness	69.51	42			
3.1 Agricultural Carrying	66.15	71			
Cereal yield per unit of arable land	15.91	94	Percentage of the urban population with access to an improved water source	95.00	93
Fertilizer consumption per unit of arable land	99.51	19			
Annual freshwater withdrawals for agriculture per unit of arable land	99.77	37	4.2 Ecological Protection	40.74	41
			Area of plantation and afforestation	0.04	101
3.2 Industrial Carrying	95.73	11	Biome protect	89.40	26
Net exports of goods as a percentage of GDP	83.30	55	Overfishing of fishing resources	46.34	61
			4.3 Resource Utilization	39.15	57
Electric power consumption per unit of value added of industry	99.70	5	Utilization rate of water resources	0.00	132
			Percentage of total internal renewable water resources to total water resources	73.21	53
SO_2 emissions per unit of value added of industry	99.97	18			

(continued)

Table 56.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
Percentage of agricultural land to total land area	23.58	113	Renewable internal freshwater resources per capita	100.00	2
Percentage of fossil fuel energy consumption to total energy consumption	59.80	24	SO_2 emissions per capita	95.68	66
			CO_2 emissions per capita	95.33	51
			Energy consumption per capita	89.92	64
5 Environment Harmony Competitiveness	76.94	3	5.2 Economy and Environment	70.44	26
5.1 Population and Environment	83.44	4	Land resource utilization efficiency	0.02	107
Percentage of population with access to Improved sanitation facilities	33.00	108	Sulfur dioxide emissions per unit of GDP	96.33	53
			Carbon dioxide emissions per unit of GDP	94.60	19
Motor vehicles per 1,000 people	98.52	16	Energy consumption per unit of GDP	90.82	40

Table 56.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	3	3	7	0	1
Ecological Environment Competitiveness	11	2	0	2	4	3
Environment Carrying Competitiveness	15	3	5	1	6	0
Environment Management Competitiveness	10	0	1	3	0	5
Environment Harmony Competitiveness	10	2	3	2	1	2
Total	60	10	12	15	11	11

Chapter 57
Report on Global Environment Competitiveness of Georgia

Georgia is located at the crossroads of Western Asia and Eastern Europe. It is bounded to the west by the Black Sea, to the north by Russia, to the south by Turkey and Armenia, and to the southeast by Azerbaijan. It covers 69.5 thousand of square kilometers and has a population of 4.49 million. Its GDP reaches $14.37 billion in 2011. Through the index system and evaluation model, the environment competitiveness index of Georgia ranks at 58 in 133 countries.

Score: 50.84
Rank: 58

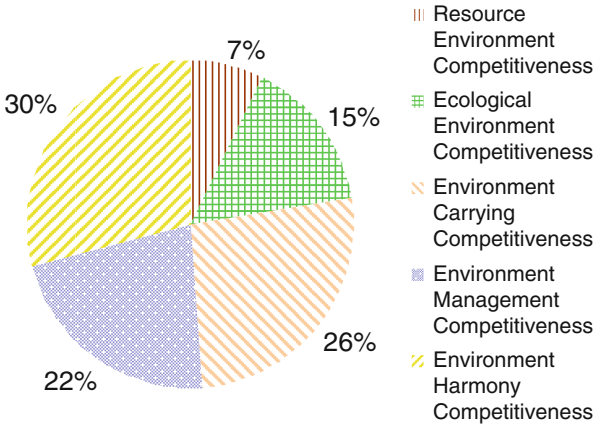

Fig. 57.1 Contribution of sub-index to GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_57,

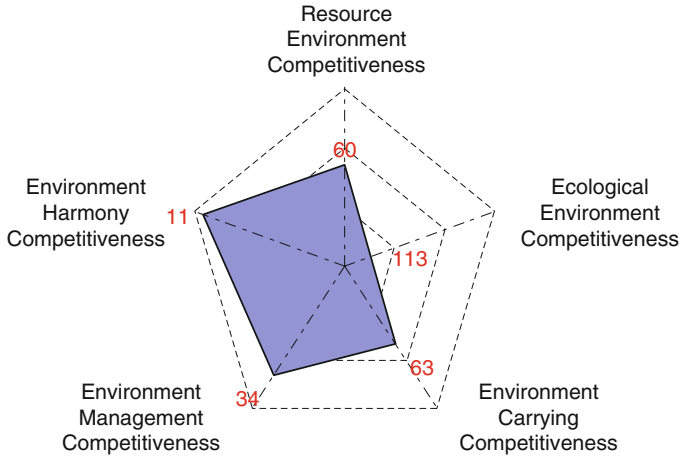

Fig. 57.2 Rank of sub-index of GEC

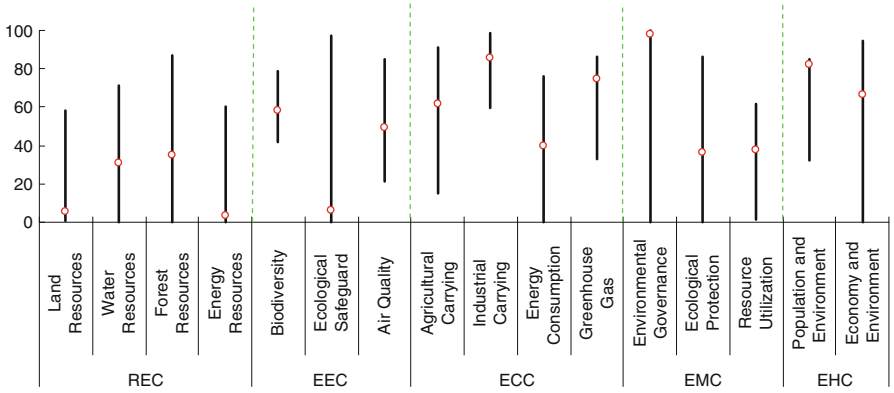

Fig. 57.3 Score and rank of the pillars of GEC

Table 57.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	18.34	60	Groundwater	35.69	17
1.1 Land Resources	5.39	120	Total internal renewable water resources	42.19	28
Land area per capita	2.77	56	1.3 Forest Resources	35.17	40
Percentage of arable land to total land area	9.96	101	Growing stock in forest and other wooded land	51.42	63
Arable land per capita	4.32	101	Proportion of land area covered by forest	46.18	38
1.2 Water Resources	30.73	33	Forest area per capita	4.26	43
Surface water	10.13	33	1.4 Energy Resources	3.36	92
Annual precipitation	34.89	59			

(continued)

Table 57.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
Fossil energy	0.00	64	Annual freshwater withdrawals for industry per value added of industry	81.90	122
Energy production	0.30	102			
Proportion of combustible renewable and waste to total energy consumption	12.33	58	3.3 Energy Consumption	39.55	25
			Energy consumption per unit of land area	99.91	42
Net energy imports of the energy consumption	5.25	97	Ratio of clean energy consumption	36.46	20
2 Ecological Environment Competitiveness	39.12	113	Elasticity of energy consumption	14.07	51
2.1 Biodiversity	58.30	60	Elasticity of electric power consumption	7.77	114
Threatened fish species	95.75	24			
Threatened mammal species	94.57	59	3.4 Greenhouse Gas	74.60	12
			Growth rate of CO_2 emissions	78.87	5
Threatened plant species	100.00	1			
GEF benefits index for biodiversity	0.60	95	Growth rate of Methane emissions	56.45	83
2.2 Ecological Safeguard	6.03	110			
Terrestrial protected areas	9.78	105	CO_2 emissions per unit of land area	99.92	46
Marine protected areas	0.40	79			
2.3 Air Quality	49.55	99	CO_2 emissions per unit of energy consumption	58.91	34
Inhalable particles (PM10)	64.23	97			
Particulate matter (PM2.5)	82.91	77	4 Environment Management Competitiveness	55.35	34
Index of indoor air pollution	12.30	87	4.1 Environmental Governance	98.00	31
Nitrogen oxides emission	68.58	35	Agricultural chemicals regulation	N/A	N/A
Sulfur dioxide emission	40.97	11			
3 Environment Carrying Competitiveness	67.17	63	Percentage of the rural population with access to an improved water source	96.00	46
3.1 Agricultural Carrying	61.85	104			
Cereal yield per unit of arable land	10.14	111	Percentage of the urban population with access to an improved water source	100.00	1
Fertilizer consumption per unit of arable land	96.53	52			
Annual freshwater withdrawals for agriculture per unit of arable land	96.11	86	4.2 Ecological Protection	36.52	56
			Area of plantation and afforestation	0.24	70
3.2 Industrial Carrying	85.94	107	Biome protect	21.40	106
Net exports of goods as a percentage of GDP	90.40	21	Overfishing of fishing resources	100.00	1
Electric power consumption per unit of value added of industry	71.63	118	4.3 Resource Utilization	37.82	63
			Utilization rate of water resources	0.10	92
SO_2 emissions per unit of value added of industry	99.84	60	Percentage of total internal renewable water resources to total water resources	70.48	60

(continued)

Table 57.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
Percentage of agricultural land to total land area	42.66	84	Renewable internal freshwater resources per capita	15.68	27
Percentage of fossil fuel energy consumption to total energy consumption	38.04	43	SO_2 emissions per capita	98.89	22
			CO_2 emissions per capita	97.10	38
			Energy consumption per capita	95.59	34
5 Environment Harmony Competitiveness	74.23	11	5.2 Economy and Environment	66.19	57
5.1 Population and Environment	82.27	7	Land resource utilization efficiency	0.06	87
Percentage of population with access to Improved sanitation facilities	95.00	47	Sulfur dioxide emissions per unit of GDP	96.81	43
			Carbon dioxide emissions per unit of GDP	85.59	74
Motor vehicles per 1,000 people	85.93	60	Energy consumption per unit of GDP	82.29	74

Table 57.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	0	1	7	3	3
Ecological Environment Competitiveness	11	1	1	3	4	2
Environment Carrying Competitiveness	15	1	4	5	1	4
Environment Management Competitiveness	10	0	0	4	4	1
Environment Harmony Competitiveness	10	1	2	5	2	0
Total	60	3	8	24	14	10

Chapter 58
Report on Global Environment Competitiveness of Germany

Germany is located in west-central Europe. It borders Denmark, Poland, Czech, Austria, Switzerland, France, Luxemburg, Belgium, Holland. It covers 348.6 thousand of square kilometers and has a population of 81.80 million. Its GDP reaches $3,600.83 billion in 2011. Through the index system and evaluation model, the environment competitiveness index of Germany ranks at 2 in 133 countries.

Score: 58.45
Rank: 2

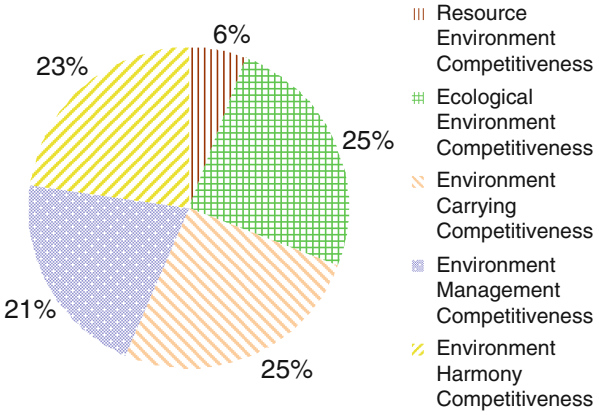

Fig. 58.1 Contribution of sub-index to GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_58,

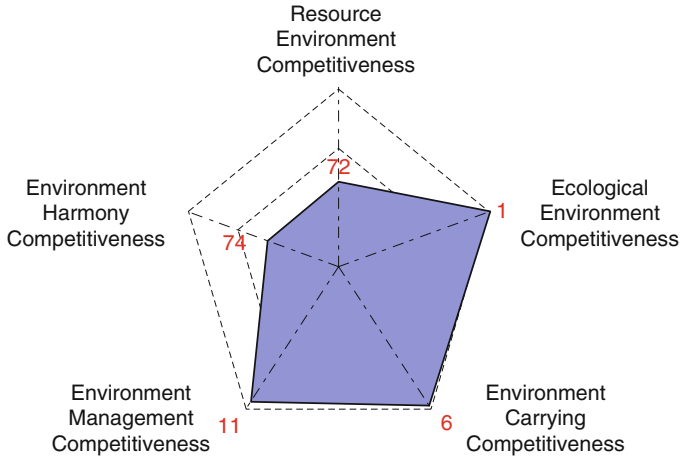

Fig. 58.2 Rank of sub-index of GEC

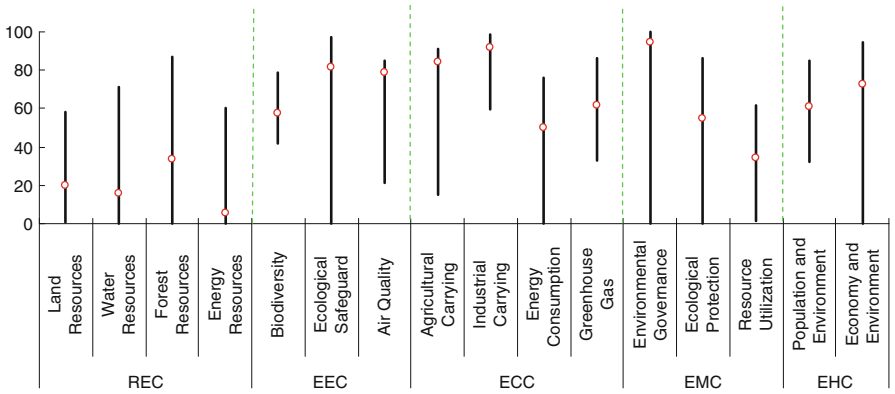

Fig. 58.3 Score and rank of the pillars of GEC

Table 58.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	16.94	72	Total internal renewable water resources	15.48	62
1.1 Land Resources	19.67	31	1.3 Forest Resources	33.34	52
Land area per capita	0.74	116	Growing stock in forest and other wooded land	60.58	15
Percentage of arable land to total land area	57.77	16	Proportion of land area covered by forest	37.22	54
Arable land per capita	6.79	76	Forest area per capita	0.94	90
1.2 Water Resources	15.85	63	1.4 Energy Resources	5.28	67
Surface water	4.75	57	Fossil energy	6.81	15
Annual precipitation	24.32	72	Energy production	1.62	46
Groundwater	18.85	43			

(continued)

Table 58.1 (continued)

Indicators	Score	Rank
Proportion of combustible renewable and waste to total energy consumption	9.62	63
Net energy imports of the energy consumption	4.99	99
2 Ecological Environment Competitiveness	73.00	1
2.1 Biodiversity	57.27	80
Threatened fish species	89.15	62
Threatened mammal species	96.74	30
Threatened plant species	99.24	67
GEF benefits index for biodiversity	0.60	95
2.2 Ecological Safeguard	81.19	3
Terrestrial protected areas	99.73	2
Marine protected areas	53.39	2
2.3 Air Quality	78.65	34
Inhalable particles (PM10)	88.32	23
Particulate matter (PM2.5)	82.79	78
Index of indoor air pollution	100.00	1
Nitrogen oxides emission	56.91	125
Sulfur dioxide emission	39.31	103
3 Environment Carrying Competitiveness	75.16	6
3.1 Agricultural Carrying	84.24	5
Cereal yield per unit of arable land	71.61	10
Fertilizer consumption per unit of arable land	85.33	98
Annual freshwater withdrawals for agriculture per unit of arable land	99.99	2
3.2 Industrial Carrying	91.63	66
Net exports of goods as a percentage of GDP	73.96	91
Electric power consumption per unit of value added of industry	95.69	27
SO_2 emissions per unit of value added of industry	99.99	13
Annual freshwater withdrawals for industry per value added of industry	96.89	72
3.3 Energy Consumption	50.04	5
Energy consumption per unit of land area	98.00	117
Ratio of clean energy consumption	22.25	29
Elasticity of energy consumption	22.17	5
Elasticity of electric power consumption	57.73	3
3.4 Greenhouse Gas	61.97	63
Growth rate of CO_2 emissions	56.36	48
Growth rate of Methane emissions	62.10	37
CO_2 emissions per unit of land area	97.57	123
CO_2 emissions per unit of energy consumption	37.48	79
4 Environment Management Competitiveness	60.27	11
4.1 Environmental Governance	94.29	47
Agricultural chemicals regulation	85.71	46
Percentage of the rural population with access to an improved water source	100.00	1
Percentage of the urban population with access to an improved water source	100.00	1
4.2 Ecological Protection	54.49	9
Area of plantation and afforestation	6.85	10
Biome protect	100.00	1
Overfishing of fishing resources	72.50	14
4.3 Resource Utilization	33.97	77
Utilization rate of water resources	0.85	39
Percentage of total internal renewable water resources to total water resources	53.77	84
Percentage of agricultural land to total land area	57.25	53

(continued)

Table 58.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
Percentage of fossil fuel energy consumption to total energy consumption	24.01	68	SO_2 emissions per capita	97.07	56
			CO_2 emissions per capita	74.84	113
			Energy consumption per capita	69.49	102
5 Environment Harmony Competitiveness	66.88	74	5.2 Economy and Environment	72.93	14
5.1 Population and Environment	60.84	116	Land resource utilization efficiency	3.02	10
Percentage of population with access to Improved sanitation facilities	100.00	1	Sulfur dioxide emissions per unit of GDP	99.53	12
Motor vehicles per 1,000 people	21.98	127	Carbon dioxide emissions per unit of GDP	93.35	32
Renewable internal freshwater resources per capita	1.58	89	Energy consumption per unit of GDP	95.80	12

Table 58.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	0	3	6	4	1
Ecological Environment Competitiveness	11	3	2	1	4	1
Environment Carrying Competitiveness	15	4	3	2	4	2
Environment Management Competitiveness	10	4	0	4	2	0
Environment Harmony Competitiveness	10	2	2	2	1	3
Total	60	13	10	15	15	7

Chapter 59
Report on Global Environment Competitiveness of Ghana

Ghana is located in West Africa. It Borders Côte d'Ivoire (Ivory Coast) to the west, Burkina Faso to the north, Togo to the east, and the Gulf of Guinea to the south. It covers 227.5 thousand of square kilometers and has a population of 24.97 million. Its GDP reaches $39.20 billion in 2011. Through the index system and evaluation model, the environment competitiveness index of Ghana ranks at 74 in 133 countries.

Score: 49.22
Rank: 74

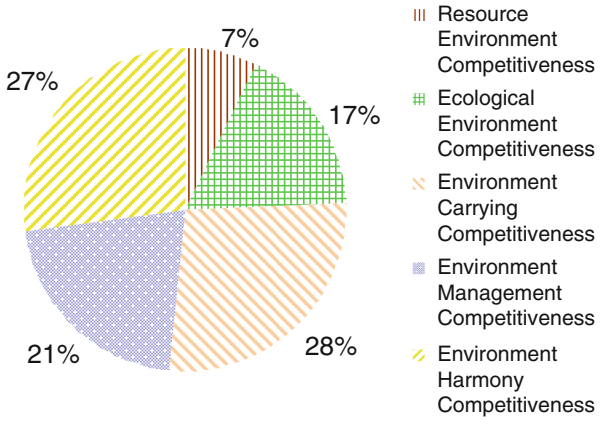

Fig. 59.1 Contribution of sub-index to GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_59,

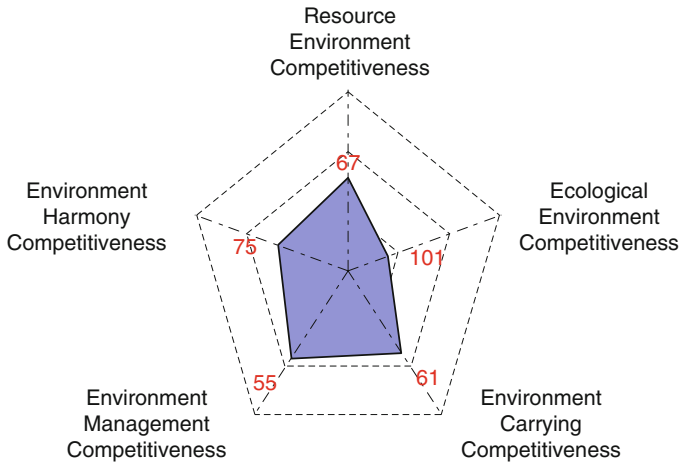

Fig. 59.2 Rank of sub-index of GEC

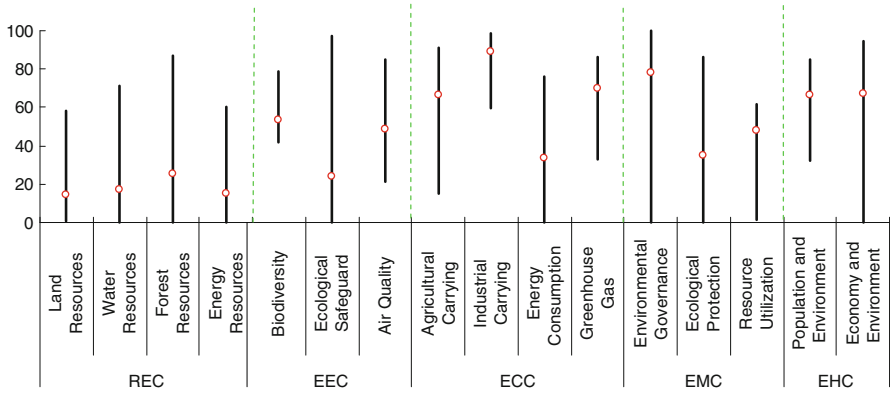

Fig. 59.3 Score and rank of the pillars of GEC

Table 59.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	17.57	67	Annual precipitation	42.19	43
1.1 Land Resources	14.06	58	Groundwater	16.61	47
Land area per capita	1.62	90	Total internal renewable water resources	6.72	88
Percentage of arable land to total land area	35.70	37	1.3 Forest Resources	25.60	82
Arable land per capita	9.00	69	Growing stock in forest and other wooded land	50.88	75
1.2 Water Resources	16.99	60	Proportion of land area covered by forest	24.83	77
Surface water	2.46	84			

(continued)

Table 59.1 (continued)

Indicators	Score	Rank
Forest area per capita	1.35	76
1.4 Energy Resources	15.13	30
Fossil energy	0.00	64
Energy production	0.28	105
Proportion of combustible renewable and waste to total energy consumption	68.36	16
Net energy imports of the energy consumption	9.11	66
2 Ecological Environment Competitiveness	42.51	101
2.1 Biodiversity	53.50	116
Threatened fish species	79.25	97
Threatened mammal species	91.30	90
Threatened plant species	93.17	109
GEF benefits index for biodiversity	1.90	70
2.2 Ecological Safeguard	23.80	61
Terrestrial protected areas	39.67	48
Marine protected areas	N/A	N/A
2.3 Air Quality	48.31	103
Inhalable particles (PM10)	83.94	47
Particulate matter(PM2.5)	71.88	104
Index of Indoor air pollution	2.70	114
Nitrogen oxides emission	67.97	62
Sulfur dioxide emission	40.91	27
3 Environment Carrying Competitiveness	67.25	61
3.1 Agricultural Carrying	66.16	70
Cereal yield per unit of arable land	16.27	93
Fertilizer consumption per unit of arable land	99.04	28
Annual freshwater withdrawals for agriculture per unit of arable land	99.80	33
3.2 Industrial Carrying	88.82	90
Net exports of goods as a percentage of GDP	70.26	100
Electric power consumption per unit of value added of industry	86.75	97
SO_2 emissions per unit of value added of industry	99.80	69
Annual freshwater withdrawals for industry per value added of industry	98.49	51
3.3 Energy Consumption	33.77	63
Energy consumption per unit of land area	99.92	39
Ratio of clean energy consumption	10.92	53
Elasticity of energy consumption	13.84	70
Elasticity of electric power consumption	10.39	80
3.4 Greenhouse Gas	70.02	19
Growth rate of CO_2 emissions	51.06	72
Growth rate of Methane emissions	72.76	8
CO_2 emissions per unit of land area	99.95	38
CO_2 emissions per unit of energy consumption	75.28	20
4 Environment Management Competitiveness	51.92	55
4.1 Environmental Governance	77.97	89
Agricultural chemicals regulation	66.67	65
Percentage of the rural population with access to an improved water source	80.00	77
Percentage of the urban population with access to an improved water source	91.00	106
4.2 Ecological Protection	35.16	63
Area of plantation and afforestation	0.34	63
Biome protect	78.10	47
Overfishing of fishing resources	38.64	76
4.3 Resource Utilization	48.24	17
Utilization rate of water resources	0.07	96
Percentage of total internal renewable water resources to total water resources	38.75	100

(continued)

Table 59.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
Percentage of agricultural land to total land area	80.52	17	Renewable internal freshwater resources per capita	1.47	93
Percentage of fossil fuel energy consumption to total energy consumption	73.61	16	SO_2 emissions per capita	99.50	14
			CO_2 emissions per capita	99.06	21
			Energy consumption per capita	98.10	13
5 Environment Harmony Competitiveness	66.85	75	5.2 Economy and Environment	67.14	52
5.1 Population and Environment	66.55	90	Land resource utilization efficiency	0.05	90
Percentage of population with access to Improved sanitation facilities	13.00	124	Sulfur dioxide emissions per unit of GDP	97.15	35
			Carbon dioxide emissions per unit of GDP	90.81	47
Motor vehicles per 1,000 people	96.17	30	Energy consumption per unit of GDP	80.53	77

Table 59.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	0	2	5	6	1
Ecological Environment Competitiveness	11	0	0	2	4	5
Environment Carrying Competitiveness	15	1	2	3	9	0
Environment Management Competitiveness	10	0	2	1	7	0
Environment Harmony Competitiveness	10	0	3	3	3	1
Total	60	1	9	14	29	7

Chapter 60
Report on Global Environment Competitiveness of Greece

Greece is located in Southeast Europe. It borders Albania, the Republic of Macedonia and Bulgaria to the north, Turkey to the east. It covers 128.9 thousand of square kilometers and has a population of 11.30 million. Its GDP reaches $289.63 billion in 2011. Through the index system and evaluation model, the environment competitiveness index of Greece ranks at 33 in 133 countries.

Score: 53.03
Rank: 33

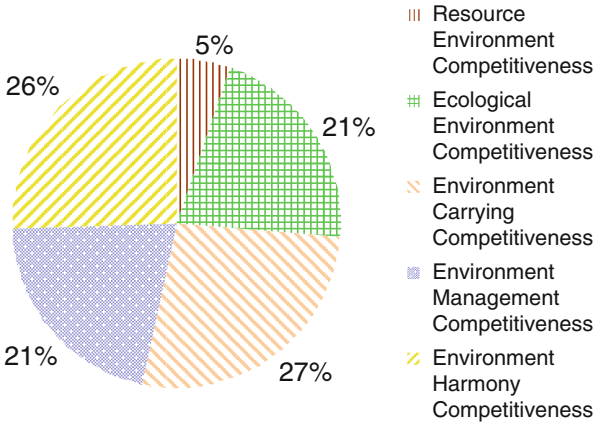

Fig. 60.1 Contribution of sub-index to GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_60,

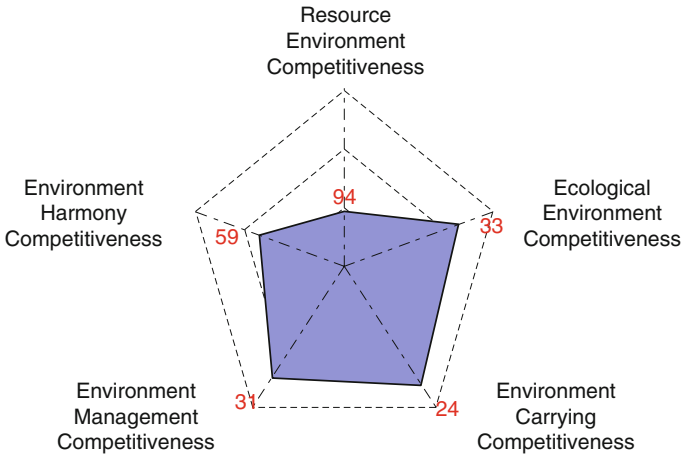

Fig. 60.2 Rank of sub-index of GEC

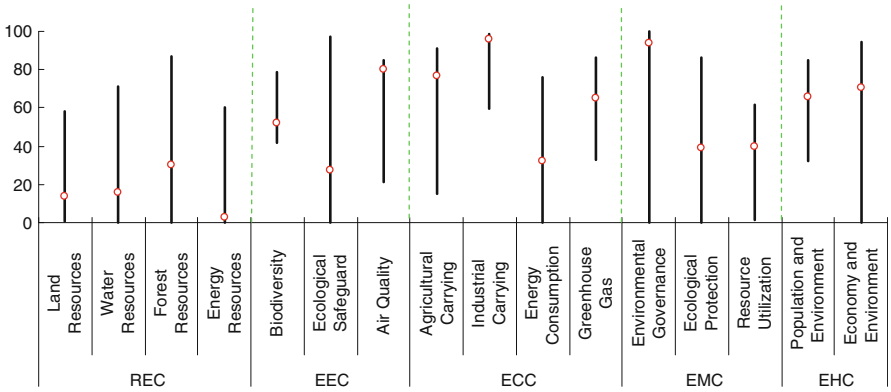

Fig. 60.3 Score and rank of the pillars of GEC

Table 60.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	14.36	94	Groundwater	11.47	60
1.1 Land Resources	13.76	62	Total internal renewable water resources	22.69	47
Land area per capita	2.03	78	1.3 Forest Resources	30.19	65
Percentage of arable land to total land area	32.81	41	Growing stock in forest and other wooded land	50.56	82
Arable land per capita	10.35	59	Proportion of land area covered by forest	35.74	61
1.2 Water Resources	15.70	64	Forest area per capita	2.43	60
Surface water	6.01	54	1.4 Energy Resources	2.86	102

(continued)

Table 60.1 (continued)

Indicators	Score	Rank
Fossil energy	3.65	20
Energy production	0.84	65
Proportion of combustible renewable and waste to total energy consumption	4.17	90
Net energy imports of the energy consumption	4.23	103
2 Ecological Environment Competitiveness	55.93	33
2.1 Biodiversity	52.35	123
Threatened fish species	64.62	121
Threatened mammal species	94.57	59
Threatened plant species	96.97	96
GEF benefits index for biodiversity	2.80	66
2.2 Ecological Safeguard	27.58	53
Terrestrial protected areas	43.75	42
Marine protected areas	3.32	52
2.3 Air Quality	79.87	25
Inhalable particles (PM10)	80.29	58
Particulate matter (PM2.5)	88.76	42
Index of indoor air pollution	100.00	1
Nitrogen oxides emission	67.73	69
Sulfur dioxide emission	39.35	97
3 Environment Carrying Competitiveness	71.22	24
3.1 Agricultural Carrying	76.90	19
Cereal yield per unit of arable land	51.20	26
Fertilizer consumption per unit of arable land	93.23	73
Annual freshwater withdrawals for agriculture per unit of arable land	94.84	95
3.2 Industrial Carrying	95.74	10
Net exports of goods as a percentage of GDP	93.34	9
Electric power consumption per unit of value added of industry	90.44	78
SO_2 emissions per unit of value added of industry	99.66	84
Annual freshwater withdrawals for industry per value added of industry	99.55	17
3.3 Energy Consumption	31.95	87
Energy consumption per unit of land area	99.55	92
Ratio of clean energy consumption	5.16	69
Elasticity of energy consumption	13.51	94
Elasticity of electric power consumption	9.60	101
3.4 Greenhouse Gas	65.18	42
Growth rate of CO_2 emissions	76.33	8
Growth rate of Methane emissions	57.42	76
CO_2 emissions per unit of land area	99.27	107
CO_2 emissions per unit of energy consumption	16.52	121
4 Environment Management Competitiveness	55.61	31
4.1 Environmental Governance	93.99	48
Agricultural chemicals regulation	85.71	46
Percentage of the rural population with access to an improved water source	99.00	30
Percentage of the urban population with access to an improved water source	100.00	1
4.2 Ecological Protection	38.99	48
Area of plantation and afforestation	0.18	77
Biome protect	95.80	20
Overfishing of fishing resources	33.94	84
4.3 Resource Utilization	39.40	56
Utilization rate of water resources	0.51	57
Percentage of total internal renewable water resources to total water resources	70.69	59

(continued)

Table 60.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
Percentage of agricultural land to total land area	75.18	23	SO_2 emissions per capita	79.29	114
			CO_2 emissions per capita	79.89	101
Percentage of fossil fuel energy consumption to total energy consumption	11.20	95	Energy consumption per capita	81.84	82
			5.2 Economy and Environment	70.48	25
5 Environment Harmony Competitiveness	68.04	59	Land resource utilization efficiency	0.66	26
5.1 Population and Environment	65.60	94	Sulfur dioxide emissions per unit of GDP	93.98	69
Percentage of population with access to Improved sanitation facilities	98.00	33	Carbon dioxide emissions per unit of GDP	91.07	46
Motor vehicles per 1,000 people	44.57	103	Energy consumption per unit of GDP	96.22	11
Renewable internal freshwater resources per capita	6.21	49			

Table 60.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	0	1	3	9	1
Ecological Environment Competitiveness	11	1	1	5	2	2
Environment Carrying Competitiveness	15	3	2	1	8	1
Environment Management Competitiveness	10	0	3	6	1	0
Environment Harmony Competitiveness	10	0	2	3	2	3
Total	60	4	9	18	22	7

Chapter 61
Report on Global Environment Competitiveness of Guatemala

Guatemala is in Central America. It is bordered by Mexico to the north, the Pacific Ocean to the west, Belize to the northeast, the Caribbean to the east, and Honduras and El Salvador to the southeast. It covers 107 thousand of square kilometers and has a population of 14.76 million. Its GDP reaches $46.90 billion in 2011. Through the index system and evaluation model, the environment competitiveness index of Guatemala ranks at 17 in 133 countries.

Score: 55.16
Rank: 17

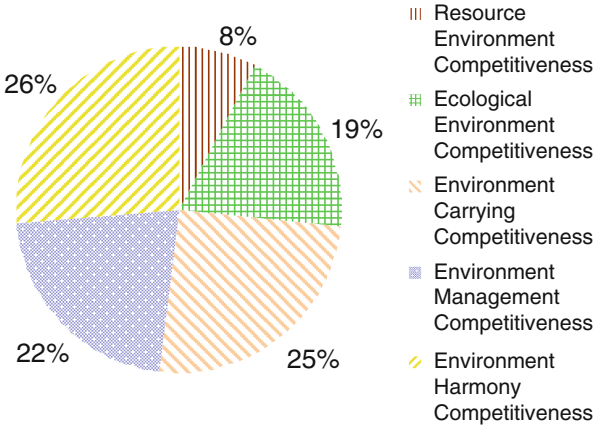

Fig. 61.1 Contribution of sub-index to GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_61,

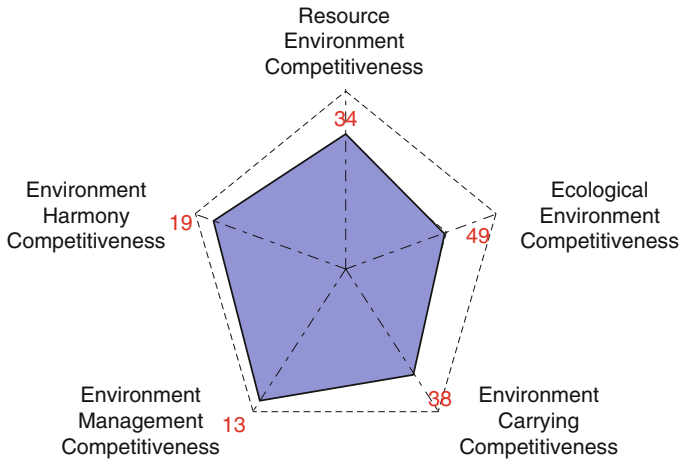

Fig. 61.2 Rank of sub-index of GEC

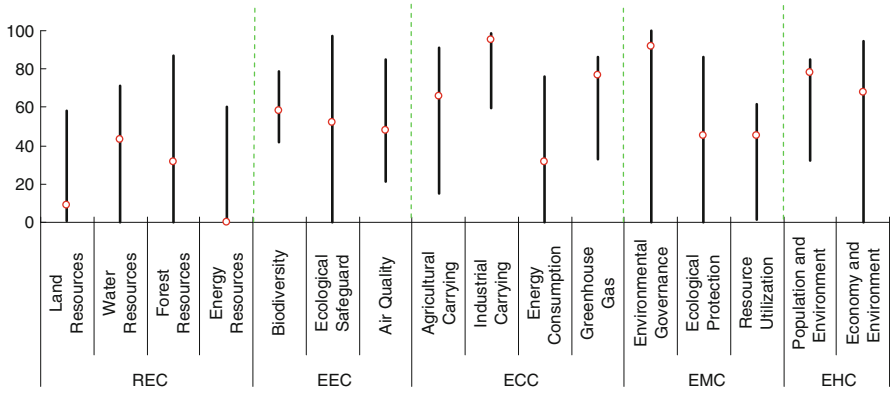

Fig. 61.3 Score and rank of the pillars of GEC

Table 61.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	21.15	34	Annual precipitation	67.37	13
1.1 Land Resources	8.94	91	Groundwater	45.25	11
Land area per capita	1.23	105	Total internal renewable water resources	50.94	17
Percentage of arable land to total land area	23.56	60	1.3 Forest Resources	31.67	58
Arable land per capita	4.62	97	Growing stock in forest and other wooded land	51.81	57
1.2 Water Resources	43.43	15	Proportion of land area covered by forest	39.04	49
Surface water	10.17	31			

(continued)

Table 61.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
Forest area per capita	1.69	68	Annual freshwater withdrawals for industry per value added of industry	98.05	58
1.4 Energy Resources	0.00	125	3.3 Energy Consumption	31.49	95
Fossil energy	0.00	64	Energy consumption per unit of land area	99.78	63
Energy production	0.51	81	Ratio of clean energy consumption	3.00	79
Proportion of combustible renewable and waste to total energy consumption	60.26	18	Elasticity of energy consumption	12.90	110
Net energy imports of the energy consumption	9.27	64	Elasticity of electric power consumption	10.27	82
2 Ecological Environment Competitiveness	52.30	49	3.4 Greenhouse Gas	76.93	7
2.1 Biodiversity	58.26	61	Growth rate of CO_2 emissions	76.67	6
Threatened fish species	88.21	68	Growth rate of Methane emissions	52.32	103
Threatened mammal species	91.30	89	CO_2 emissions per unit of land area	99.89	50
Threatened plant species	95.80	102	CO_2 emissions per unit of energy consumption	75.28	19
GEF benefits index for biodiversity	8.00	34	4 Environment Management Competitiveness	59.37	13
2.2 Ecological Safeguard	52.02	13	4.1 Environmental Governance	92.00	58
Terrestrial protected areas	75.82	7	Agricultural chemicals regulation	N/A	N/A
Marine protected areas	16.33	18	Percentage of the rural population with access to an improved water source	86.00	70
2.3 Air Quality	48.03	105	Percentage of the urban population with access to an improved water source	98.00	69
Inhalable particles (PM10)	62.04	98	4.2 Ecological Protection	45.35	22
Particulate matter (PM2.5)	86.26	59	Area of plantation and afforestation	0.22	72
Index of indoor air pollution	6.90	102	Biome protect	78.90	45
Nitrogen oxides emission	67.83	63	Overfishing of fishing resources	71.98	15
Sulfur dioxide emission	40.80	48	4.3 Resource Utilization	45.44	28
3 Environment Carrying Competitiveness	69.92	38	Utilization rate of water resources	0.10	90
3.1 Agricultural Carrying	65.55	77	Percentage of total internal renewable water resources to total water resources	79.60	39
Cereal yield per unit of arable land	21.70	84			
Fertilizer consumption per unit of arable land	91.32	81			
Annual freshwater withdrawals for agriculture per unit of arable land	98.26	70			
3.2 Industrial Carrying	95.23	16			
Net exports of goods as a percentage of GDP	86.06	38			
Electric power consumption per unit of value added of industry	98.07	8			
SO_2 emissions per unit of value added of industry	98.75	121			

(continued)

Table 61.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
Percentage of agricultural land to total land area	47.61	73	SO_2 emissions per capita	98.13	37
			CO_2 emissions per capita	98.15	28
Percentage of fossil fuel energy consumption to total energy consumption	54.44	28	Energy consumption per capita	95.48	36
			5.2 Economy and Environment	67.85	46
5 Environment Harmony Competitiveness	73.07	19	Land resource utilization efficiency	0.12	59
5.1 Population and Environment	78.28	26	Sulfur dioxide emissions per unit of GDP	95.10	63
Percentage of population with access to Improved sanitation facilities	81.00	76	Carbon dioxide emissions per unit of GDP	92.41	35
Motor vehicles per 1,000 people	85.43	61	Energy consumption per unit of GDP	83.79	67
Renewable internal freshwater resources per capita	8.19	43			

Table 61.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	0	4	5	3	2
Ecological Environment Competitiveness	11	1	1	1	5	3
Environment Carrying Competitiveness	15	3	1	2	6	3
Environment Management Competitiveness	10	0	2	3	4	0
Environment Harmony Competitiveness	10	0	2	5	3	0
Total	60	4	10	16	21	8

Chapter 62
Report on Global Environment Competitiveness of Guinea

Guinea is located in West Africa. It shares its northern border with Guinea-Bissau, Senegal, and Mali, its western border with Sierra Leone, its southern border with Liberia and its southeast border with Cote d'Ivoire. It covers 245.7 thousand of square kilometers and has a population of 10.22 million. Its GDP reaches $5.09 billion in 2011. Through the index system and evaluation model, the environment competitiveness index of Guinea ranks at 100 in 133 countries.

Score: 46.82
Rank: 100

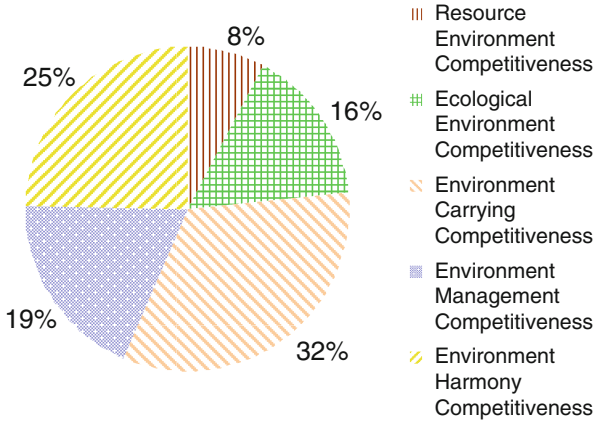

Fig. 62.1 Contribution of sub-index to GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_62,

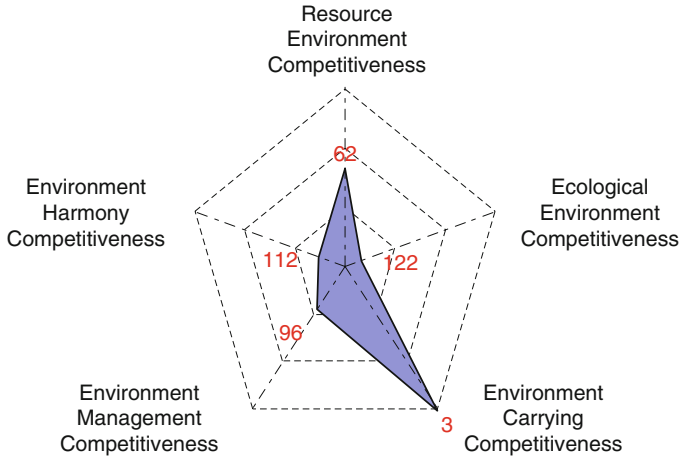

Fig. 62.2 Rank of sub-index of GEC

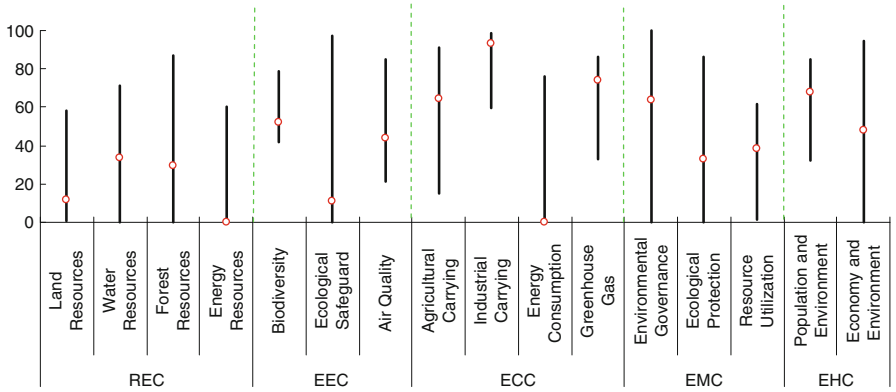

Fig. 62.3 Score and rank of the pillars of GEC

Table 62.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	18.23	62	Groundwater	22.24	33
1.1 Land Resources	11.50	75	Total internal renewable water resources	46.39	22
Land area per capita	4.31	40	1.3 Forest Resources	29.20	68
Percentage of arable land to total land area	19.55	71	Growing stock in forest and other wooded land	51.53	61
Arable land per capita	13.05	40	Proportion of land area covered by forest	31.02	67
1.2 Water Resources	33.64	29	Forest area per capita	4.44	41
Surface water	9.93	34	1.4 Energy Resources	0.00	125
Annual precipitation	56.01	25			

(continued)

Table 62.1 (continued)

Indicators	Score	Rank
Fossil energy	0.00	64
Energy production	N/A	N/A
Proportion of combustible renewable and waste to total energy consumption	N/A	N/A
Net energy imports of the energy consumption	N/A	N/A
2 Ecological Environment Competitiveness	36.50	122
2.1 Biodiversity	52.14	124
Threatened fish species	69.34	115
Threatened mammal species	88.04	101
Threatened plant species	98.72	79
GEF benefits index for biodiversity	2.30	68
2.2 Ecological Safeguard	10.92	95
Terrestrial protected areas	18.21	86
Marine protected areas	N/A	N/A
2.3 Air Quality	43.95	116
Inhalable particles (PM10)	59.85	104
Particulate matter (PM2.5)	78.24	93
Index of indoor air pollution	0.30	126
Nitrogen oxides emission	67.30	81
Sulfur dioxide emission	41.00	2
3 Environment Carrying Competitiveness	77.55	3
3.1 Agricultural Carrying	64.45	92
Cereal yield per unit of arable land	11.70	107
Fertilizer consumption per unit of arable land	99.95	3
Annual freshwater withdrawals for agriculture per unit of arable land	99.28	54
3.2 Industrial Carrying	93.20	47
Net exports of goods as a percentage of GDP	79.63	72
Electric power consumption per unit of value added of industry	96.63	21
SO_2 emissions per unit of value added of industry	99.99	8
Annual freshwater withdrawals for industry per value added of industry	96.54	77
3.3 Energy Consumption	0.00	127
Energy consumption per unit of land area	N/A	N/A
Ratio of clean energy consumption	0.00	116
Elasticity of energy consumption	N/A	N/A
Elasticity of electric power consumption	N/A	N/A
3.4 Greenhouse Gas	73.75	13
Growth rate of CO_2 emissions	60.62	36
Growth rate of Methane emissions	N/A	N/A
CO_2 emissions per unit of land area	100.00	10
CO_2 emissions per unit of energy consumption	N/A	N/A
4 Environment Management Competitiveness	43.86	96
4.1 Environmental Governance	63.64	114
Agricultural chemicals regulation	42.86	80
Percentage of the rural population with access to an improved water source	65.00	96
Percentage of the urban population with access to an improved water source	90.00	111
4.2 Ecological Protection	33.02	70
Area of plantation and afforestation	0.12	82
Biome protect	39.90	86
Overfishing of fishing resources	70.00	17
4.3 Resource Utilization	38.53	59
Utilization rate of water resources	0.03	118
Percentage of total internal renewable water resources to total water resources	85.61	26

(continued)

Table 62.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
Percentage of agricultural land to total land area	68.50	34	SO_2 emissions per capita	99.99	2
			CO_2 emissions per capita	99.77	8
Percentage of fossil fuel energy consumption to total energy consumption	N/A	N/A	Energy consumption per capita	N/A	N/A
			5.2 Economy and Environment	47.98	116
5 Environment Harmony Competitiveness	57.93	112	Land resource utilization efficiency	0.00	125
5.1 Population and Environment	67.89	81	Sulfur dioxide emissions per unit of GDP	99.68	9
Percentage of population with access to Improved sanitation facilities	19.00	120	Carbon dioxide emissions per unit of GDP	92.23	38
Motor vehicles per 1,000 people	99.63	5	Energy consumption per unit of GDP	N/A	N/A
Renewable internal freshwater resources per capita	26.75	16			

Table 62.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	0	2	3	6	1
Ecological Environment Competitiveness	11	0	0	0	5	6
Environment Carrying Competitiveness	15	3	2	2	2	3
Environment Management Competitiveness	10	0	1	2	5	2
Environment Harmony Competitiveness	10	4	1	1	1	3
Total	60	7	6	8	19	15

Chapter 63
Report on Global Environment Competitiveness of Haiti

Haiti is a Caribbean country. It borders Dominican Republic to the east. It covers 27.6 thousand of square kilometers and has a population of 10.12 million. Its GDP reaches $7.35 billion in 2011. Through the index system and evaluation model, the environment competitiveness index of Haiti ranks at 98 in 133 countries.

Score: 47.00
Rank: 98

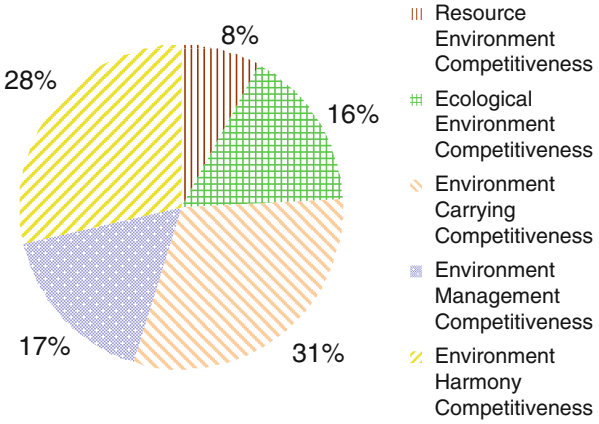

Fig. 63.1 Contribution of sub-index to GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_63,

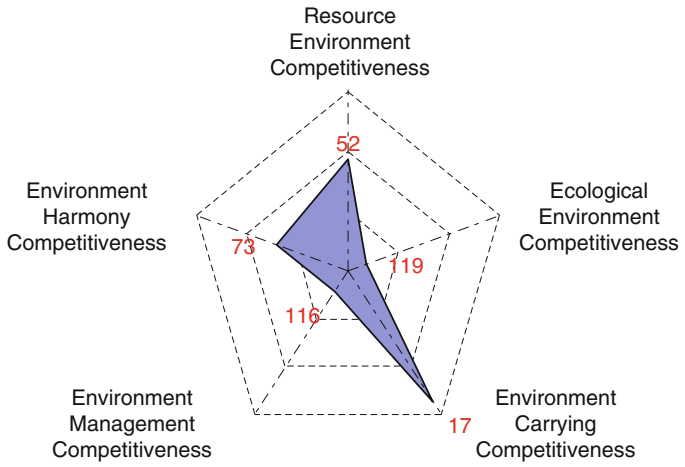

Fig. 63.2 Rank of sub-index of GEC

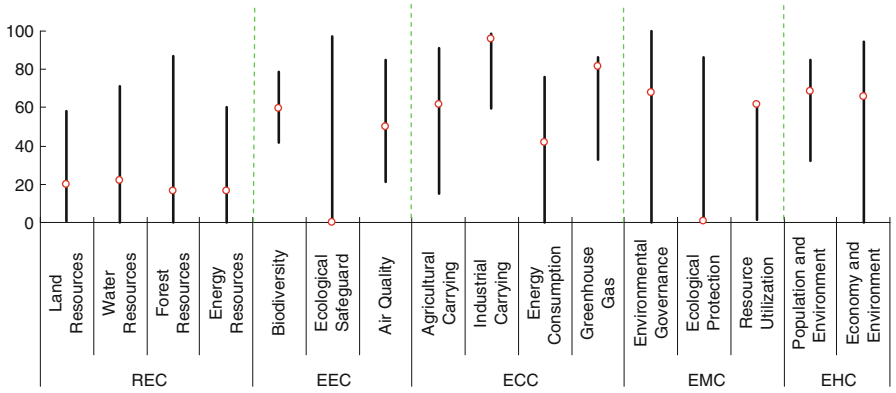

Fig. 63.3 Score and rank of the pillars of GEC

Table 63.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	18.92	52	Groundwater	11.24	62
1.1 Land Resources	20.03	30	Total internal renewable water resources	23.81	44
Land area per capita	0.47	126	1.3 Forest Resources	16.73	112
Percentage of arable land to total land area	61.54	14	Growing stock in forest and other wooded land	50.02	112
Arable land per capita	4.62	98	Proportion of land area covered by forest	4.26	113
1.2 Water Resources	22.21	47	Forest area per capita	0.07	125
Surface water	4.65	59	1.4 Energy Resources	16.36	27
Annual precipitation	49.16	37			

(continued)

Table 63.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
Fossil energy	0.00	64	3.3 Energy Consumption	41.94	19
Energy production	0.16	117	Energy consumption per unit of land area	99.83	57
Proportion of combustible renewable and waste to total energy consumption	74.82	13	Ratio of clean energy consumption	1.17	97
Net energy imports of the energy consumption	8.90	69	Elasticity of energy consumption	19.26	8
2 Ecological Environment Competitiveness	37.90	119	Elasticity of electric power consumption	47.51	4
2.1 Biodiversity	59.35	26	3.4 Greenhouse Gas	81.75	3
Threatened fish species	90.57	53	Growth rate of CO_2 emissions	85.01	2
Threatened mammal species	97.28	22	Growth rate of Methane emissions	60.98	49
Threatened plant species	98.48	83	CO_2 emissions per unit of land area	99.91	47
GEF benefits index for biodiversity	5.20	45	CO_2 emissions per unit of energy consumption	77.83	16
2.2 Ecological Safeguard	0.33	130	4 Environment Management Competitiveness	39.21	116
Terrestrial protected areas	0.54	128	4.1 Environmental Governance	68.00	108
Marine protected areas	N/A	N/A	Agricultural chemicals regulation	N/A	N/A
2.3 Air Quality	49.98	97	Percentage of the rural population with access to an improved water source	51.00	107
Inhalable particles (PM10)	74.45	79	Percentage of the urban population with access to an improved water source	85.00	118
Particulate matter (PM2.5)	91.71	27	4.2 Ecological Protection	0.75	131
Index of indoor air pollution	1.00	120	Area of plantation and afforestation	0.04	102
Nitrogen oxides emission	68.71	31	Biome protect	1.70	128
Sulfur dioxide emission	40.98	8	Overfishing of fishing resources	N/A	N/A
3 Environment Carrying Competitiveness	72.00	17	4.3 Resource Utilization	61.69	1
3.1 Agricultural Carrying	61.97	103	Utilization rate of water resources	0.34	66
Cereal yield per unit of arable land	6.85	120	Percentage of total internal renewable water resources to total water resources	92.75	10
Fertilizer consumption per unit of arable land	98.84	33	Percentage of agricultural land to total land area	78.91	20
Annual freshwater withdrawals for agriculture per unit of arable land	98.58	68			
3.2 Industrial Carrying	95.59	12			
Net exports of goods as a percentage of GDP	90.61	18			
Electric power consumption per unit of value added of industry	97.99	9			
SO_2 emissions per unit of value added of industry	99.76	74			
Annual freshwater withdrawals for industry per value added of industry	94.00	95			

(continued)

Table 63.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
Percentage of fossil fuel energy consumption to total energy consumption	74.77	15	SO_2 emissions per capita	99.74	6
			CO_2 emissions per capita	99.53	13
			Energy consumption per capita	99.31	3
5 Environment Harmony Competitiveness	66.96	73	5.2 Economy and Environment	65.74	61
5.1 Population and Environment	68.17	80	Land resource utilization efficiency	0.08	80
Percentage of population with access to Improved sanitation facilities	17.00	121	Sulfur dioxide emissions per unit of GDP	96.99	40
			Carbon dioxide emissions per unit of GDP	89.78	56
Motor vehicles per 1,000 people	98.77	12			
Renewable internal freshwater resources per capita	1.55	91	Energy consumption per unit of GDP	76.10	87

Table 63.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	0	4	3	2	5
Ecological Environment Competitiveness	11	0	3	2	3	3
Environment Carrying Competitiveness	15	4	3	4	2	2
Environment Management Competitiveness	10	2	1	0	1	5
Environment Harmony Competitiveness	10	1	2	2	4	1
Total	60	7	13	11	12	16

Chapter 64
Report on Global Environment Competitiveness of Honduras

Honduras is located in Central America. It borders Guatemala to the west, El Salvador to the southwest, Nicaragua to the southeast. It covers 111.9 thousand of square kilometers and has a population of 7.75 million. Its GDP reaches $17.43 billion in 2011. Through the index system and evaluation model, the environment competitiveness index of Honduras ranks at 16 in 133 countries.

Score: 55.21
Rank: 16

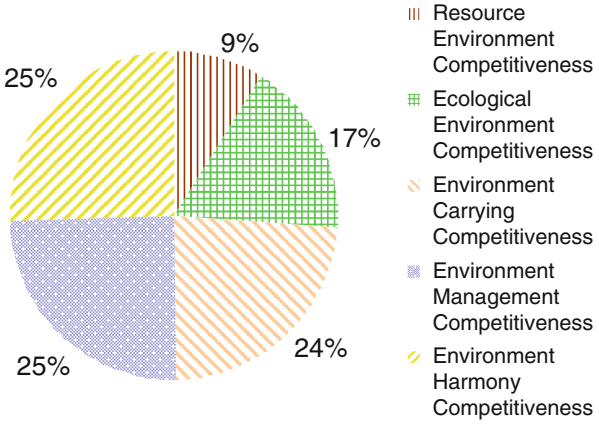

Fig. 64.1 Contribution of sub-index to GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_64,

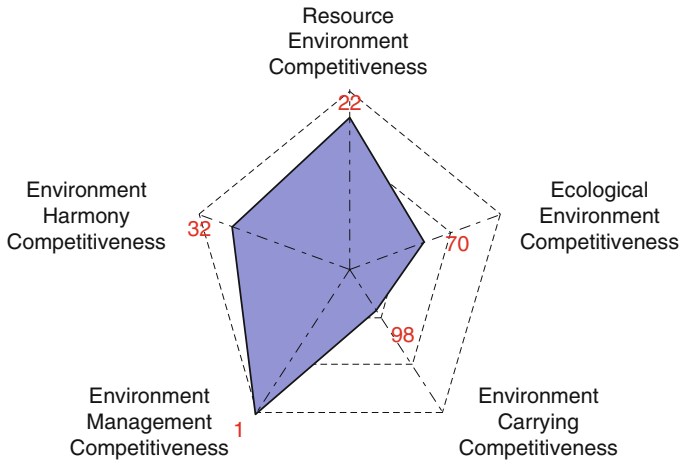

Fig. 64.2 Rank of sub-index of GEC

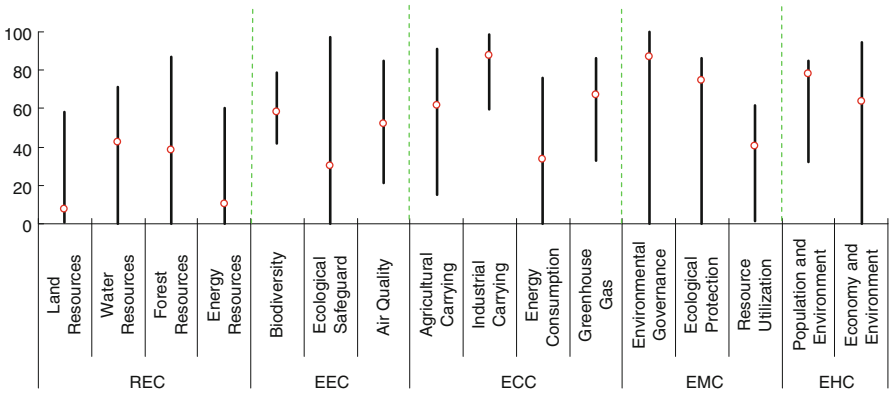

Fig. 64.3 Score and rank of the pillars of GEC

Table 64.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	24.89	22	Groundwater	50.19	10
1.1 Land Resources	7.48	106	Total internal renewable water resources	43.24	24
Land area per capita	2.58	62	1.3 Forest Resources	38.18	31
Percentage of arable land to total land area	15.33	85	Growing stock in forest and other wooded land	51.91	54
Arable land per capita	6.15	81	Proportion of land area covered by forest	53.09	24
1.2 Water Resources	42.29	19	Forest area per capita	4.56	39
Surface water	8.38	41	1.4 Energy Resources	10.23	43
Annual precipitation	67.37	14			

(continued)

Table 64.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
Fossil energy	0.00	64	3.3 Energy Consumption	33.66	64
Energy production	0.29	103	Energy consumption per unit of land area	99.92	38
Proportion of combustible renewable and waste to total energy consumption	46.08	27	Ratio of clean energy consumption	9.31	56
Net energy imports of the energy consumption	6.08	89	Elasticity of energy consumption	13.83	74
2 Ecological Environment Competitiveness	47.52	70	Elasticity of electric power consumption	11.58	37
2.1 Biodiversity	58.32	58	3.4 Greenhouse Gas	66.97	36
Threatened fish species	87.26	71	Growth rate of CO_2 emissions	61.73	33
Threatened mammal species	96.20	37	Growth rate of Methane emissions	52.95	100
Threatened plant species	93.76	107	CO_2 emissions per unit of land area	99.93	45
GEF benefits index for biodiversity	7.20	38	CO_2 emissions per unit of energy consumption	58.54	36
2.2 Ecological Safeguard	30.47	42	4 Environment Management Competitiveness	68.01	1
Terrestrial protected areas	49.18	33	4.1 Environmental Governance	87.00	75
Marine protected areas	2.39	59	Agricultural chemicals regulation	N/A	N/A
2.3 Air Quality	52.20	85	Percentage of the rural population with access to an improved water source	79.00	79
Inhalable particles (PM10)	75.18	76	Percentage of the urban population with access to an improved water source	95.00	93
Particulate matter (PM2.5)	91.70	28	4.2 Ecological Protection	74.43	3
Index of indoor air pollution	8.10	98	Area of plantation and afforestation	N/A	N/A
Nitrogen oxides emission	68.40	43	Biome protect	82.20	42
Sulfur dioxide emission	40.87	43	Overfishing of fishing resources	66.67	22
3 Environment Carrying Competitiveness	64.91	98	4.3 Resource Utilization	40.45	50
3.1 Agricultural Carrying	61.44	108	Utilization rate of water resources	0.05	110
Cereal yield per unit of arable land	8.15	116	Percentage of total internal renewable water resources to total water resources	76.18	47
Fertilizer consumption per unit of arable land	94.96	64	Percentage of agricultural land to total land area	33.70	104
Annual freshwater withdrawals for agriculture per unit of arable land	98.97	63			
3.2 Industrial Carrying	87.83	95			
Net exports of goods as a percentage of GDP	69.86	103			
Electric power consumption per unit of value added of industry	89.99	85			
SO_2 emissions per unit of value added of industry	99.68	83			
Annual freshwater withdrawals for industry per value added of industry	91.78	110			

(continued)

Table 64.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
Percentage of fossil fuel energy consumption to total energy consumption	51.88	32	SO_2 emissions per capita	97.62	46
			CO_2 emissions per capita	97.51	37
			Energy consumption per capita	96.37	28
5 Environment Harmony Competitiveness	70.73	32	5.2 Economy and Environment	63.63	77
5.1 Population and Environment	77.82	28	Land resource utilization efficiency	0.04	92
Percentage of population with access to Improved sanitation facilities	71.00	86	Sulfur dioxide emissions per unit of GDP	91.06	84
			Carbon dioxide emissions per unit of GDP	83.53	81
Motor vehicles per 1,000 people	88.27	53			
Renewable internal freshwater resources per capita	14.97	29	Energy consumption per unit of GDP	79.90	81

Table 64.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	1	4	4	3	2
Ecological Environment Competitiveness	11	0	1	5	4	1
Environment Carrying Competitiveness	15	0	0	5	7	3
Environment Management Competitiveness	10	1	0	3	2	2
Environment Harmony Competitiveness	10	0	2	3	5	0
Total	60	2	7	20	21	8

Chapter 65
Report on Global Environment Competitiveness of Hungary

Hungary is located in central Europe. It is bordered by Slovakia to the north, Ukraine, and Romania to the east, Serbia, and Croatia to the south, Slovenia to the southwest and Austria to the west. It covers 90.5 thousand of square kilometers and has a population of 9.97 million. Its GDP reaches $140.03 billion in 2011. Through the index system and evaluation model, the environment competitiveness index of Hungary ranks at 65 in 133 countries.

Score: 49.97
Rank: 65

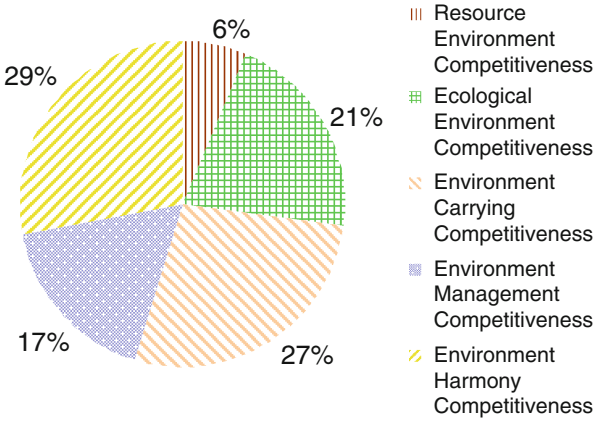

Fig. 65.1 Contribution of sub-index to GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_65,

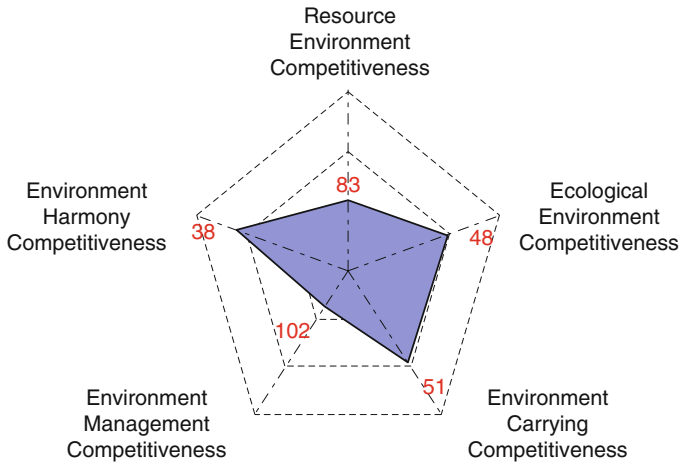

Fig. 65.2 Rank of sub-index of GEC

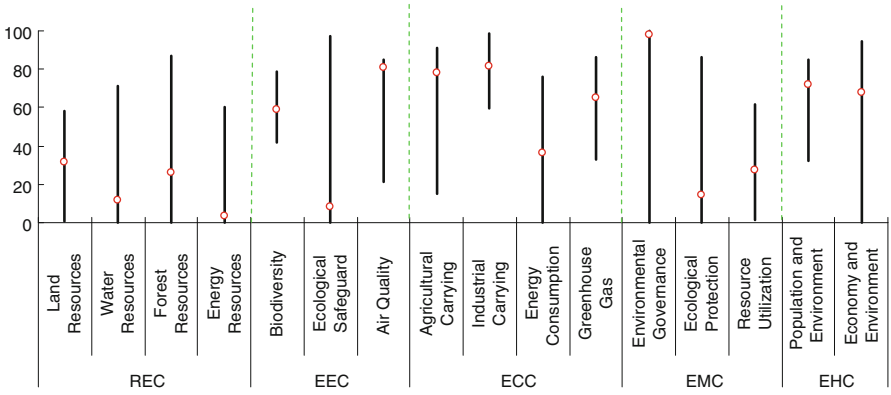

Fig. 65.3 Score and rank of the pillars of GEC

Table 65.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	16.04	83	Groundwater	9.51	68
1.1 Land Resources	31.55	8	Total internal renewable water resources	3.34	103
Land area per capita	1.61	91	1.3 Forest Resources	26.30	77
Percentage of arable land to total land area	82.40	6	Growing stock in forest and other wooded land	51.09	72
Arable land per capita	20.63	20	Proportion of land area covered by forest	26.37	72
1.2 Water Resources	11.44	84	Forest area per capita	1.43	72
Surface water	12.40	27	1.4 Energy Resources	3.44	90
Annual precipitation	20.52	91			

(continued)

Table 65.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
Fossil energy	2.27	23	Annual freshwater withdrawals for industry per value added of industry	85.94	121
Energy production	1.12	57			
Proportion of combustible renewable and waste to total energy consumption	7.83	67	3.3 Energy Consumption	36.59	37
			Energy consumption per unit of land area	99.40	104
Net energy imports of the energy consumption	5.37	96	Ratio of clean energy consumption	28.70	25
2 Ecological Environment Competitiveness	52.32	48	Elasticity of energy consumption	11.95	119
2.1 Biodiversity	58.92	35	Elasticity of electric power consumption	6.31	117
Threatened fish species	95.75	24			
Threatened mammal species	98.91	6	3.4 Greenhouse Gas	65.28	40
			Growth rate of CO_2 emissions	57.11	46
Threatened plant species	99.53	56	Growth rate of Methane emissions	63.20	33
GEF benefits index for biodiversity	0.20	109			
2.2 Ecological Safeguard	8.15	104	CO_2 emissions per unit of land area	99.40	101
Terrestrial protected areas	13.59	97			
Marine protected areas	N/A	N/A	CO_2 emissions per unit of energy consumption	49.59	48
2.3 Air Quality	80.50	23			
Inhalable particles (PM10)	89.05	16	4 Environment Management Competitiveness	43.26	102
Particulate matter (PM2.5)	82.37	82			
Index of indoor air pollution	100.00	1	4.1 Environmental Governance	98.10	24
			Agricultural chemicals regulation	95.24	20
Nitrogen oxides emission	67.52	75			
Sulfur dioxide emission	40.57	73	Percentage of the rural population with access to an improved water source	100.00	1
3 Environment Carrying Competitiveness	68.27	51			
3.1 Agricultural Carrying	77.83	15	Percentage of the urban population with access to an improved water source	100.00	1
Cereal yield per unit of arable land	49.51	30			
Fertilizer consumption per unit of arable land	93.53	71	4.2 Ecological Protection	14.09	116
Annual freshwater withdrawals for agriculture per unit of arable land	99.90	21	Area of plantation and afforestation	2.09	28
			Biome protect	30.10	95
3.2 Industrial Carrying	81.81	121	Overfishing of fishing resources	N/A	N/A
Net exports of goods as a percentage of GDP	49.16	127			
			4.3 Resource Utilization	27.30	109
Electric power consumption per unit of value added of industry	92.26	61	Utilization rate of water resources	0.21	75
			Percentage of total internal renewable water resources to total water resources	5.45	124
SO_2 emissions per unit of value added of industry	99.89	46			

(continued)

Table 65.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
Percentage of agricultural land to total land area	75.51	21	Renewable internal freshwater resources per capita	0.73	111
Percentage of fossil fuel energy consumption to total energy consumption	28.02	59	SO_2 emissions per capita	93.85	79
			CO_2 emissions per capita	86.83	83
			Energy consumption per capita	80.84	84
5 Environment Harmony Competitiveness	69.98	38	5.2 Economy and Environment	68.01	44
5.1 Population and Environment	71.96	58	Land resource utilization efficiency	0.45	31
Percentage of population with access to Improved sanitation facilities	100.00	1	Sulfur dioxide emissions per unit of GDP	96.44	49
			Carbon dioxide emissions per unit of GDP	87.36	70
Motor vehicles per 1,000 people	63.09	92	Energy consumption per unit of GDP	87.78	52

Table 65.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	2	2	1	9	0
Ecological Environment Competitiveness	11	2	3	2	3	1
Environment Carrying Competitiveness	15	0	3	5	2	5
Environment Management Competitiveness	10	1	4	0	2	3
Environment Harmony Competitiveness	10	1	0	4	4	1
Total	60	6	12	12	20	10

Chapter 66
Report on Global Environment Competitiveness of India

India is located in the South Asian subcontinent. It borders Bangladesh, Burma, and the people's Republic of China, Bhutan, Nepal and Pakistan and other countries. It covers 2,973.2 thousand of square kilometers and has a population of 1,241.49 million. Its GDP reaches $1,847.98 billion in 2011. Through the index system and evaluation model, the environment competitiveness index of India ranks at 117 in 133 countries.

Score: 44.32
Rank: 117

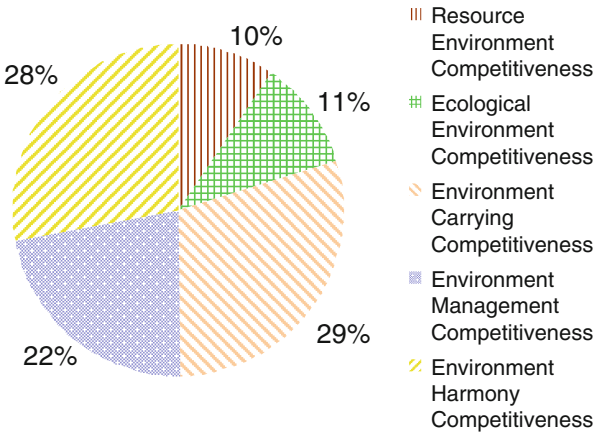

Fig. 66.1 Contribution of sub-index to GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_66,

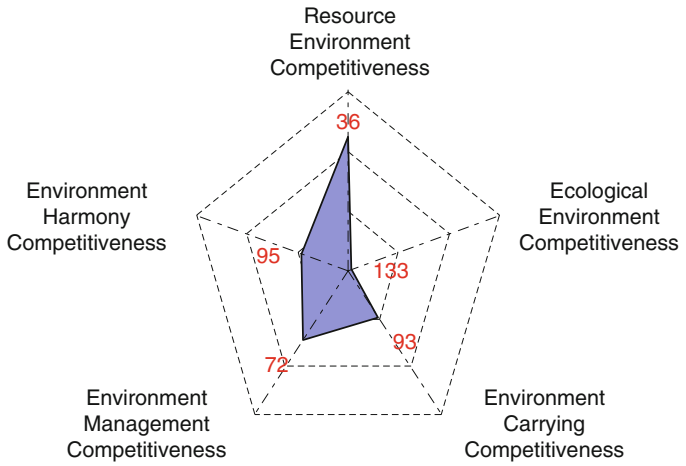

Fig. 66.2 Rank of sub-index of GEC

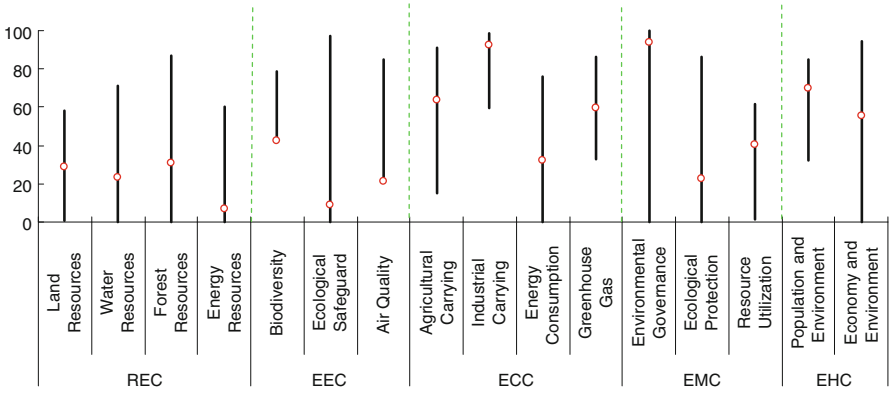

Fig. 66.3 Score and rank of the pillars of GEC

Table 66.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	21.08	36	Groundwater	20.90	38
1.1 Land Resources	28.89	13	Total internal renewable water resources	24.53	43
Land area per capita	0.41	128	1.3 Forest Resources	30.91	62
Percentage of arable land to total land area	89.84	5	Growing stock in forest and other wooded land	66.63	9
Arable land per capita	5.93	85	Proportion of land area covered by forest	27.02	71
1.2 Water Resources	23.36	45	Forest area per capita	0.39	107
Surface water	7.40	45	1.4 Energy Resources	7.04	57
Annual precipitation	40.60	46			

(continued)

Table 66.1 (continued)

Indicators	Score	Rank
Fossil energy	0.69	34
Energy production	0.43	93
Proportion of combustible renewable and waste to total energy consumption	26.32	34
Net energy imports of the energy consumption	9.46	63
2 Ecological Environment Competitiveness	23.83	133
2.1 Biodiversity	42.35	131
Threatened fish species	0.00	133
Threatened mammal species	48.91	131
Threatened plant species	83.02	127
GEF benefits index for biodiversity	39.90	8
2.2 Ecological Safeguard	8.84	103
Terrestrial protected areas	13.32	98
Marine protected areas	2.12	62
2.3 Air Quality	21.18	133
Inhalable particles (PM10)	62.04	99
Particulate matter (PM2.5)	0.00	133
Index of indoor air pollution	7.50	100
Nitrogen oxides emission	23.43	129
Sulfur dioxide emission	20.07	129
3 Environment Carrying Competitiveness	65.15	93
3.1 Agricultural Carrying	63.70	97
Cereal yield per unit of arable land	24.43	80
Fertilizer consumption per unit of arable land	86.43	96
Annual freshwater withdrawals for agriculture per unit of arable land	93.32	103
3.2 Industrial Carrying	92.47	53
Net exports of goods as a percentage of GDP	89.98	23
Electric power consumption per unit of value added of industry	85.52	102
SO_2 emissions per unit of value added of industry	99.49	104
Annual freshwater withdrawals for industry per value added of industry	94.88	92
3.3 Energy Consumption	32.08	81
Energy consumption per unit of land area	99.51	96
Ratio of clean energy consumption	4.00	74
Elasticity of energy consumption	14.03	57
Elasticity of electric power consumption	10.80	59
3.4 Greenhouse Gas	59.43	87
Growth rate of CO_2 emissions	51.65	68
Growth rate of Methane emissions	57.56	74
CO_2 emissions per unit of land area	99.39	102
CO_2 emissions per unit of energy consumption	36.88	82
4 Environment Management Competitiveness	49.08	72
4.1 Environmental Governance	93.50	51
Agricultural chemicals regulation	N/A	N/A
Percentage of the rural population with access to an improved water source	90.00	60
Percentage of the urban population with access to an improved water source	97.00	80
4.2 Ecological Protection	22.33	99
Area of plantation and afforestation	13.23	4
Biome protect	29.80	98
Overfishing of fishing resources	26.99	91
4.3 Resource Utilization	40.34	51
Utilization rate of water resources	1.61	23
Percentage of total internal renewable water resources to total water resources	58.52	78
Percentage of agricultural land to total land area	71.55	32

(continued)

Table 66.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
Percentage of fossil fuel energy consumption to total energy consumption	29.67	54	SO_2 emissions per capita	97.58	47
			CO_2 emissions per capita	96.34	42
			Energy consumption per capita	96.65	27
5 Environment Harmony Competitiveness	62.47	95	5.2 Economy and Environment	55.34	101
5.1 Population and Environment	69.60	71	Land resource utilization efficiency	0.18	50
Percentage of population with access to Improved sanitation facilities	31.00	111	Sulfur dioxide emissions per unit of GDP	86.64	100
Motor vehicles per 1,000 people	98.02	19	Carbon dioxide emissions per unit of GDP	63.79	113
Renewable internal freshwater resources per capita	1.41	95	Energy consumption per unit of GDP	70.77	101

Table 66.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	2	1	7	3	1
Ecological Environment Competitiveness	11	0	0	0	3	8
Environment Carrying Competitiveness	15	0	1	2	9	3
Environment Management Competitiveness	10	1	1	4	3	0
Environment Harmony Competitiveness	10	0	1	3	3	3
Total	60	3	4	16	21	15

Chapter 67
Report on Global Environment Competitiveness of Indonesia

Indonesia across Asia and Oceania, occupy the principal corner between the Pacific Ocean and the Indian Ocean, borders on Papua New Guinea, east Timor and Malaysia. The climate is tropical climate, and it is abundant with natural resources. It covers 1,811.6 thousand of square kilometers and has a population of 242.33 million. Its GDP reaches $846.83 billion in 2011. Through the index system and evaluation model, the environment competitiveness index of Indonesia ranks at 46 in 133 countries.

Score: 51.71
Rank: 46

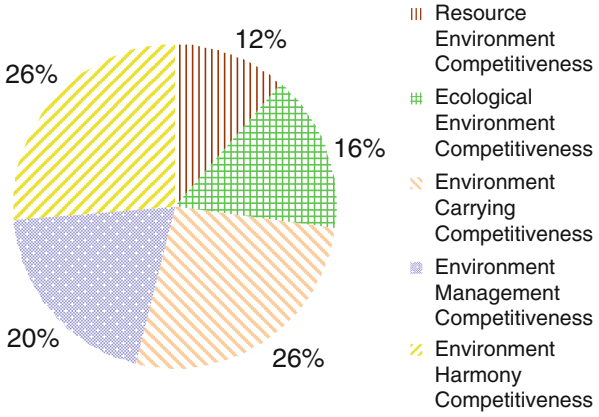

Fig. 67.1 Contribution of sub-index to GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_67,

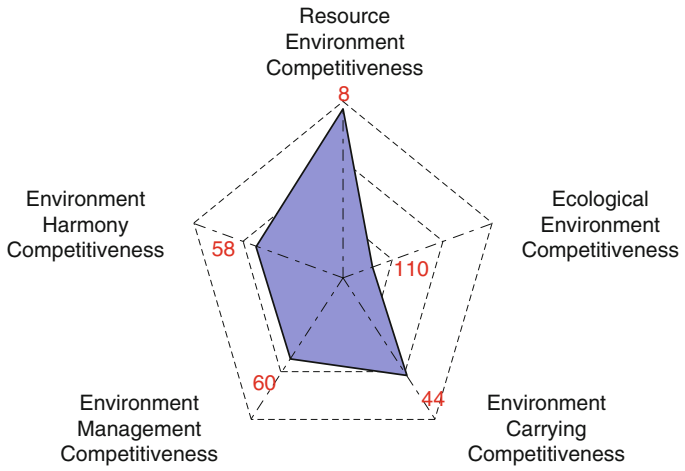

Fig. 67.2 Rank of sub-index of GEC

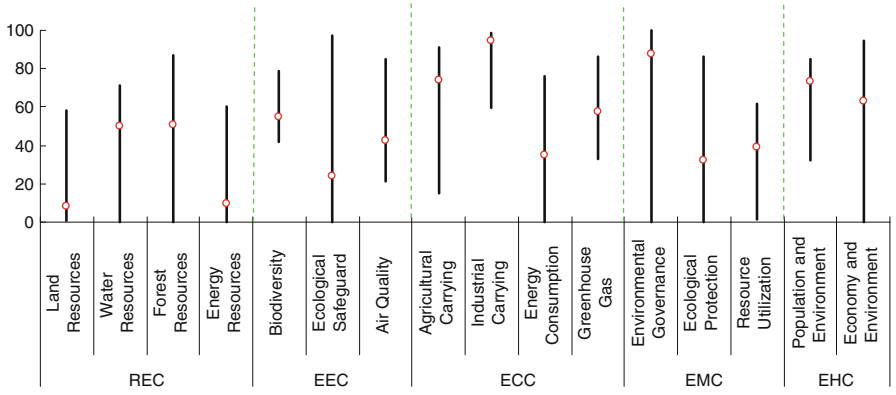

Fig. 67.3 Score and rank of the pillars of GEC

Table 67.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	29.74	8	Groundwater	36.34	16
1.1 Land Resources	8.46	93	Total internal renewable water resources	56.21	16
Land area per capita	1.32	102	1.3 Forest Resources	50.36	13
Percentage of arable land to total land area	21.89	66	Growing stock in forest and other wooded land	84.37	6
Arable land per capita	4.54	99	Proportion of land area covered by forest	60.61	17
1.2 Water Resources	50.16	12	Forest area per capita	2.70	57
Surface water	11.76	28	1.4 Energy Resources	9.75	45
Annual precipitation	96.32	3			

(continued)

Table 67.1 (continued)

Indicators	Score	Rank
Fossil energy	0.36	43
Energy production	1.61	47
Proportion of combustible renewable and waste to total energy consumption	27.85	32
Net energy imports of the energy consumption	23.41	25
2 Ecological Environment Competitiveness	40.55	110
2.1 Biodiversity	54.70	111
Threatened fish species	33.96	129
Threatened mammal species	0.00	133
Threatened plant species	77.54	130
GEF benefits index for biodiversity	81.00	4
2.2 Ecological Safeguard	23.84	60
Terrestrial protected areas	38.04	51
Marine protected areas	2.52	57
2.3 Air Quality	42.48	120
Inhalable particles (PM10)	56.20	112
Particulate matter (PM2.5)	84.19	71
Index of indoor air pollution	8.60	96
Nitrogen oxides emission	42.63	128
Sulfur dioxide emission	36.17	119
3 Environment Carrying Competitiveness	69.16	44
3.1 Agricultural Carrying	74.13	27
Cereal yield per unit of arable land	50.83	27
Fertilizer consumption per unit of arable land	85.33	97
Annual freshwater withdrawals for agriculture per unit of arable land	93.97	98
3.2 Industrial Carrying	94.82	21
Net exports of goods as a percentage of GDP	84.81	46
Electric power consumption per unit of value added of industry	96.88	17
SO_2 emissions per unit of value added of industry	99.86	53
Annual freshwater withdrawals for industry per value added of industry	97.71	63
3.3 Energy Consumption	34.68	50
Energy consumption per unit of land area	99.76	71
Ratio of clean energy consumption	14.33	42
Elasticity of energy consumption	13.97	62
Elasticity of electric power consumption	10.66	67
3.4 Greenhouse Gas	57.70	101
Growth rate of CO_2 emissions	42.75	98
Growth rate of Methane emissions	55.70	87
CO_2 emissions per unit of land area	99.75	75
CO_2 emissions per unit of energy consumption	47.57	53
4 Environment Management Competitiveness	51.02	60
4.1 Environmental Governance	87.90	69
Agricultural chemicals regulation	95.24	20
Percentage of the rural population with access to an improved water source	74.00	86
Percentage of the urban population with access to an improved water source	92.00	104
4.2 Ecological Protection	32.49	73
Area of plantation and afforestation	4.60	13
Biome protect	81.10	43
Overfishing of fishing resources	21.07	96
4.3 Resource Utilization	38.85	58
Utilization rate of water resources	0.22	72
Percentage of total internal renewable water resources to total water resources	83.07	30
Percentage of agricultural land to total land area	34.97	102

(continued)

Table 67.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
Percentage of fossil fuel energy consumption to total energy consumption	37.13	44	SO_2 emissions per capita	97.15	53
			CO_2 emissions per capita	95.46	49
			Energy consumption per capita	94.27	46
5 Environment Harmony Competitiveness	68.07	58	5.2 Economy and Environment	63.09	80
5.1 Population and Environment	73.04	49	Land resource utilization efficiency	0.14	57
Percentage of population with access to Improved sanitation facilities	52.00	95	Sulfur dioxide emissions per unit of GDP	92.71	73
Motor vehicles per 1,000 people	90.49	48	Carbon dioxide emissions per unit of GDP	79.30	95
Renewable internal freshwater resources per capita	10.08	40			
			Energy consumption per unit of GDP	80.23	78

Table 67.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	2	5	4	2	1
Ecological Environment Competitiveness	11	0	0	2	2	7
Environment Carrying Competitiveness	15	0	4	4	6	1
Environment Management Competitiveness	10	0	3	2	4	1
Environment Harmony Competitiveness	10	0	0	6	4	0
Total	60	2	12	18	18	10

Chapter 68
Report on Global Environment Competitiveness of Iran

Score: 45.89
Rank: 110

Iran is located in southwest Asia, borders on Pakistan, Afghanistan, Iraq and other countries, and the north-central close to the Caspian sea, south by the Persian gulf and the Arabian sea. The most of the region is desert climate half-desert climate. Petroleum, natural gas and mineral resources are rich. It covers 1,628.6 thousand of square kilometers and has a population of 74.80 million. Its GDP reaches $521.83 billion in 2011. Through the index system and evaluation model, the environment competitiveness index of Iran ranks at 110 in 133 countries.

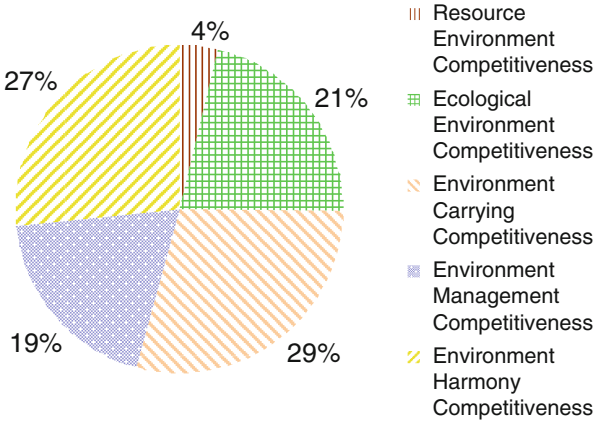

Fig. 68.1 Contribution of sub-index to GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_68,

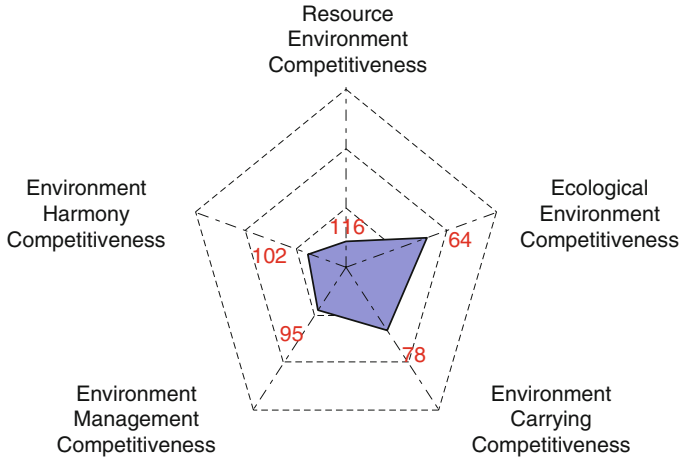

Fig. 68.2 Rank of sub-index of GEC

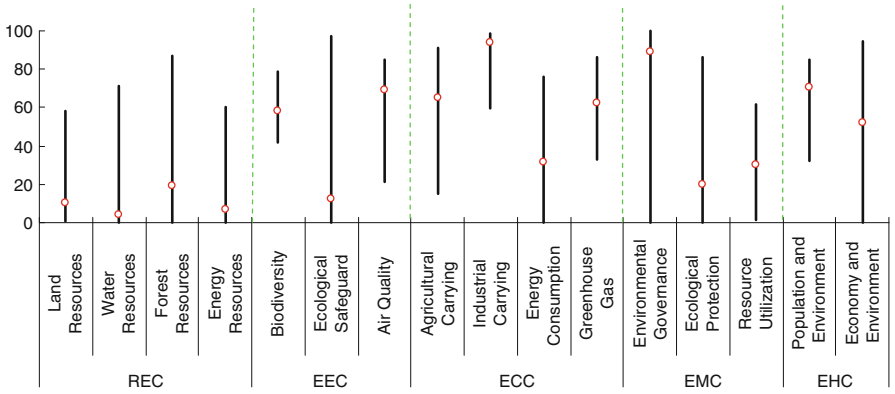

Fig. 68.3 Score and rank of the pillars of GEC

Table 68.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	9.12	116	Groundwater	4.32	91
1.1 Land Resources	10.30	80	Total internal renewable water resources	3.98	101
Land area per capita	3.90	44	1.3 Forest Resources	18.98	105
Percentage of arable land to total land area	18.14	74	Growing stock in forest and other wooded land	51.62	59
Arable land per capita	10.98	51	Proportion of land area covered by forest	7.96	107
1.2 Water Resources	4.32	110	Forest area per capita	1.03	88
Surface water	0.71	103	1.4 Energy Resources	6.57	59
Annual precipitation	8.28	114			

(continued)

Table 68.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
Fossil energy	5.55	17	Annual freshwater withdrawals for industry per value added of industry	99.44	24
Energy production	4.77	20			
Proportion of combustible renewable and waste to total energy consumption	0.16	109	3.3 Energy Consumption	31.32	100
			Energy consumption per unit of land area	99.73	77
Net energy imports of the energy consumption	21.36	26	Ratio of clean energy consumption	0.53	105
2 Ecological Environment Competitiveness	48.93	64	Elasticity of energy consumption	14.27	37
2.1 Biodiversity	58.43	52	Elasticity of electric power consumption	10.74	62
Threatened fish species	86.32	74			
Threatened mammal species	91.30	90	3.4 Greenhouse Gas	62.48	61
			Growth rate of CO_2 emissions	63.15	27
Threatened plant species	99.94	22	Growth rate of Methane emissions	52.32	104
GEF benefits index for biodiversity	7.30	37			
2.2 Ecological Safeguard	12.26	91	CO_2 emissions per unit of land area	99.65	83
Terrestrial protected areas	19.02	80			
Marine protected areas	2.12	62	CO_2 emissions per unit of energy consumption	34.12	92
2.3 Air Quality	69.30	47			
Inhalable particles (PM10)	59.12	105	4 Environment Management Competitiveness	43.92	95
Particulate matter (PM2.5)	62.91	119			
Index of indoor air pollution	100.00	1	4.1 Environmental Governance	89.08	65
			Agricultural chemicals regulation	80.95	53
Nitrogen oxides emission	63.31	110			
Sulfur dioxide emission	35.95	120	Percentage of the rural population with access to an improved water source	92.00	53
3 Environment Carrying Competitiveness	66.50	78			
3.1 Agricultural Carrying	65.04	81			
Cereal yield per unit of arable land	22.43	82	Percentage of the urban population with access to an improved water source	97.00	80
Fertilizer consumption per unit of arable land	94.37	70			
Annual freshwater withdrawals for agriculture per unit of arable land	92.51	105	4.2 Ecological Protection	20.20	102
			Area of plantation and afforestation	1.09	39
3.2 Industrial Carrying	94.09	29	Biome protect	40.30	83
Net exports of goods as a percentage of GDP	84.19	50	Overfishing of fishing resources	25.58	92
			4.3 Resource Utilization	30.37	96
Electric power consumption per unit of value added of industry	92.97	54	Utilization rate of water resources	2.74	17
			Percentage of total internal renewable water resources to total water resources	82.00	33
SO_2 emissions per unit of value added of industry	99.76	73			

(continued)

Table 68.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
Percentage of agricultural land to total land area	35.21	100	SO_2 emissions per capita	90.30	95
Percentage of fossil fuel energy consumption to total energy consumption	1.53	119	CO_2 emissions per capita	81.44	97
5 Environment Harmony Competitiveness	61.00	102	Energy consumption per capita	78.87	90
5.1 Population and Environment	70.23	66	5.2 Economy and Environment	51.77	109
Percentage of population with access to Improved sanitation facilities	83.00	73	Land resource utilization efficiency	0.09	70
Motor vehicles per 1,000 people	78.64	81	Sulfur dioxide emissions per unit of GDP	87.33	98
Renewable internal freshwater resources per capita	2.08	85	Carbon dioxide emissions per unit of GDP	54.87	120
			Energy consumption per unit of GDP	64.79	108

Table 68.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	0	2	3	3	6
Ecological Environment Competitiveness	11	1	1	2	4	3
Environment Carrying Competitiveness	15	0	2	3	8	2
Environment Management Competitiveness	10	0	1	4	4	1
Environment Harmony Competitiveness	10	0	0	0	8	2
Total	60	1	6	12	27	14

Chapter 69
Report on Global Environment Competitiveness of Iraq

Iraq is located in the Middle East in the southwest of Asia, borders on Saudi Arabia, Kuwait, Turkey and other countries. The local climate is tropical desert climate, domestic crude oil and natural gas resources are rich. It covers 434.3 thousand of square kilometers and has a population of 32.96 million. Its GDP reaches $115.39 billion in 2011. Through the index system and evaluation model, the environment competitiveness index of Iraq ranks at 131 in 133 countries.

Score: 38.02
Rank: 131

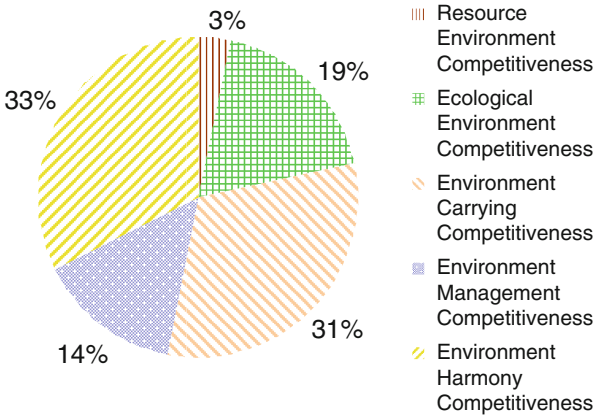

Fig. 69.1 Contribution of sub-index to GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_69,

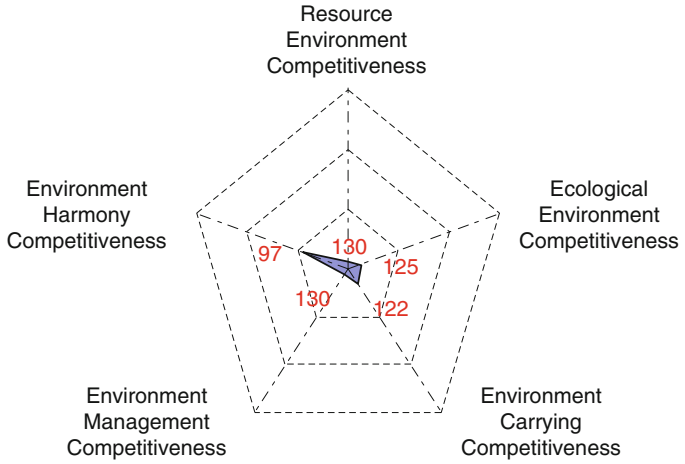

Fig. 69.2 Rank of sub-index of GEC

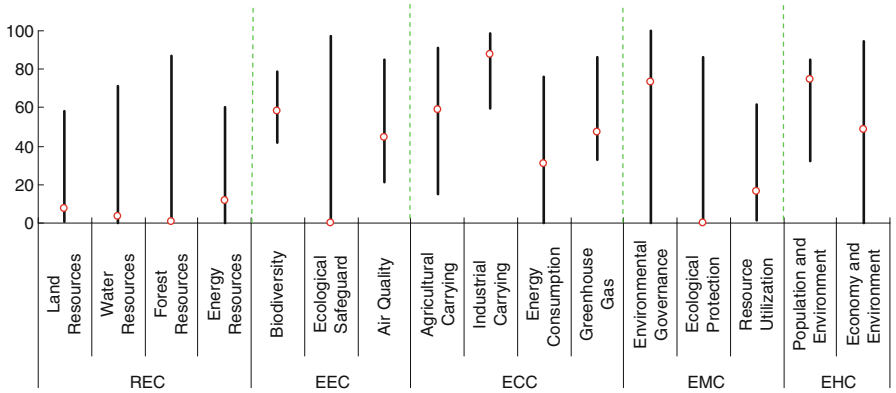

Fig. 69.3 Score and rank of the pillars of GEC

Table 69.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	6.17	130	Groundwater	1.05	108
1.1 Land Resources	7.29	107	Total internal renewable water resources	4.09	100
Land area per capita	2.35	69	1.3 Forest Resources	0.94	130
Percentage of arable land to total land area	15.49	83	Growing stock in forest and other wooded land	0.00	121
Arable land per capita	5.68	88	Proportion of land area covered by forest	2.22	118
1.2 Water Resources	3.71	115	Forest area per capita	0.17	118
Surface water	2.37	87	1.4 Energy Resources	11.37	40
Annual precipitation	7.34	118			

(continued)

Table 69.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
Fossil energy	11.90	11	Annual freshwater withdrawals for industry per value added of industry	87.18	117
Energy production	3.98	25			
Proportion of combustible renewable and waste to total energy consumption	0.07	113	3.3 Energy Consumption	31.16	104
			Energy consumption per unit of land area	99.82	59
Net energy imports of the energy consumption	42.65	11	Ratio of clean energy consumption	1.47	92
2 Ecological Environment Competitiveness	35.24	125	Elasticity of energy consumption	13.34	99
2.1 Biodiversity	58.19	63	Elasticity of electric power consumption	9.99	94
Threatened fish species	94.81	28	3.4 Greenhouse Gas	47.16	127
Threatened mammal species	92.93	78	Growth rate of CO_2 emissions	28.92	121
Threatened plant species	100.00	1	Growth rate of Methane emissions	53.38	97
GEF benefits index for biodiversity	1.60	73	CO_2 emissions per unit of land area	99.73	77
2.2 Ecological Safeguard	0.00	132	CO_2 emissions per unit of energy consumption	24.83	110
Terrestrial protected areas	0.00	130			
Marine protected areas	N/A	N/A	4 Environment Management Competitiveness	27.17	130
2.3 Air Quality	44.46	113			
Inhalable particles (PM10)	35.77	122	4.1 Environmental Governance	73.50	97
Particulate matter (PM2.5)	42.96	128			
Index of indoor air pollution	41.90	54	Agricultural chemicals regulation	N/A	N/A
Nitrogen oxides emission	68.28	49	Percentage of the rural population with access to an improved water source	56.00	100
Sulfur dioxide emission	39.32	101			
3 Environment Carrying Competitiveness	59.67	122	Percentage of the urban population with access to an improved water source	91.00	106
3.1 Agricultural Carrying	59.08	122			
Cereal yield per unit of arable land	14.84	99	4.2 Ecological Protection	0.27	133
Fertilizer consumption per unit of arable land	96.99	49	Area of plantation and afforestation	0.02	108
Annual freshwater withdrawals for agriculture per unit of arable land	80.14	123	Biome protect	0.60	131
			Overfishing of fishing resources	N/A	N/A
3.2 Industrial Carrying	87.62	98	4.3 Resource Utilization	16.71	129
Net exports of goods as a percentage of GDP	66.37	109	Utilization rate of water resources	3.54	13
Electric power consumption per unit of value added of industry	97.10	15	Percentage of total internal renewable water resources to total water resources	35.70	104
SO_2 emissions per unit of value added of industry	99.82	66			

(continued)

Table 69.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
Percentage of agricultural land to total land area	23.81	112	SO_2 emissions per capita	92.57	86
Percentage of fossil fuel energy consumption to total energy consumption	3.79	112	CO_2 emissions per capita	91.34	68
5 Environment Harmony Competitiveness	61.85	97	Energy consumption per capita	91.80	57
5.1 Population and Environment	74.96	43	5.2 Economy and Environment	48.73	113
Percentage of population with access to Improved sanitation facilities	73.00	84	Land resource utilization efficiency	0.08	81
Motor vehicles per 1,000 people	94.07	39	Sulfur dioxide emissions per unit of GDP	77.70	117
Renewable internal freshwater resources per capita	1.29	102	Carbon dioxide emissions per unit of GDP	50.77	126
			Energy consumption per unit of GDP	66.37	105

Table 69.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	0	2	1	3	8
Ecological Environment Competitiveness	11	1	1	2	2	5
Environment Carrying Competitiveness	15	0	1	2	7	5
Environment Management Competitiveness	10	0	1	0	2	6
Environment Harmony Competitiveness	10	0	0	2	4	4
Total	60	1	5	7	18	28

Chapter 70
Report on Global Environment Competitiveness of Ireland

Ireland is on the Irish sea located in the coast of northwest Europe. The west near the Atlantic ocean, the east near the Irish sea, and the south near the Celtic sea. The climate is temperate Marine climate, is abundant with lead-zinc deposit. It covers 68.9 thousand of square kilometers and has a population of 4.58 million. Its GDP reaches $217.27 billion in 2011. Through the index system and evaluation model, the environment competitiveness index of Ireland ranks at 51 in 133 countries.

Score: 51.43
Rank: 51

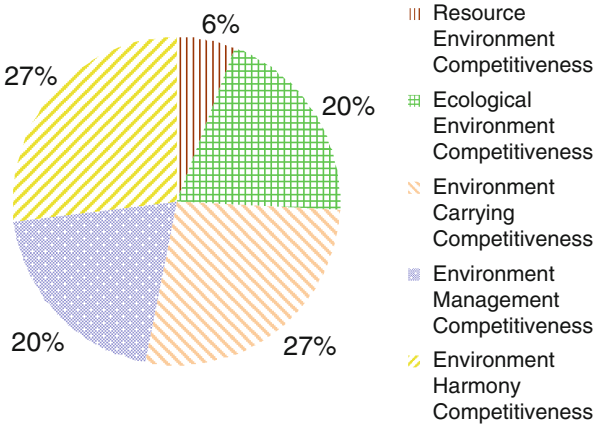

Fig. 70.1 Contribution of sub-index to GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_70,

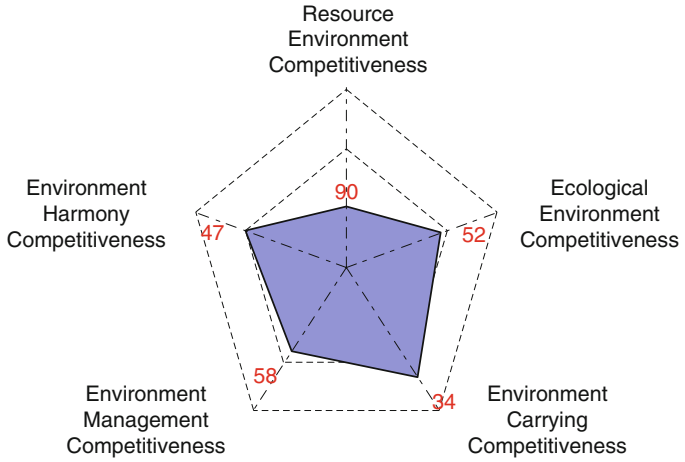

Fig. 70.2 Rank of sub-index of GEC

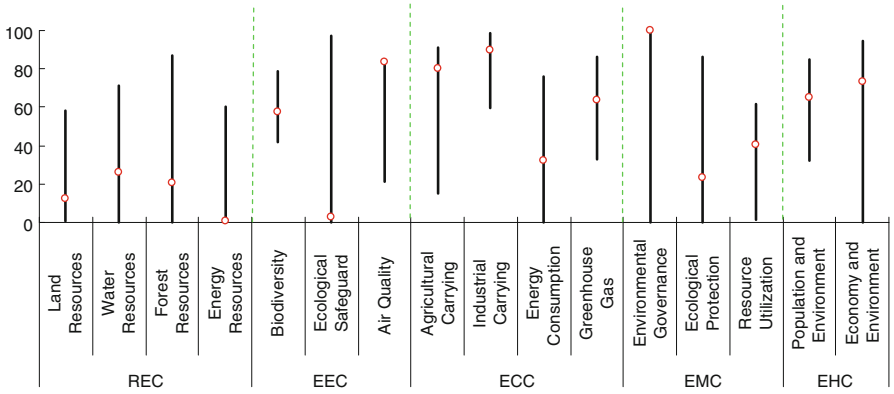

Fig. 70.3 Score and rank of the pillars of GEC

Table 70.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	14.70	90	Total internal renewable water resources	35.87	30
1.1 Land Resources	12.15	69	1.3 Forest Resources	20.49	99
Land area per capita	2.69	58	Growing stock in forest and other wooded land	50.22	94
Percentage of arable land to total land area	26.04	55	Proportion of land area covered by forest	12.71	94
Arable land per capita	10.86	52	Forest area per capita	1.14	80
1.2 Water Resources	26.28	39	1.4 Energy Resources	0.95	114
Surface water	8.02	42	Fossil energy	0.00	64
Annual precipitation	38.67	52	Energy production	0.45	89
Groundwater	22.55	32			

(continued)

Table 70.1 (continued)

Indicators	Score	Rank
Proportion of combustible renewable and waste to total energy consumption	2.73	96
Net energy imports of the energy consumption	1.61	119
2 Ecological Environment Competitiveness	51.55	52
2.1 Biodiversity	57.80	70
Threatened fish species	90.57	53
Threatened mammal species	97.28	22
Threatened plant species	99.94	22
GEF benefits index for biodiversity	0.60	95
2.2 Ecological Safeguard	2.82	119
Terrestrial protected areas	4.62	115
Marine protected areas	0.13	88
2.3 Air Quality	83.41	7
Inhalable particles (PM10)	90.51	12
Particulate matter (PM2.5)	95.42	12
Index of indoor air pollution	100.00	1
Nitrogen oxides emission	67.41	79
Sulfur dioxide emission	40.77	54
3 Environment Carrying Competitiveness	70.23	34
3.1 Agricultural Carrying	80.16	10
Cereal yield per unit of arable land	79.44	4
Fertilizer consumption per unit of arable land	61.38	121
Annual freshwater withdrawals for agriculture per unit of arable land	99.89	23
3.2 Industrial Carrying	89.98	82
Net exports of goods as a percentage of GDP	63.58	112
Electric power consumption per unit of value added of industry	97.36	12
SO_2 emissions per unit of value added of industry	99.97	20
Annual freshwater withdrawals for industry per value added of industry	99.00	40
3.3 Energy Consumption	32.23	78
Energy consumption per unit of land area	99.56	91
Ratio of clean energy consumption	4.00	75
Elasticity of energy consumption	14.17	43
Elasticity of electric power consumption	11.21	45
3.4 Greenhouse Gas	63.73	51
Growth rate of CO_2 emissions	62.93	28
Growth rate of Methane emissions	66.29	19
CO_2 emissions per unit of land area	99.38	103
CO_2 emissions per unit of energy consumption	27.11	107
4 Environment Management Competitiveness	51.42	58
4.1 Environmental Governance	100.00	1
Agricultural chemicals regulation	100.00	1
Percentage of the rural population with access to an improved water source	100.00	1
Percentage of the urban population with access to an improved water source	100.00	1
4.2 Ecological Protection	22.99	98
Area of plantation and afforestation	0.85	42
Biome protect	10.40	116
Overfishing of fishing resources	65.09	25
4.3 Resource Utilization	40.74	49
Utilization rate of water resources	0.06	103
Percentage of total internal renewable water resources to total water resources	79.03	42
Percentage of agricultural land to total land area	71.87	31

(continued)

Table 70.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
Percentage of fossil fuel energy consumption to total energy consumption	12.00	93	SO_2 emissions per capita	92.82	85
			CO_2 emissions per capita	76.68	109
			Energy consumption per capita	75.70	95
5 Environment Harmony Competitiveness	69.23	47	5.2 Economy and Environment	73.27	12
5.1 Population and Environment	65.19	96	Land resource utilization efficiency	0.92	20
Percentage of population with access to Improved sanitation facilities	99.00	31	Sulfur dioxide emissions per unit of GDP	98.90	19
			Carbon dioxide emissions per unit of GDP	95.10	13
Motor vehicles per 1,000 people	33.33	114			
Renewable internal freshwater resources per capita	12.96	30	Energy consumption per unit of GDP	98.18	3

Table 70.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	0	0	6	7	1
Ecological Environment Competitiveness	11	2	4	1	2	2
Environment Carrying Competitiveness	15	2	4	2	4	3
Environment Management Competitiveness	10	3	0	4	1	2
Environment Harmony Competitiveness	10	0	5	1	2	2
Total	60	7	13	14	16	10

Chapter 71
Report on Global Environment Competitiveness of Israel

Israel is located in the Levant in the west of Asia, and in the southeast of the Mediterranean Sea. It borders on Lebanon, Syria, Jordan and Egypt. The climate is the Mediterranean climate. The soil is infertile and the resources is short. It covers 21.6 thousand of square kilometers and has a population of 7.77 million. Its GDP reaches $242.93 billion in 2011. Through the index system and evaluation model, the environment competitiveness index of Israel ranks at 69 in 133 countries.

Score: 49.49
Rank: 69

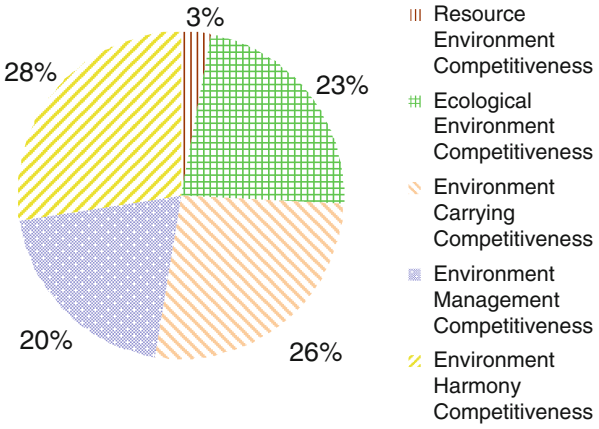

Fig. 71.1 Contribution of sub-index to GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_71,

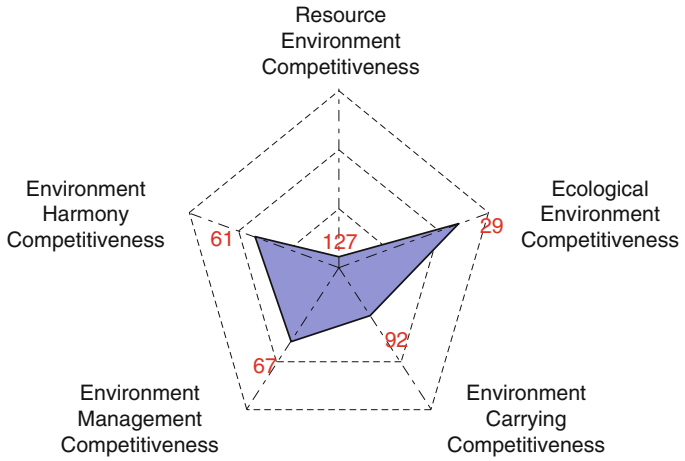

Fig. 71.2 Rank of sub-index of GEC

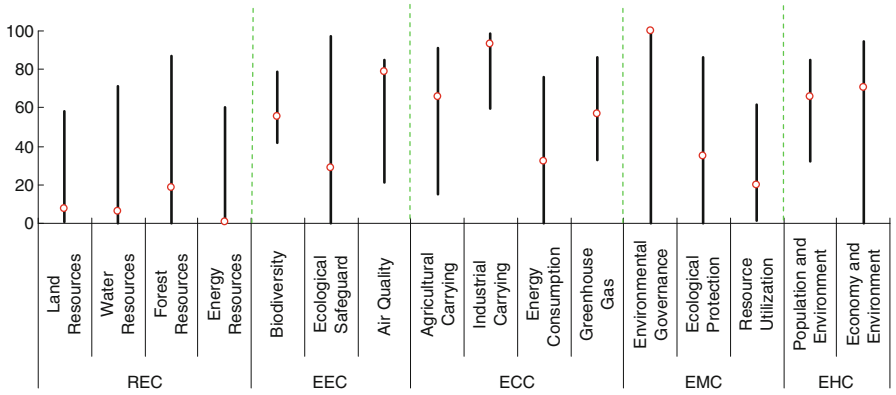

Fig. 71.3 Score and rank of the pillars of GEC

Table 71.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	7.28	127	Total internal renewable water resources	1.75	111
1.1 Land Resources	7.80	101	1.3 Forest Resources	18.38	108
Land area per capita	0.48	124	Growing stock in forest and other wooded land	50.02	113
Percentage of arable land to total land area	23.56	61	Proportion of land area covered by forest	8.32	105
Arable land per capita	1.82	123	Forest area per capita	0.14	123
1.2 Water Resources	6.30	104	1.4 Energy Resources	0.50	120
Surface water	0.28	114	Fossil energy	0.00	64
Annual precipitation	15.04	106	Energy production	0.51	84
Groundwater	8.12	74			

(continued)

Table 71.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
Proportion of combustible renewable and waste to total energy consumption	0.11	111	3.3 Energy Consumption	32.48	72
Net energy imports of the energy consumption	2.00	116	Energy consumption per unit of land area	97.74	118
2 Ecological Environment Competitiveness	56.87	29	Ratio of clean energy consumption	8.27	59
2.1 Biodiversity	55.29	107	Elasticity of energy consumption	13.52	93
Threatened fish species	83.02	85	Elasticity of electric power consumption	10.41	79
Threatened mammal species	91.85	84	3.4 Greenhouse Gas	57.10	105
Threatened plant species	100.00	1	Growth rate of CO_2 emissions	44.20	93
GEF benefits index for biodiversity	0.80	88	Growth rate of Methane emissions	81.73	3
2.2 Ecological Safeguard	29.02	49	CO_2 emissions per unit of land area	96.50	125
Terrestrial protected areas	48.10	36	CO_2 emissions per unit of energy consumption	18.87	117
Marine protected areas	0.40	79	4 Environment Management Competitiveness	49.89	67
2.3 Air Quality	78.94	29	4.1 Environmental Governance	100.00	1
Inhalable particles (PM10)	84.67	42	Agricultural chemicals regulation	N/A	N/A
Particulate matter (PM2.5)	78.92	90	Percentage of the rural population with access to an improved water source	100.00	1
Index of indoor air pollution	100.00	1	Percentage of the urban population with access to an improved water source	100.00	1
Nitrogen oxides emission	68.63	34	4.2 Ecological Protection	34.80	65
Sulfur dioxide emission	39.51	96	Area of plantation and afforestation	0.11	83
3 Environment Carrying Competitiveness	65.50	92	Biome protect	70.70	55
3.1 Agricultural Carrying	65.62	75	Overfishing of fishing resources	45.16	63
Cereal yield per unit of arable land	29.83	64	4.3 Resource Utilization	19.90	126
Fertilizer consumption per unit of arable land	84.67	101	Utilization rate of water resources	4.13	9
Annual freshwater withdrawals for agriculture per unit of arable land	94.29	97	Percentage of total internal renewable water resources to total water resources	42.13	94
3.2 Industrial Carrying	92.99	49	Percentage of agricultural land to total land area	28.51	106
Net exports of goods as a percentage of GDP	82.35	60			
Electric power consumption per unit of value added of industry	90.29	81			
SO_2 emissions per unit of value added of industry	99.64	87			
Annual freshwater withdrawals for industry per value added of industry	99.70	13			

(continued)

Table 71.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
Percentage of fossil fuel energy consumption to total energy consumption	4.83	110	SO_2 emissions per capita	72.24	121
			CO_2 emissions per capita	75.88	110
			Energy consumption per capita	77.38	93
5 Environment Harmony Competitiveness	67.90	61	5.2 Economy and Environment	70.34	28
5.1 Population and Environment	65.45	95	Land resource utilization efficiency	3.28	9
Percentage of population with access to Improved sanitation facilities	100.00	1	Sulfur dioxide emissions per unit of GDP	92.67	74
			Carbon dioxide emissions per unit of GDP	90.08	52
Motor vehicles per 1,000 people	58.02	96			
Renewable internal freshwater resources per capita	0.12	127	Energy consumption per unit of GDP	95.35	15

Table 71.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	0	0	0	4	10
Ecological Environment Competitiveness	11	2	1	4	3	1
Environment Carrying Competitiveness	15	1	0	3	7	4
Environment Management Competitiveness	10	3	0	1	3	2
Environment Harmony Competitiveness	10	2	1	1	3	3
Total	60	8	2	9	20	20

Chapter 72
Report on Global Environment Competitiveness of Italy

Italy is located in the south of Europe, borders on France, Switzerland, Austria and Slovenia, closes to Adriatic Sea and the Tyrrhenian sea. The most of the region have a subtropical Mediterranean climate. The natural resources are poor. It covers 294.1 thousand of square kilometers and has a population of 60.72 million. Its GDP reaches $2,193.97 billion in 2011. Through the index system and evaluation model, the environment competitiveness index of Italy ranks at 32 in 133 countries.

Score: 53.04
Rank: 32

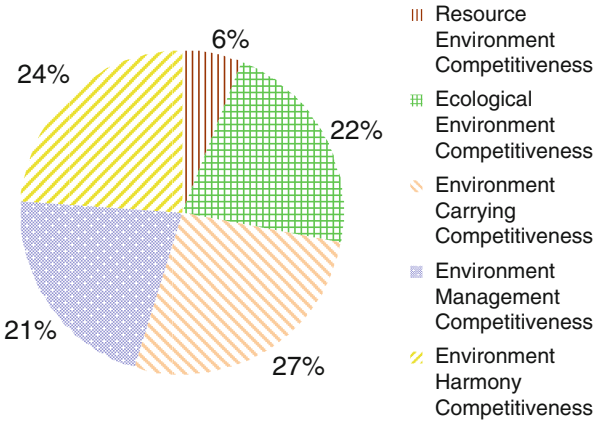

Fig. 72.1 Contribution of sub-index to GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_72,

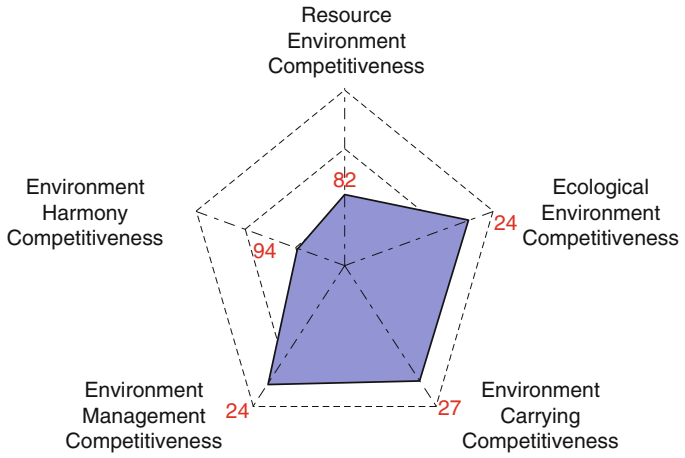

Fig. 72.2 Rank of sub-index of GEC

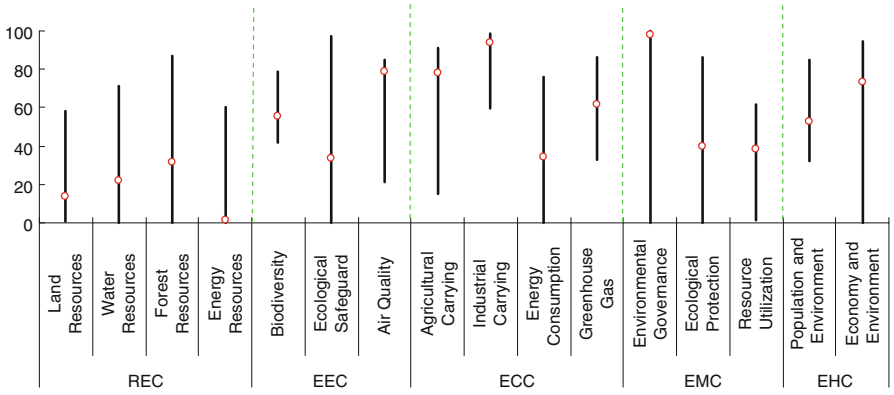

Fig. 72.3 Score and rank of the pillars of GEC

Table 72.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	16.05	82	Total internal renewable water resources	31.29	38
1.1 Land Resources	13.65	63	1.3 Forest Resources	31.27	60
Land area per capita	0.85	112	Growing stock in forest and other wooded land	54.19	36
Percentage of arable land to total land area	39.15	32	Proportion of land area covered by forest	36.74	57
Arable land per capita	5.24	92	Forest area per capita	1.06	87
1.2 Water Resources	21.95	48	1.4 Energy Resources	1.61	111
Surface water	6.58	48	Fossil energy	0.06	58
Annual precipitation	28.90	67	Energy production	0.50	85
Groundwater	21.02	37			

(continued)

Table 72.1 (continued)

Indicators	Score	Rank
Proportion of combustible renewable and waste to total energy consumption	5.50	77
Net energy imports of the energy consumption	2.09	115
2 Ecological Environment Competitiveness	58.31	24
2.1 Biodiversity	55.61	103
threatened fish species	77.83	103
threatened mammal species	96.20	37
threatened plant species	96.44	98
GEF benefits index for biodiversity	3.80	52
2.2 Ecological Safeguard	33.65	34
Terrestrial protected areas	40.76	44
Marine protected areas	22.97	13
2.3 Air Quality	78.82	33
Inhalable particles (PM10)	84.67	42
Particulate matter(PM2.5)	82.45	81
Index of Indoor air pollution	100.00	1
Nitrogen oxides emission	62.89	112
Sulfur dioxide emission	39.75	94
3 Environment Carrying Competitiveness	70.77	27
3.1 Agricultural Carrying	78.23	14
Cereal yield per unit of arable land	57.16	21
Fertilizer consumption per unit of arable land	89.04	90
Annual freshwater withdrawals for agriculture per unit of arable land	95.51	90
3.2 Industrial Carrying	93.86	33
Net exports of goods as a percentage of GDP	84.94	45
Electric power consumption per unit of value added of industry	94.84	37
SO_2 emissions per unit of value added of industry	99.98	17
Annual freshwater withdrawals for industry per value added of industry	95.68	86
3.3 Energy Consumption	34.35	56
Energy consumption per unit of land area	98.77	112
Ratio of clean energy consumption	10.09	55
Elasticity of energy consumption	15.23	19
Elasticity of electric power consumption	13.31	22
3.4 Greenhouse Gas	61.37	67
Growth rate of CO_2 emissions	55.46	50
Growth rate of Methane emissions	60.35	53
CO_2 emissions per unit of land area	98.49	117
CO_2 emissions per unit of energy consumption	37.07	80
4 Environment Management Competitiveness	56.96	24
4.1 Environmental Governance	98.10	24
Agricultural chemicals regulation	95.24	20
Percentage of the rural population with access to an improved water source	100.00	1
Percentage of the urban population with access to an improved water source	100.00	1
4.2 Ecological Protection	39.94	47
Area of plantation and afforestation	0.80	45
Biome protect	88.80	28
Overfishing of fishing resources	43.24	65
4.3 Resource Utilization	38.51	60
Utilization rate of water resources	0.96	37
Percentage of total internal renewable water resources to total water resources	82.10	32
Percentage of agricultural land to total land area	55.89	56

(continued)

Table 72.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
Percentage of fossil fuel energy consumption to total energy consumption	15.10	81	SO_2 emissions per capita	97.07	55
			CO_2 emissions per capita	82.24	96
			Energy consumption per capita	78.88	89
5 Environment Harmony Competitiveness	63.12	94	5.2 Economy and Environment	73.39	9
5.1 Population and Environment	52.86	125	Land resource utilization efficiency	2.18	14
Percentage of population with access to Improved sanitation facilities	N/A	N/A	Sulfur dioxide emissions per unit of GDP	99.43	13
			Carbon dioxide emissions per unit of GDP	94.84	17
Motor vehicles per 1,000 people	15.06	129			
Renewable internal freshwater resources per capita	3.64	66	Energy consumption per unit of GDP	97.12	6

Table 72.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	0	0	8	4	2
Ecological Environment Competitiveness	11	1	0	5	2	3
Environment Carrying Competitiveness	15	0	4	7	2	2
Environment Management Competitiveness	10	1	3	6	0	0
Environment Harmony Competitiveness	10	1	3	1	2	2
Total	60	3	10	27	10	9

Chapter 73
Report on the Global Environment Competitiveness of Jamaica

Jamaica is located in North America, the northwest of Caribbean. The are closes to Haiti separating from the Jamaica channel. It is tropical rainforest climate. The main resources are aluminum copper, iron, etc. It covers 10 thousand square kilometres. It had a population of 2.7 million and domestic production the gross (GDP) of USD 14.4 billion in 2011 Through the evaluation of global environment competitiveness, we can know that the environment competitiveness index of Jamaica ranks at 35 among 133 countries.

Score: 52.86
Rank: 35

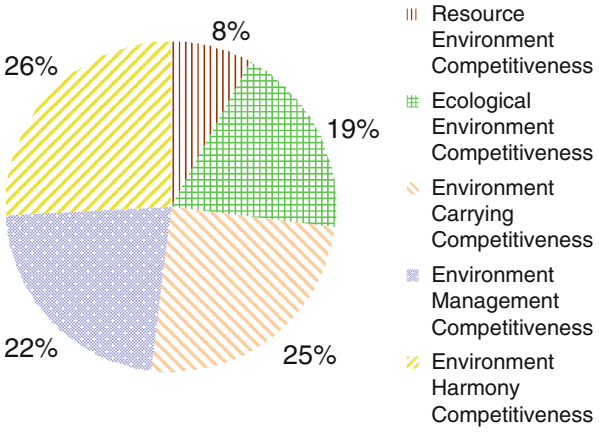

Fig. 73.1 Contribution of sub-index of GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_73,

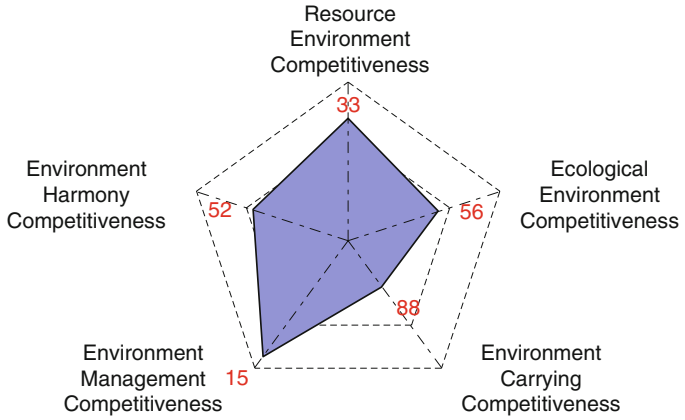

Fig. 73.2 Rank of sub-index of GEC

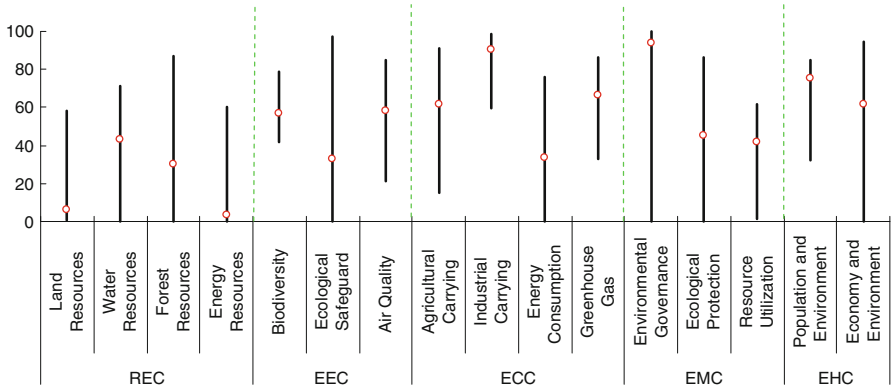

Fig. 73.3 Score and rank of the pillars of GEC

Table 73.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	21.18	33	Groundwater	51.74	8
1.1 Land Resources	6.50	113	Total internal renewable water resources	43.79	23
Land area per capita	0.70	117	1.3 Forest Resources	29.87	67
Percentage of arable land to total land area	18.67	72	Growing stock in forest and other wooded land	50.16	97
Arable land per capita	2.07	122	Proportion of land area covered by forest	36.41	59
1.2 Water Resources	42.90	18	Forest area per capita	0.87	92
Surface water	5.49	56	1.4 Energy Resources	3.46	88
Annual precipitation	70.57	10			

(continued)

Table 73.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
Fossil energy	0.00	64	3.3 Energy Consumption	33.80	62
Energy production	0.17	116	Energy consumption per unit of land area	99.40	103
Proportion of combustible renewables and waste to total energy consumption	15.65	50	Ratio of clean energy consumption	0.73	100
Net energy imports of the energy consumption	1.79	117	Elasticity of energy consumption	14.79	23
2 Ecological Environment Competitiveness	50.28	56	Elasticity of electric power consumption	20.27	11
2.1 Biodiversity	56.83	84	3.4 Greenhouse Gas	66.64	37
Threatened fish species	90.09	58	Growth rate of CO_2 emissions	69.56	17
Threatened mammal species	97.28	22	Growth rate of Methane emissions	65.47	22
Threatened plant species	87.98	119	CO_2 emissions per unit of land area	99.18	109
GEF benefits index for biodiversity	4.40	50	CO_2 emissions per unit of energy consumption	29.44	103
2.2 Ecological Safeguard	32.83	36	4 Environment Management Competitiveness	58.64	15
Terrestrial protected areas	51.09	29	4.1 Environmental Governance	93.90	49
Marine protected areas	5.44	38	Agricultural chemicals regulation	95.24	20
2.3 Air Quality	58.44	65	Percentage of the rural population with access to an improved water source	88.00	67
Inhalable particles (PM10)	80.29	58	Percentage of the urban population with access to an improved water source	98.00	70
Particulate matter (PM2.5)	90.07	33	4.2 Ecological Protection	45.00	23
Index of indoor air pollution	26.40	70	Area of plantation and afforestation	0.01	113
Nitrogen oxides emission	68.89	13	Biome protect	100.00	1
Sulfur dioxide emission	40.79	52	Overfishing of fishing resources	50.00	55
3 Environment Carrying Competitiveness	65.58	88	4.3 Resource Utilization	41.56	45
3.1 Agricultural Carrying	61.44	109	Utilization rate of water resources	0.25	70
Cereal yield per unit of arable land	9.02	115	Percentage of total internal renewable water resources to total water resources	100.00	2
Fertilizer consumption per unit of arable land	95.30	63	Percentage of agricultural land to total land area	49.00	72
Annual freshwater withdrawals for agriculture per unit of arable land	97.46	77			
3.2 Industrial Carrying	90.21	81			
Net exports as a percentage of GDP	80.69	69			
Electric power consumption per unit of value added of industry	87.89	91			
SO_2 emissions per unit of value added of industry	99.00	120			
Annual freshwater withdrawals for industry per value added of industry	93.25	100			

(continued)

Table 73.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
Percentage of fossil fuel energy consumption to total energy consumption	16.98	79	SO_2 emissions (metric tons per capita)	88.86	99
			CO_2 emissions (metric tons per capita)	92.12	66
5 Environment Harmony Competitiveness	68.61	52	Energy consumption per capita	92.19	55
5.1 Population and Environment	75.29	42	5.2 Economy and Environment	61.92	83
Improved sanitation facilities (% of population with access)	83.00	73	Land resource utilization efficiency	0.39	32
			Sulfur dioxide emissions per unit of GDP	82.97	107
Motor vehicles (per 1,000 people)	85.43	63	Carbon dioxide emissions per unit of GDP	78.79	96
Renewable internal freshwater resources per capita	4.20	60	Energy consumption per unit of GDP	85.52	63

Table 73.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	2	1	3	5	3
Ecological Environment Competitiveness	11	0	3	4	3	1
Environment Carrying Competitiveness	15	0	3	1	6	5
Environment Management Competitiveness	10	2	2	2	3	1
Environment Harmony Competitiveness	10	0	0	3	6	1
Total	60	4	9	13	23	11

Chapter 74
Report on the Global Environment Competitiveness of Japan

Score: 57.21
Rank: 6

Japan is a country in the Pacific island outside the East Coast of Asian continent.

It closes to China, North Korea, South Korea and Russia separating from the East China Sea, the sea of Japan and Okhotsk, and the east near the Pacific. It crosses the subtropical and temperate zone, and lacks of resources. It covers 365 thousand square kilometres. It had a population of 127.8 million and domestic production the gross (GDP) of USD 5,867 billion in 2011. Through the evaluation of global environment competitiveness, we can know that the environment competitiveness index of Japan ranks at 6 among 133 countries.

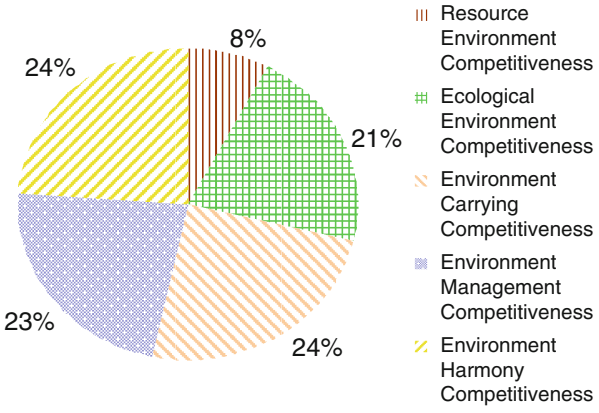

Fig. 74.1 Contribution of sub-index of GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_74,

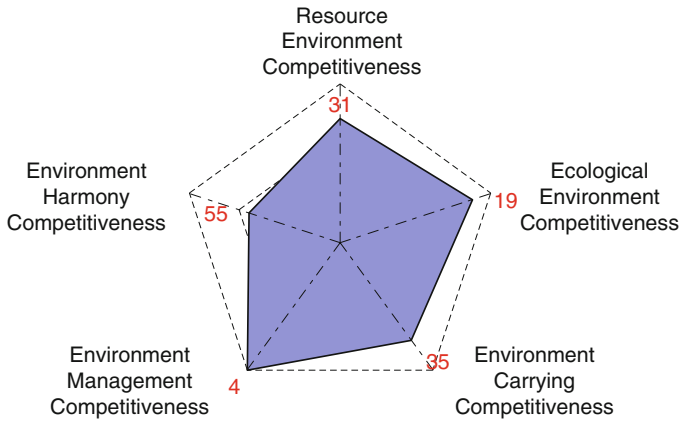

Fig. 74.2 Rank of sub-index of GEC

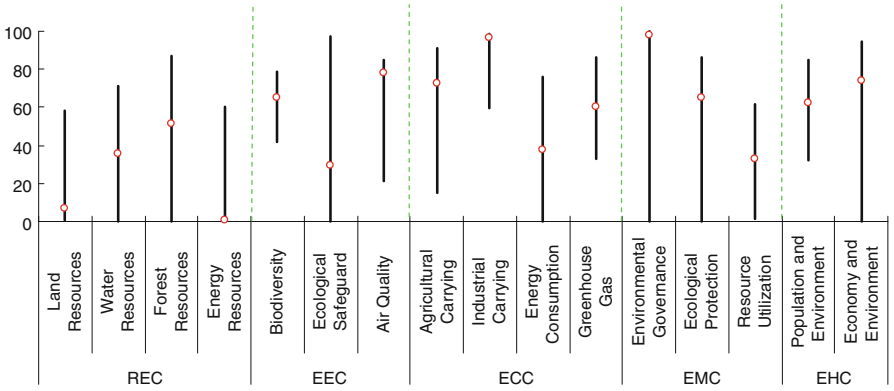

Fig. 74.3 Score and rank of the pillars of GEC

Table 74.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	22.46	31	Groundwater	10.63	63
1.1 Land Resources	6.56	111	Total internal renewable water resources	59.50	14
Land area per capita	0.49	123	1.3 Forest Resources	51.39	12
Percentage of arable land to total land area	19.67	70	Growing stock in forest and other wooded land	62.87	11
Arable land per capita	1.55	125	Proportion of land area covered by forest	80.29	4
1.2 Water Resources	35.30	27	Forest area per capita	1.36	75
Surface water	12.44	26	1.4 Energy Resources	0.93	115
Annual precipitation	58.64	24			

(continued)

Table 74.1 (continued)

Indicators	Score	Rank
Fossil energy	0.00	64
Energy production	0.77	69
Proportion of combustible renewables and waste to total energy consumption	1.54	101
Net energy imports of the energy consumption	2.34	113
2 Ecological Environment Competitiveness	59.78	19
2.1 Biodiversity	65.25	5
Threatened fish species	69.81	113
Threatened mammal species	84.78	106
Threatened plant species	99.65	51
GEF benefits index for biodiversity	36.00	9
2.2 Ecological Safeguard	29.61	46
Terrestrial protected areas	44.57	40
Marine protected areas	7.17	32
2.3 Air Quality	78.30	35
Inhalable particles (PM10)	82.48	53
Particulate matter (PM2.5)	83.16	76
Index of indoor air pollution	100.00	1
Nitrogen oxides emission	62.64	113
Sulfur dioxide emission	38.52	107
3 Environment Carrying Competitiveness	70.22	35
3.1 Agricultural Carrying	72.91	31
Cereal yield per unit of arable land	61.85	16
Fertilizer consumption per unit of arable land	80.98	108
Annual freshwater withdrawals for agriculture per unit of arable land	79.59	124
3.2 Industrial Carrying	96.24	6
Net exports as a percentage of GDP	91.17	15
Electric power consumption per unit of value added of industry	95.03	35
SO_2 emissions per unit of value added of industry	99.99	12
Annual freshwater withdrawals for industry per value added of industry	98.77	48
3.3 Energy Consumption	37.42	34
Energy consumption per unit of land area	97.09	119
Ratio of clean energy consumption	30.02	22
Elasticity of energy consumption	13.50	95
Elasticity of electric power consumption	9.06	108
3.4 Greenhouse Gas	59.97	79
Growth rate of CO_2 emissions	50.78	74
Growth rate of Methane emissions	63.57	29
CO_2 emissions per unit of land area	96.51	124
CO_2 emissions per unit of energy consumption	38.22	78
4 Environment Management Competitiveness	65.37	4
4.1 Environmental Governance	98.10	24
Agricultural chemicals regulation	95.24	20
Percentage of the rural population with access to an improved water source	100.00	1
Percentage of the urban population with access to an improved water source	100.00	1
4.2 Ecological Protection	64.97	7
Area of plantation and afforestation	N/A	N/A
Biome protect	87.80	29
Overfishing of fishing resources	42.15	68
4.3 Resource Utilization	33.16	82
Utilization rate of water resources	0.85	40
Percentage of total internal renewable water resources to total water resources	96.20	6
Percentage of agricultural land to total land area	14.95	121
Percentage of fossil fuel energy consumption to total energy consumption	20.65	75

(continued)

Table 74.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
5 Environment Harmony Competitiveness	68.20	55	CO_2 emissions (metric tons per capita)	75.77	111
5.1 Population and Environment	62.62	111	Energy consumption per capita	70.32	101
Improved sanitation facilities (% of population with access)	100.00	1	5.2 Economy and Environment	73.79	7
			Land resource utilization efficiency	4.70	6
Motor vehicles (per 1,000 people)	27.53	123	Sulfur dioxide emissions per unit of GDP	99.60	11
Renewable internal freshwater resources per capita	4.07	62	Carbon dioxide emissions per unit of GDP	94.30	23
SO_2 emissions (metric tons per capita)	97.25	51	Energy consumption per unit of GDP	96.54	9

Table 74.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	1	5	0	4	4
Ecological Environment Competitiveness	11	2	0	5	1	3
Environment Carrying Competitiveness	15	1	5	3	3	3
Environment Management Competitiveness	10	3	3	1	1	1
Environment Harmony Competitiveness	10	3	2	1	1	3
Total	60	10	15	10	10	14

Chapter 75
Report on the Global Environment Competitiveness of Jordan

Jordan is located in the west of Asia, borders on Palestinian, Israel, Iraq, Saudi Arabia and other countries. It's capital Amman and the western mountains are the subtropical Mediterranean climate. The mainly natural resources are phosphate, potassium, copper and so on. It covers 90 thousand square kilometres. It had a population of 6.18 million and domestic production the gross (GDP) of USD 28.8 billion in 2011. Through the evaluation of global environment competitiveness, we can know that the environment competitiveness index of Jordan ranks at 120 among 133 countries.

Score: 43.94
Rank: 120

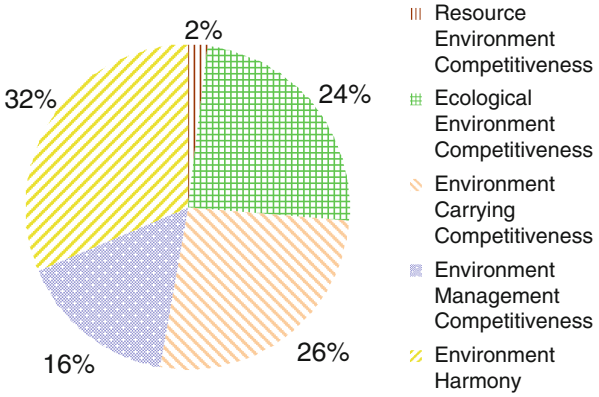

Fig. 75.1 Contribution of sub-index of GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_75,

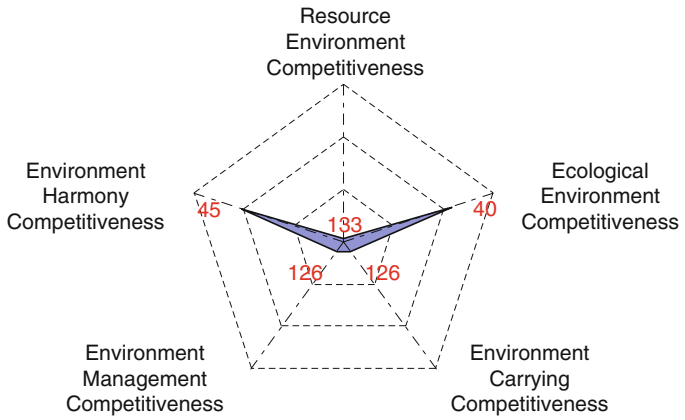

Fig. 75.2 Rank of sub-index of GEC

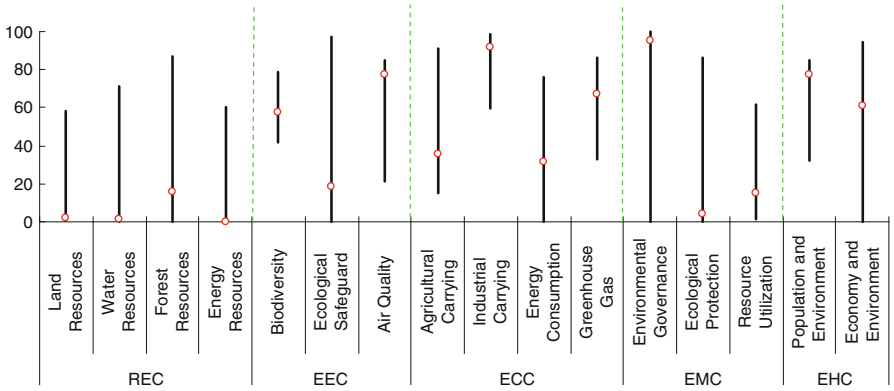

Fig. 75.3 Score and rank of the pillars of GEC

Table 75.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	4.02	133	Total internal renewable water resources	0.39	119
1.1 Land Resources	2.38	129	1.3 Forest Resources	15.55	118
Land area per capita	2.57	63	Growing stock in forest and other wooded land	50.01	118
Percentage of arable land to total land area	3.19	117	Proportion of land area covered by forest	1.29	121
Arable land per capita	1.32	127	Forest area per capita	0.11	124
1.2 Water Resources	1.36	124	1.4 Energy Resources	0.08	124
Surface water	0.14	119	Fossil energy	0.00	64
Annual precipitation	3.79	124	Energy production	0.05	124
Groundwater	1.13	107			

(continued)

Table 75.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
Proportion of combustible renewables and waste to total energy consumption	0.08	112	Energy consumption per unit of land area	99.83	56
Net energy imports of the energy consumption	0.33	122	Ratio of clean energy consumption	2.87	83
2 Ecological Environment Competitiveness	53.76	40	Elasticity of energy consumption	14.54	28
2.1 Biodiversity	57.51	75	Elasticity of electric power consumption	9.92	96
Threatened fish species	93.87	36	3.4 Greenhouse Gas	67.43	32
Threatened mammal species	92.93	78	Growth rate of CO_2 emissions	68.84	19
Threatened plant species	99.94	22	Growth rate of Methane emissions	69.72	13
GEF benefits index for biodiversity	0.40	103	CO_2 emissions per unit of land area	99.77	71
2.2 Ecological Safeguard	18.82	74	CO_2 emissions per unit of energy consumption	30.00	101
Terrestrial protected areas	4.89	113	4 Environment Management Competitiveness	34.55	126
Marine protected areas	39.71	7	4.1 Environmental Governance	95.10	43
2.3 Air Quality	77.16	36	Agricultural chemicals regulation	95.24	20
Inhalable particles (PM10)	78.10	69	Percentage of the rural population with access to an improved water source	92.00	53
Particulate matter (PM2.5)	75.51	97	Percentage of the urban population with access to an improved water source	98.00	70
Index of indoor air pollution	100.00	1	4.2 Ecological Protection	3.93	130
Nitrogen oxides emission	68.87	15	Area of plantation and afforestation	0.06	95
Sulfur dioxide emission	40.71	62	Biome protect	9.10	118
3 Environment Carrying Competitiveness	58.14	126	Overfishing of fishing resources	N/A	N/A
3.1 Agricultural Carrying	35.61	131	4.3 Resource Utilization	14.84	131
Cereal yield per unit of arable land	17.95	90	Utilization rate of water resources	4.03	12
Fertilizer consumption per unit of arable land	0.08	130	Percentage of total internal renewable water resources to total water resources	36.37	103
Annual freshwater withdrawals for agriculture per unit of arable land	94.69	96	Percentage of agricultural land to total land area	13.65	122
3.2 Industrial Carrying	92.03	58	Percentage of fossil fuel energy consumption to total energy consumption	5.30	108
Net exports as a percentage of GDP	82.54	57			
Electric power consumption per unit of value added of industry	86.51	98			
SO_2 emissions per unit of value added of industry	99.63	91			
Annual freshwater withdrawals for industry per value added of industry	99.44	23			
3.3 Energy Consumption	31.79	90			

(continued)

Table 75.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
5 Environment Harmony Competitiveness	69.25	45	CO_2 emissions (metric tons per capita)	91.76	67
5.1 Population and Environment	77.37	30	Energy consumption per capita	91.71	59
Improved sanitation facilities (% of population with access)	98.00	33	5.2 Economy and Environment	61.13	86
			Land resource utilization efficiency	0.09	69
Motor vehicles (per 1,000 people)	81.23	71	Sulfur dioxide emissions per unit of GDP	88.21	94
Renewable internal freshwater resources per capita	0.13	125	Carbon dioxide emissions per unit of GDP	74.29	103
SO_2 emissions (metric tons per capita)	93.20	84	Energy consumption per unit of GDP	81.91	76

Table 75.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	0	0	0	2	12
Ecological Environment Competitiveness	11	1	2	2	5	1
Environment Carrying Competitiveness	15	0	3	4	6	2
Environment Management Competitiveness	10	0	2	2	1	5
Environment Harmony Competitiveness	10	0	1	1	6	2
Total	60	1	8	9	20	22

Chapter 76
Report on the Global Environment Competitiveness of Kazakhstan

Score: 39.84
Rank: 128

Kazakhstan across Asia and Europe, including the north of central Asia and the southwest of Ural which is in the Eastern Europe. It faces the Caspian sea, borders on Russia, China, Uzbekistan, Kyrgyzstan and other countries. Its continental climate. The uranium, copper, lead, zinc and chromium are rich. It covers 2,700 thousand square kilometres. It had a population of 16.5 million and domestic production the gross (GDP) of USD 188 billion in 2011. Through the evaluation of global environment competitiveness, we can know that the environment competitiveness index of Kazakhstan ranks at 128 among 133 countries.

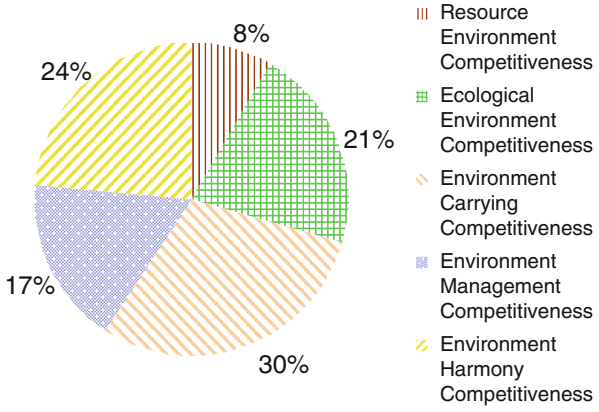

Fig. 76.1 Contribution of sub-index of GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_76,

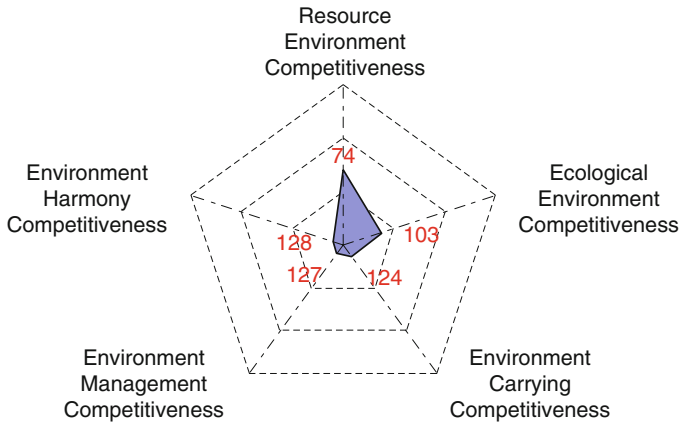

Fig. 76.2 Rank of sub-index of GEC

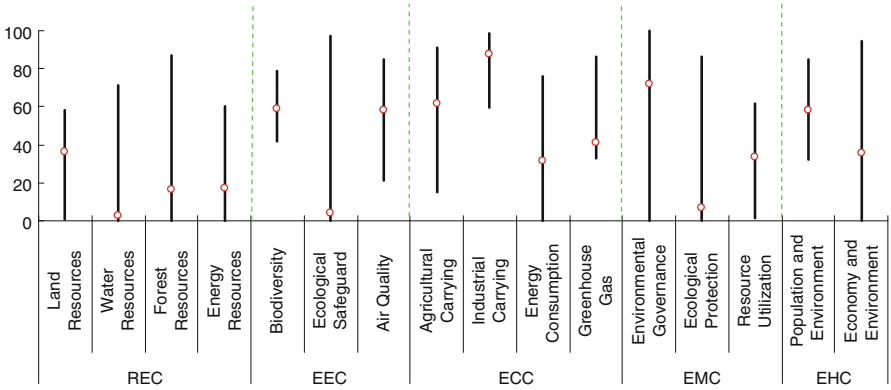

Fig. 76.3 Score and rank of the pillars of GEC

Table 76.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	16.67	74	Groundwater	1.76	104
1.1 Land Resources	36.63	6	Total internal renewable water resources	1.20	116
Land area per capita	29.37	9	1.3 Forest Resources	16.32	114
Percentage of arable land to total land area	14.97	87	Growing stock in forest and other wooded land	51.10	71
Arable land per capita	67.96	2	Proportion of land area covered by forest	1.43	120
1.2 Water Resources	3.01	116	Forest area per capita	1.39	73
Surface water	0.51	112	1.4 Energy Resources	17.26	23
Annual precipitation	8.56	113			

(continued)

Table 76.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
Fossil energy	32.84	5	3.3 Energy Consumption	31.37	99
Energy production	9.70	11	Energy consumption per unit of land area	99.94	29
Proportion of combustible renewables and waste to total energy consumption	0.07	114	Ratio of clean energy consumption	1.53	91
Net energy imports of the energy consumption	26.68	23	Elasticity of energy consumption	13.29	101
2 Ecological Environment Competitiveness	41.98	103	Elasticity of electric power consumption	10.70	63
2.1 Biodiversity	58.79	39	3.4 Greenhouse Gas	41.21	129
Threatened fish species	93.40	41	Growth rate of CO_2 emissions	20.23	129
Threatened mammal species	91.30	90	Growth rate of Methane emissions	50.40	111
Threatened plant species	99.07	74	CO_2 emissions per unit of land area	99.90	48
GEF benefits index for biodiversity	5.10	47	CO_2 emissions per unit of energy consumption	15.29	123
2.2 Ecological Safeguard	3.91	115	4 Environment Management Competitiveness	34.38	127
Terrestrial protected areas	6.52	109	4.1 Environmental Governance	71.94	104
Marine protected areas	N/A	N/A	Agricultural chemicals regulation	38.10	82
2.3 Air Quality	57.92	68	Percentage of the rural population with access to an improved water source	90.00	60
Inhalable particles (PM10)	86.86	30	Percentage of the urban population with access to an improved water source	99.00	51
Particulate matter (PM2.5)	83.38	75	4.2 Ecological Protection	6.75	125
Index of indoor air pollution	30.60	64	Area of plantation and afforestation	1.17	37
Nitrogen oxides emission	65.25	98	Biome protect	14.20	111
Sulfur dioxide emission	32.71	125	Overfishing of fishing resources	N/A	N/A
3 Environment Carrying Competitiveness	59.21	124	4.3 Resource Utilization	33.65	78
3.1 Agricultural Carrying	61.63	107	Utilization rate of water resources	1.17	30
Cereal yield per unit of arable land	4.87	123	Percentage of total internal renewable water resources to total water resources	39.86	98
Fertilizer consumption per unit of arable land	99.81	9	Percentage of agricultural land to total land area	91.28	5
Annual freshwater withdrawals for agriculture per unit of arable land	99.11	60	Percentage of fossil fuel energy consumption to total energy consumption	2.29	116
3.2 Industrial Carrying	87.35	99			
Net exports as a percentage of GDP	70.06	101			
Electric power consumption per unit of value added of industry	90.87	71			
SO_2 emissions per unit of value added of industry	98.72	122			
Annual freshwater withdrawals for industry per value added of industry	89.75	115			

(continued)

Table 76.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
5 Environment Harmony Competitiveness	46.94	128	CO_2 emissions (metric tons per capita)	61.51	123
5.1 Population and Environment	58.36	121	Energy consumption per capita	64.82	109
Improved sanitation facilities (% of population with access)	97.00	39	5.2 Economy and Environment	35.52	124
Motor vehicles (per 1,000 people)	75.68	82	Land resource utilization efficiency	0.02	105
Renewable internal freshwater resources per capita	4.70	55	Sulfur dioxide emissions per unit of GDP	39.44	126
SO_2 emissions (metric tons per capita)	27.82	128	Carbon dioxide emissions per unit of GDP	39.51	128
			Energy consumption per unit of GDP	63.11	112

Table 76.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	3	2	0	2	7
Ecological Environment Competitiveness	11	0	1	2	6	2
Environment Carrying Competitiveness	15	1	1	1	4	8
Environment Management Competitiveness	10	1	1	2	3	3
Environment Harmony Competitiveness	10	0	0	2	1	7
Total	60	5	5	7	16	27

Chapter 77
Report on the Global Environment Competitiveness of Kenya

Kenya is located in Eastern Africa, borders on Somalia, Tanzania, Ethiopia and other countries, and the southeast closes to the Indian Ocean. It mainly is the Savannah climate and the tropical monsoon, which lacks of mineral resources. It covers 569 thousand square kilometres. It had a population of 41.6 million and domestic production the gross (GDP) of USD 33.6 billion in 2011. Through the evaluation of global environment competitiveness, we can know that the environment competitiveness index of Kenya ranks at 90 among 133 countries.

Score: 47.76
Rank: 90

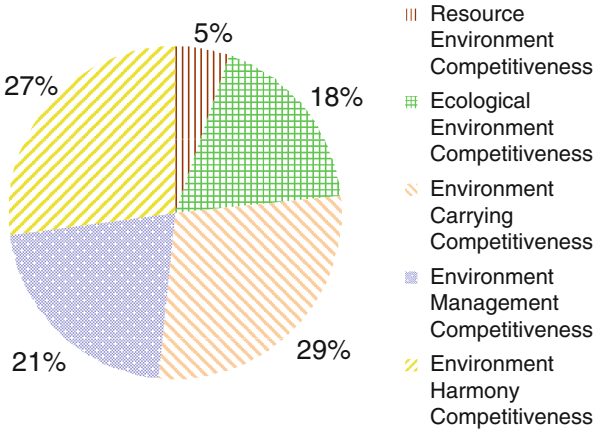

Fig. 77.1 Contribution of sub-index of GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_77,

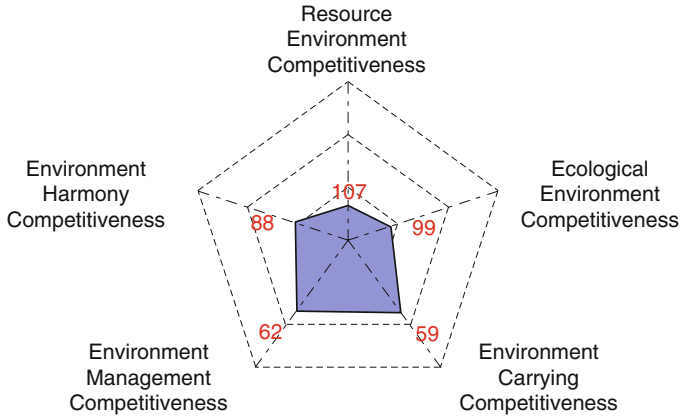

Fig. 77.2 Rank of sub-index of GEC

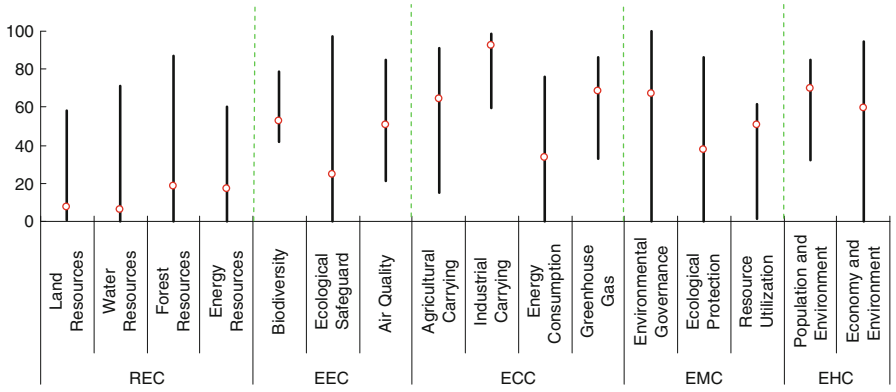

Fig. 77.3 Score and rank of the pillars of GEC

Table 77.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	12.31	107	Groundwater	0.84	110
1.1 Land Resources	7.71	104	Total internal renewable water resources	1.83	110
Land area per capita	2.44	66	1.3 Forest Resources	18.59	107
Percentage of arable land to total land area	16.26	82	Growing stock in forest and other wooded land	51.91	54
Arable land per capita	6.18	80	Proportion of land area covered by forest	7.11	109
1.2 Water Resources	6.26	105	Forest area per capita	0.58	101
Surface water	0.57	108	1.4 Energy Resources	17.26	24
Annual precipitation	21.78	87			

(continued)

Table 77.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
Fossil energy	0.00	64	Energy consumption per unit of land area	99.93	36
Energy production	0.39	95	Ratio of clean energy consumption	12.20	45
Proportion of combustible renewables and waste to total energy consumption	77.95	11	Elasticity of energy consumption	13.29	102
Net energy imports of the energy consumption	10.20	57	Elasticity of electric power consumption	8.10	113
2 Ecological Environment Competitiveness	43.56	99	3.4 Greenhouse Gas	68.27	27
2.1 Biodiversity	52.59	120	Growth rate of CO_2 emissions	45.88	88
Threatened fish species	67.92	116	Growth rate of Methane emissions	61.00	48
Threatened mammal species	84.78	106	CO_2 emissions per unit of land area	99.98	22
Threatened plant species	92.65	112	CO_2 emissions per unit of energy consumption	88.59	8
GEF benefits index for biodiversity	8.80	31	4 Environment Management Competitiveness	50.56	62
2.2 Ecological Safeguard	24.60	58	4.1 Environmental Governance	67.00	112
Terrestrial protected areas	31.79	61	Agricultural chemicals regulation	N/A	N/A
Marine protected areas	13.81	24	Percentage of the rural population with access to an improved water source	52.00	104
2.3 Air Quality	51.02	91	Percentage of the urban population with access to an improved water source	82.00	122
Inhalable particles (PM10)	78.10	69	4.2 Ecological Protection	37.91	49
Particulate matter (PM2.5)	89.98	35	Area of plantation and afforestation	0.26	68
Index of indoor air pollution	4.20	108	Biome protect	67.20	57
Nitrogen oxides emission	66.76	88	Overfishing of fishing resources	58.82	35
Sulfur dioxide emission	40.84	45	4.3 Resource Utilization	50.99	12
3 Environment Carrying Competitiveness	67.43	59	Utilization rate of water resources	0.36	64
3.1 Agricultural Carrying	64.63	87	Percentage of total internal renewable water resources to total water resources	61.42	71
Cereal yield per unit of arable land	14.00	102	Percentage of agricultural land to total land area	56.80	55
Fertilizer consumption per unit of arable land	97.38	48	Percentage of fossil fuel energy consumption to total energy consumption	85.37	8
Annual freshwater withdrawals for agriculture per unit of arable land	99.40	49			
3.2 Industrial Carrying	92.36	55			
Net exports as a percentage of GDP	81.82	64			
Electric power consumption per unit of value added of industry	90.53	76			
SO_2 emissions per unit of value added of industry	99.68	82			
Annual freshwater withdrawals for industry per value added of industry	97.41	66			
3.3 Energy Consumption	33.38	65			

(continued)

Table 77.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
5 Environment Harmony Competitiveness	64.93	88	CO_2 emissions (metric tons per capita)	99.38	16
5.1 Population and Environment	70.19	67	Energy consumption per capita	97.30	21
Improved sanitation facilities (% of population with access)	31.00	111	5.2 Economy and Environment	59.67	92
Motor vehicles (per 1,000 people)	97.41	25	Land resource utilization efficiency	0.02	112
Renewable internal freshwater resources per capita	0.60	114	Sulfur dioxide emissions per unit of GDP	94.60	67
SO_2 emissions (metric tons per capita)	99.44	16	Carbon dioxide emissions per unit of GDP	89.07	62
			Energy consumption per unit of GDP	55.00	116

Table 77.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	0	2	1	5	6
Ecological Environment Competitiveness	11	0	0	2	4	5
Environment Carrying Competitiveness	15	0	2	5	6	2
Environment Management Competitiveness	10	0	1	3	3	2
Environment Harmony Competitiveness	10	0	3	0	4	3
Total	60	0	8	11	22	18

Chapter 78
Report on the Global Environment Competitiveness of South Korea

South Korea is located in the south of Korean Peninsula which is in the northeast Asian. Its east, south and west sides face the sea. It borders on North Korea. The north region is temperate monsoon climate, and the south is subtropical climate. It lacks of natural resource, so the main industrial raw material depend on import. It covers 97 thousand square kilometres. It had a population of 49.7 million and domestic production the gross (GDP) of USD 1116 billion in 2011. Through the evaluation of global environment competitiveness, we can know that the environment competitiveness index of South Korea ranks at 64 among 133 countries.

Score: 50.26
Rank: 64

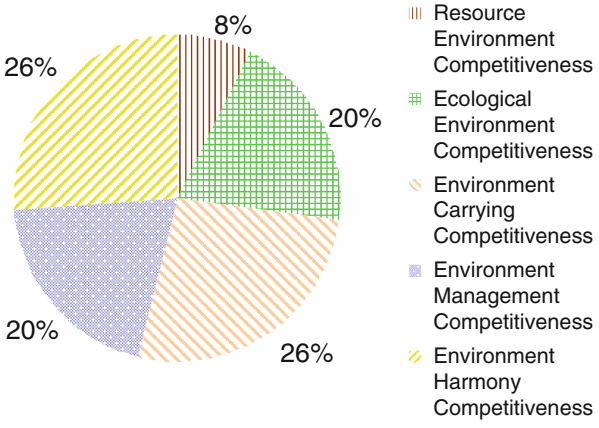

Fig. 78.1 Contribution of sub-index of GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_78,

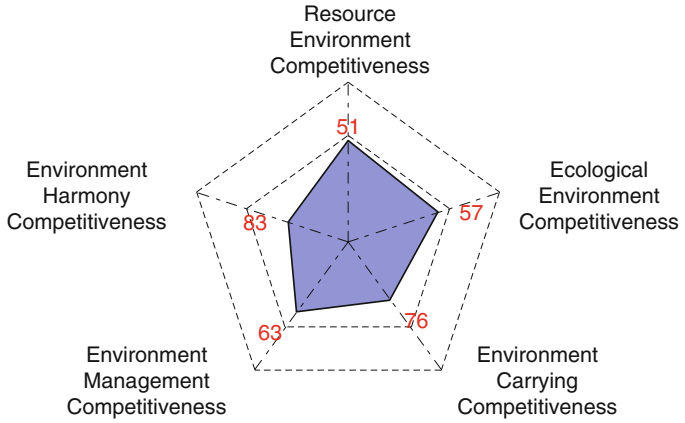

Fig. 78.2 Rank of sub-index of GEC

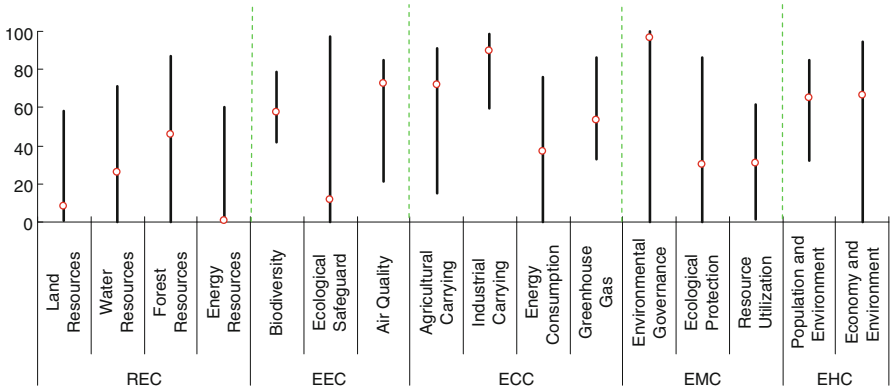

Fig. 78.3 Score and rank of the pillars of GEC

Table 78.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	19.01	51	Total internal renewable water resources	33.68	34
1.1 Land Resources	8.34	94	1.3 Forest Resources	45.80	17
Land area per capita	0.33	130	Growing stock in forest and other wooded land	51.83	56
Percentage of arable land to total land area	25.96	56	Proportion of land area covered by forest	74.97	7
Arable land per capita	1.40	126	Forest area per capita	0.87	91
1.2 Water Resources	26.32	38	1.4 Energy Resources	0.95	113
Surface water	7.46	44	Fossil energy	0.03	59
Annual precipitation	44.45	41	Energy production	0.92	64
Groundwater	19.70	40			

(continued)

Table 78.1 (continued)

Indicators	Score	Rank
Proportion of combustible renewables and waste to total energy consumption	1.48	102
Net energy imports of the energy consumption	2.15	114
2 Ecological Environment Competitiveness	49.74	57
2.1 Biodiversity	57.47	77
Threatened fish species	91.04	47
Threatened mammal species	95.11	49
Threatened plant species	99.82	40
GEF benefits index for biodiversity	0.70	92
2.2 Ecological Safeguard	11.48	92
Terrestrial protected areas	15.76	91
Marine protected areas	5.05	41
2.3 Air Quality	72.63	44
Inhalable particles (PM10)	62.04	99
Particulate matter (PM2.5)	71.65	105
Index of indoor air pollution	100.00	1
Nitrogen oxides emission	66.11	93
Sulfur dioxide emission	39.80	93
3 Environment Carrying Competitiveness	66.58	76
3.1 Agricultural Carrying	72.01	35
Cereal yield per unit of arable land	65.74	12
Fertilizer consumption per unit of arable land	68.55	119
Annual freshwater withdrawals for agriculture per unit of arable land	83.83	117
3.2 Industrial Carrying	89.60	86
Net exports as a percentage of GDP	68.49	104
Electric power consumption per unit of value added of industry	90.79	72
SO_2 emissions per unit of value added of industry	99.97	19
Annual freshwater withdrawals for industry per value added of industry	99.14	35
3.3 Energy Consumption	36.80	36
Energy consumption per unit of land area	94.50	125
Ratio of clean energy consumption	28.98	24
Elasticity of energy consumption	13.63	86
Elasticity of electric power consumption	10.08	90
3.4 Greenhouse Gas	53.72	120
Growth rate of CO_2 emissions	39.27	111
Growth rate of Methane emissions	56.87	79
CO_2 emissions per unit of land area	93.55	131
CO_2 emissions per unit of energy consumption	39.62	72
4 Environment Management Competitiveness	50.18	63
4.1 Environmental Governance	96.40	34
Agricultural chemicals regulation	100.00	1
Percentage of the rural population with access to an improved water source	88.00	67
Percentage of the urban population with access to an improved water source	100.00	1
4.2 Ecological Protection	29.96	81
Area of plantation and afforestation	2.36	23
Biome protect	34.20	92
Overfishing of fishing resources	62.50	32
4.3 Resource Utilization	30.93	91
Utilization rate of water resources	1.48	24
Percentage of total internal renewable water resources to total water resources	80.66	35
Percentage of agricultural land to total land area	22.57	115

(continued)

Table 78.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
Percentage of fossil fuel energy consumption to total energy consumption	19.00	77	SO_2 emissions (metric tons per capita)	96.57	59
			CO_2 emissions (metric tons per capita)	68.86	119
5 Environment Harmony Competitiveness	65.77	83	Energy consumption per capita	61.14	112
5.1 Population and Environment	64.91	98	5.2 Economy and Environment	66.63	55
Improved sanitation facilities (% of population with access)	100.00	1	Land resource utilization efficiency	3.36	8
			Sulfur dioxide emissions per unit of GDP	98.82	21
Motor vehicles (per 1,000 people)	53.46	100	Carbon dioxide emissions per unit of GDP	80.33	91
Renewable internal freshwater resources per capita	1.58	90	Energy consumption per unit of GDP	84.02	66

Table 78.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	1	1	7	2	3
Ecological Environment Competitiveness	11	1	0	4	5	1
Environment Carrying Competitiveness	15	0	3	2	4	6
Environment Management Competitiveness	10	1	2	2	4	1
Environment Harmony Competitiveness	10	2	1	2	4	1
Total	60	5	7	17	19	12

Chapter 79
Report on the Global Environment Competitiveness of Kuwait

Kuwait located in the northeast of the Arabian Peninsula which is in the south-west of Asia, and closes to the northwest of Persian Gulf. It borders on Saudi Arabia and Iraq. It is tropical desert climate, and the oil and natural gas resources are rich. It covers 18 thousand square kilometres. It had a population of 2.8 million and domestic production the gross (GDP) of USD 176 billion in 2011. Through the evaluation of global environment competitiveness, we can know that the environment competitiveness index of Kuwait ranks at 124 among 133 countries.

Score: 42.37
Rank: 124

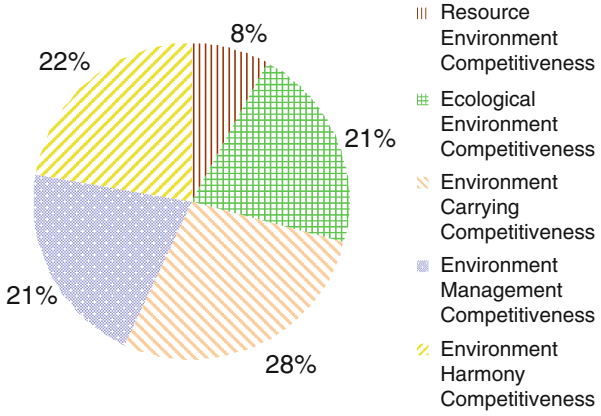

Fig. 79.1 Contribution of sub-index of GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_79,

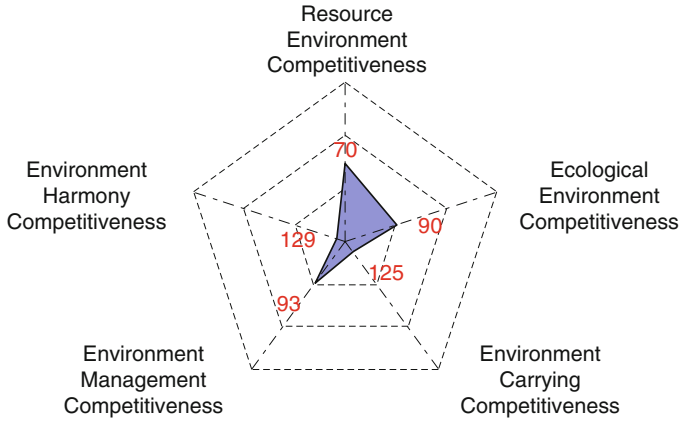

Fig. 79.2 Rank of sub-index of GEC

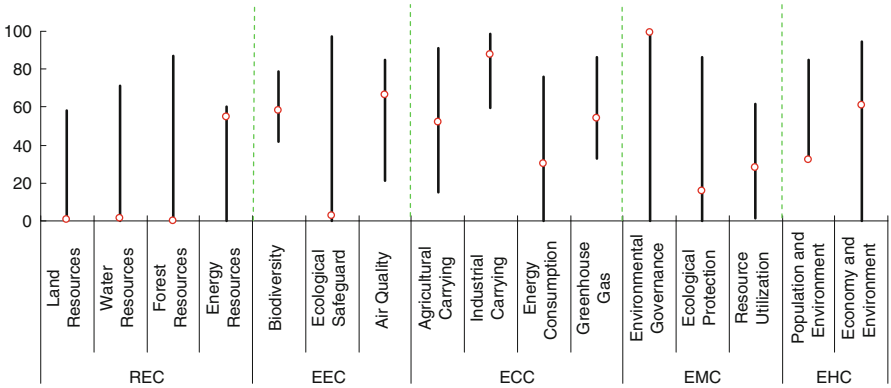

Fig. 79.3 Score and rank of the pillars of GEC

Table 79.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	17.00	70	Groundwater	0.12	123
1.1 Land Resources	0.76	132	Total internal renewable water resources	0.00	133
Land area per capita	1.12	107	1.3 Forest Resources	0.17	131
Percentage of arable land to total land area	0.87	128	Growing stock in forest and other wooded land	0.00	121
Arable land per capita	0.18	132	Proportion of land area covered by forest	0.42	126
1.2 Water Resources	1.06	126	Forest area per capita	0.02	128
Surface water	0.00	127	1.4 Energy Resources	55.00	2
Annual precipitation	4.10	123			

(continued)

Table 79.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
Fossil energy	100.00	1	Energy consumption per unit of land area	96.00	121
Energy production	49.44	3	Ratio of clean energy consumption	0.00	116
Proportion of combustible renewables and waste to total energy consumption	0.00	120	Elasticity of energy consumption	13.41	98
Net energy imports of the energy consumption	51.33	8	Elasticity of electric power consumption	10.68	66
2 Ecological Environment Competitiveness	44.85	90	3.4 Greenhouse Gas	54.01	117
2.1 Biodiversity	58.35	57	Growth rate of CO_2 emissions	41.55	102
Threatened fish species	94.81	28	Growth rate of Methane emissions	63.31	32
Threatened mammal species	96.74	30	CO_2 emissions per unit of land area	94.55	128
Threatened plant species	100.00	1	CO_2 emissions per unit of energy consumption	29.10	104
GEF benefits index for biodiversity	0.10	122	4 Environment Management Competitiveness	44.43	93
2.2 Ecological Safeguard	2.45	122	4.1 Environmental Governance	99.40	19
Terrestrial protected areas	4.08	117	Agricultural chemicals regulation	100.00	1
Marine protected areas	N/A	N/A	Percentage of the rural population with access to an improved water source	99.00	30
2.3 Air Quality	66.54	52	Percentage of the urban population with access to an improved water source	99.00	51
Inhalable particles (PM10)	33.58	124	4.2 Ecological Protection	15.68	114
Particulate matter (PM2.5)	67.95	112	Area of plantation and afforestation	0.01	114
Index of indoor air pollution	100.00	1	Biome protect	9.40	117
Nitrogen oxides emission	68.87	14	Overfishing of fishing resources	42.86	66
Sulfur dioxide emission	39.32	102	4.3 Resource Utilization	27.78	107
3 Environment Carrying Competitiveness	58.71	125	Utilization rate of water resources	100.00	1
3.1 Agricultural Carrying	51.92	126	Percentage of total internal renewable water resources to total water resources	0.00	128
Cereal yield per unit of arable land	34.35	54	Percentage of agricultural land to total land area	10.02	124
Fertilizer consumption per unit of arable land	95.59	61	Percentage of fossil fuel energy consumption to total energy consumption	1.12	122
Annual freshwater withdrawals for agriculture per unit of arable land	31.68	129			
3.2 Industrial Carrying	87.75	96			
Net exports as a percentage of GDP	54.92	122			
Electric power consumption per unit of value added of industry	96.27	22			
SO_2 emissions per unit of value added of industry	99.83	63			
Annual freshwater withdrawals for industry per value added of industry	99.99	3			
3.3 Energy Consumption	30.02	122			

(continued)

Table 79.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
5 Environment Harmony Competitiveness	46.86	129	CO_2 emissions (metric tons per capita)	13.48	131
5.1 Population and Environment	32.48	133	Energy consumption per capita	4.70	125
			5.2 Economy and Environment	61.24	84
Improved sanitation facilities (% of population with access)	100.00	1	Land resource utilization efficiency	2.89	12
Motor vehicles (per 1,000 people)	39.14	107	Sulfur dioxide emissions per unit of GDP	85.47	102
Renewable internal freshwater resources per capita	0.00	133	Carbon dioxide emissions per unit of GDP	74.37	102
SO_2 emissions (metric tons per capita)	12.80	130	Energy consumption per unit of GDP	82.23	75

Table 79.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	3	0	0	0	11
Ecological Environment Competitiveness	11	2	3	2	0	4
Environment Carrying Competitiveness	15	0	1	2	4	8
Environment Management Competitiveness	10	2	2	0	0	6
Environment Harmony Competitiveness	10	1	1	0	1	7
Total	60	8	7	4	5	36

Chapter 80
Report on the Global Environment Competitiveness of Kyrgyzstan

Kyrgyzstan is located in the northeast of Central Asia, borders on China, Kazakhstan, Uzbekistan, Tajikistan. It is continental climate, and the deposit of coal, mercury and antimony are rich. It covers 192 thousand square kilometres. It had a population of 5.5 million and domestic production the gross (GDP) of USD5.9 billion in 2011. Through the evaluation of global environment competitiveness, we can know that the environment competitiveness index of Kyrgyzstan ranks at 123 in 133 countries.

Score: 42.52
Rank: 123

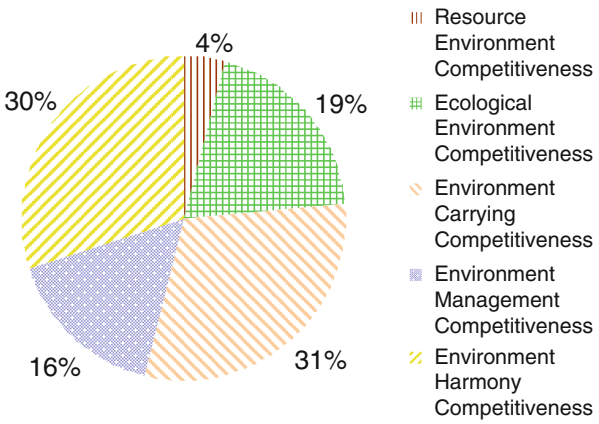

Fig. 80.1 Contribution of sub-index of GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_80,

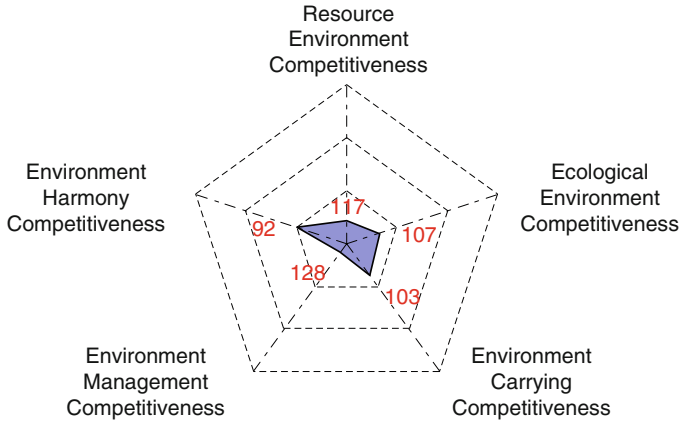

Fig. 80.2 Rank of sub-index of GEC

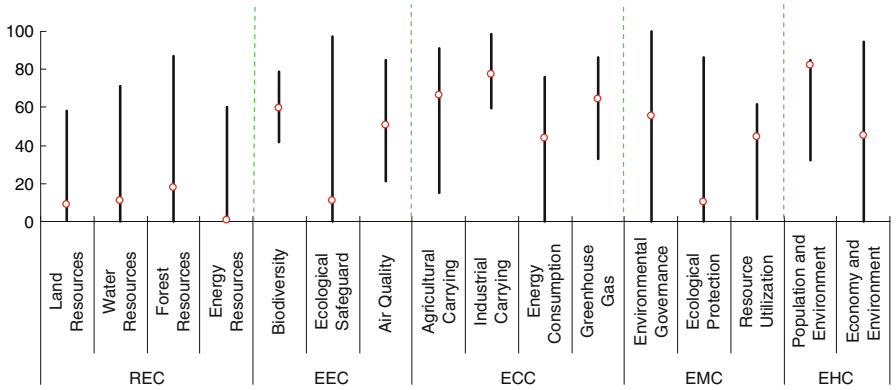

Fig. 80.3 Score and rank of the pillars of GEC

Table 80.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	8.98	117	Total internal renewable water resources	12.87	70
1.1 Land Resources	9.09	90	1.3 Forest Resources	17.78	110
Land area per capita	6.25	32	Growing stock in forest and other wooded land	50.14	99
Percentage of arable land to total land area	11.14	95	Proportion of land area covered by forest	5.93	110
Arable land per capita	10.83	53	Forest area per capita	1.23	78
1.2 Water Resources	11.15	86	1.4 Energy Resources	0.86	117
Surface water	2.65	81	Fossil energy	0.00	64
Annual precipitation	18.85	98	Energy production	0.22	113
Groundwater	10.24	66			

(continued)

Table 80.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
Proportion of combustible renewables and waste to total energy consumption	0.13	110	Energy consumption per unit of land area	99.97	17
Net energy imports of the energy consumption	5.04	98	Ratio of clean energy consumption	48.30	9
2 Ecological Environment Competitiveness	41.28	107	Elasticity of energy consumption	15.66	15
2.1 Biodiversity	59.34	27	Elasticity of electric power consumption	12.38	30
Threatened fish species	98.58	9	3.4 Greenhouse Gas	64.11	48
Threatened mammal species	96.74	30	Growth rate of CO_2 emissions	67.85	22
Threatened plant species	99.18	70	Growth rate of Methane emissions	49.33	116
GEF benefits index for biodiversity	1.10	81	CO_2 emissions per unit of land area	99.96	32
2.2 Ecological Safeguard	11.09	94	CO_2 emissions per unit of energy consumption	35.57	87
Terrestrial protected areas	18.48	84	4 Environment Management Competitiveness	33.98	128
Marine protected areas	N/A	N/A	4.1 Environmental Governance	55.20	125
2.3 Air Quality	50.37	95	Agricultural chemicals regulation	0.00	86
Inhalable particles (PM10)	74.45	79	Percentage of the rural population with access to an improved water source	85.00	72
Particulate matter (PM2.5)	73.90	101	Percentage of the urban population with access to an improved water source	99.00	51
Index of indoor air pollution	14.20	86	4.2 Ecological Protection	10.03	123
Nitrogen oxides emission	68.69	32	Area of plantation and afforestation	0.07	93
Sulfur dioxide emission	40.92	26	Biome protect	23.30	105
3 Environment Carrying Competitiveness	64.62	103	Overfishing of fishing resources	N/A	N/A
3.1 Agricultural Carrying	66.17	69	4.3 Resource Utilization	44.69	30
Cereal yield per unit of arable land	25.19	77	Utilization rate of water resources	1.77	21
Fertilizer consumption per unit of arable land	98.30	38	Percentage of total internal renewable water resources to total water resources	80.60	36
Annual freshwater withdrawals for agriculture per unit of arable land	88.69	113	Percentage of agricultural land to total land area	65.43	41
3.2 Industrial Carrying	77.08	127	Percentage of fossil fuel energy consumption to total energy consumption	30.95	53
Net exports as a percentage of GDP	78.84	78			
Electric power consumption per unit of value added of industry	54.70	124			
SO_2 emissions per unit of value added of industry	99.37	107			
Annual freshwater withdrawals for industry per value added of industry	75.43	125			
3.3 Energy Consumption	44.08	13			

(continued)

Table 80.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
5 Environment Harmony Competitiveness	63.78	92	CO_2 emissions (metric tons per capita)	96.58	40
5.1 Population and Environment	82.50	6	Energy consumption per capita	96.89	25
Improved sanitation facilities (% of population with access)	93.00	54	5.2 Economy and Environment	45.06	118
Motor vehicles (per 1,000 people)	92.96	41	Land resource utilization efficiency	0.01	116
Renewable internal freshwater resources per capita	10.74	36	Sulfur dioxide emissions per unit of GDP	81.31	111
SO_2 emissions (metric tons per capita)	97.84	44	Carbon dioxide emissions per unit of GDP	44.00	127
			Energy consumption per unit of GDP	54.91	117

Table 80.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	0	0	1	8	5
Ecological Environment Competitiveness	11	1	2	1	6	1
Environment Carrying Competitiveness	15	1	4	3	3	4
Environment Management Competitiveness	10	0	2	2	3	3
Environment Harmony Competitiveness	10	1	0	5	0	4
Total	60	3	8	12	20	17

Chapter 81
Report on the Global Environment Competitiveness of Latvia

Latvia is located in the west of the plain in Eastern Europe, near the east coast of Baltic sea, and borders on Estonia, Russia, Belarus and Lithuania. The climate is temperate broad-leaved forest climate, and the peat resources are rich. It covers 62 thousand square kilometres. It had a population of 2.1 million and domestic production the gross (GDP) of USD 28 billion in 2011. Through the evaluation of global environment competitiveness, we can know that the environment competitiveness index of Latvia ranks at 36 in 133 countries.

Score: 52.82
Rank: 36

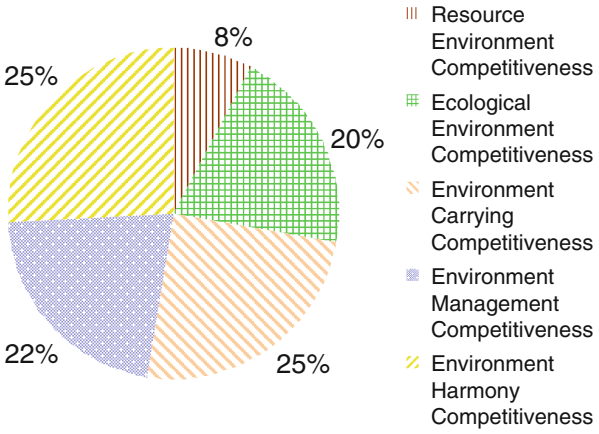

Fig. 81.1 Contribution of sub-index of GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_81,

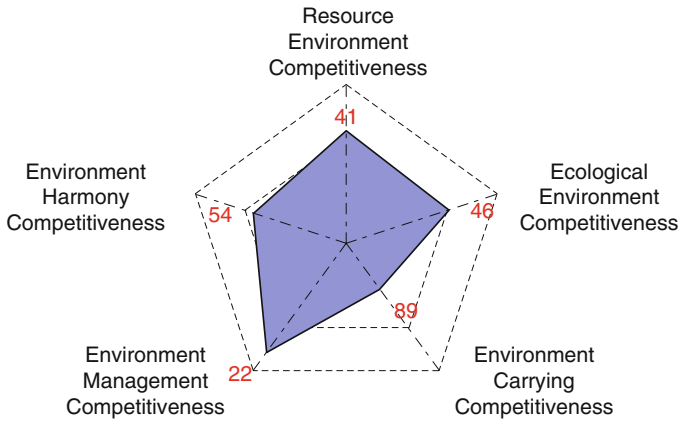

Fig. 81.2 Rank of sub-index of GEC

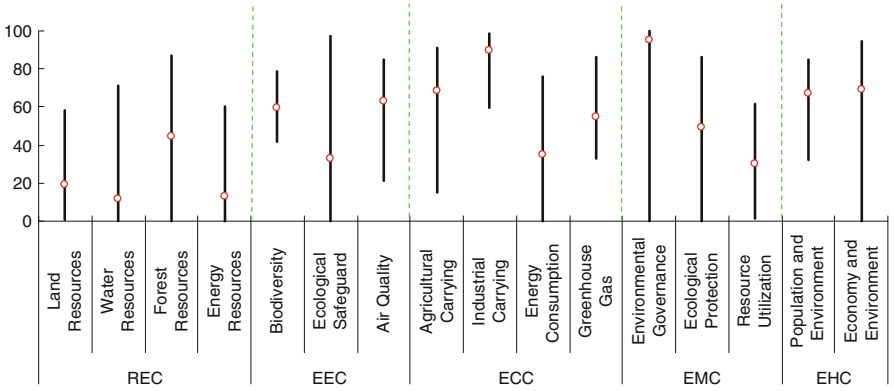

Fig. 81.3 Score and rank of the pillars of GEC

Table 81.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	20.30	41	Total internal renewable water resources	13.58	67
1.1 Land Resources	19.52	32	1.3 Forest Resources	44.34	19
Land area per capita	5.42	36	Growing stock in forest and other wooded land	51.92	53
Percentage of arable land to total land area	31.49	43	Proportion of land area covered by forest	63.37	12
Arable land per capita	26.34	11	Forest area per capita	11.40	20
1.2 Water Resources	11.82	79	1.4 Energy Resources	13.27	35
Surface water	6.12	53	Fossil energy	0.00	64
Annual precipitation	22.54	82	Energy production	0.95	63
Groundwater	5.06	87			

(continued)

Table 81.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
Proportion of combustible renewables and waste to total energy consumption	60.20	20	Ratio of clean energy consumption	12.20	46
Net energy imports of the energy consumption	5.99	93	Elasticity of energy consumption	14.80	22
2 Ecological Environment Competitiveness	52.69	46	Elasticity of electric power consumption	13.47	20
2.1 Biodiversity	59.33	29	3.4 Greenhouse Gas	54.63	114
Threatened fish species	97.17	17	Growth rate of CO_2 emissions	30.95	119
Threatened mammal species	99.46	2	Growth rate of Methane emissions	59.57	60
Threatened plant species	100.00	1	CO_2 emissions per unit of land area	99.86	60
GEF benefits index for biodiversity	0.00	128	CO_2 emissions per unit of energy consumption	51.83	45
2.2 Ecological Safeguard	32.69	37	4 Environment Management Competitiveness	57.29	22
Terrestrial protected areas	48.64	35	4.1 Environmental Governance	94.99	45
Marine protected areas	8.76	29	Agricultural chemicals regulation	90.48	37
2.3 Air Quality	62.73	56	Percentage of the rural population with access to an improved water source	96.00	46
Inhalable particles (PM10)	91.24	9	Percentage of the urban population with access to an improved water source	100.00	1
Particulate matter (PM2.5)	90.88	31	4.2 Ecological Protection	49.42	16
Index of indoor air pollution	32.80	62	Area of plantation and afforestation	0.81	44
Nitrogen oxides emission	68.75	26	Biome protect	100.00	1
Sulfur dioxide emission	40.99	4	Overfishing of fishing resources	63.64	29
3 Environment Carrying Competitiveness	65.54	89	4.3 Resource Utilization	30.09	99
3.1 Agricultural Carrying	68.77	53	Utilization rate of water resources	0.04	112
Cereal yield per unit of arable land	25.90	75	Percentage of total internal renewable water resources to total water resources	44.70	92
Fertilizer consumption per unit of arable land	94.76	65	Percentage of agricultural land to total land area	34.84	103
Annual freshwater withdrawals for agriculture per unit of arable land	99.94	17	Percentage of fossil fuel energy consumption to total energy consumption	40.78	41
3.2 Industrial Carrying	89.88	83			
Net exports as a percentage of GDP	73.34	94			
Electric power consumption per unit of value added of industry	90.23	82			
SO_2 emissions per unit of value added of industry	99.98	14			
Annual freshwater withdrawals for industry per value added of industry	95.96	83			
3.3 Energy Consumption	35.08	46			
Energy consumption per unit of land area	99.85	50			

(continued)

Table 81.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
5 Environment Harmony Competitiveness	68.28	54	CO_2 emissions (metric tons per capita)	90.34	72
5.1 Population and Environment	67.08	86	Energy consumption per capita	85.55	76
Improved sanitation facilities (% of population with access)	78.00	80	5.2 Economy and Environment	69.48	32
Motor vehicles (per 1,000 people)	43.58	104	Land resource utilization efficiency	0.13	58
Renewable internal freshwater resources per capita	9.84	41	Sulfur dioxide emissions per unit of GDP	99.62	10
SO_2 emissions (metric tons per capita)	99.35	19	Carbon dioxide emissions per unit of GDP	89.14	60
			Energy consumption per unit of GDP	89.04	48

Table 81.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	0	3	6	5	0
Ecological Environment Competitiveness	11	3	3	4	1	0
Environment Carrying Competitiveness	15	0	2	6	5	2
Environment Management Competitiveness	10	1	1	4	2	2
Environment Harmony Competitiveness	10	1	1	4	3	1
Total	60	5	10	24	16	5

Chapter 82
Report on the Global Environment Competitiveness of Lebanon

Lebanon is located in Southwest and closes to the east of Mediterranean Sea. It borders on Syria and Palestinian. It is tropical Mediterranean climate, and mineral resources is less, mainly is iron, lead, copper and so on. It covers 10 thousand square kilometres. It had a population of 4.2 million and domestic production the gross (GDP) of USD 40 billion in 2011. Through the evaluation of global environment competitiveness, we can know that the environment competitiveness index of Lebanon ranks at 94 in 133 countries.

Score: 47.47
Rank: 94

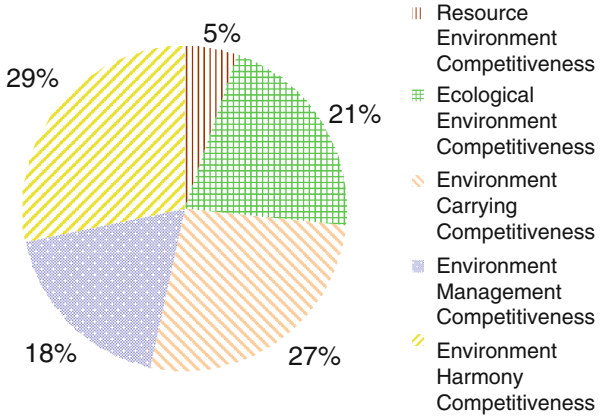

Fig. 82.1 Contribution of sub-index of GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_82,

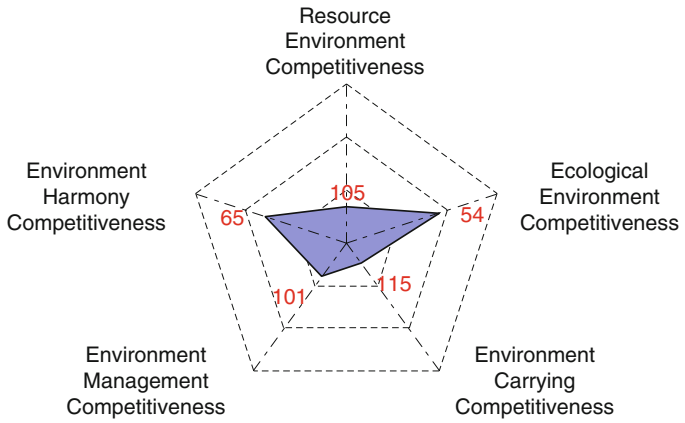

Fig. 82.2 Rank of sub-index of GEC

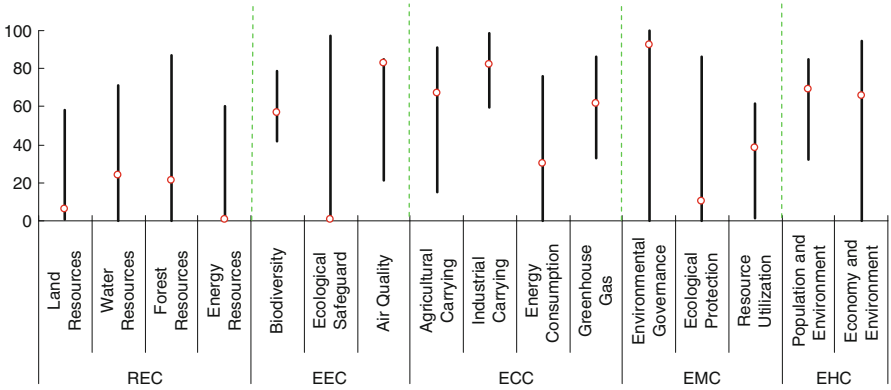

Fig. 82.3 Score and rank of the pillars of GEC

Table 82.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	12.81	105	Groundwater	45.03	13
1.1 Land Resources	6.06	119	Total internal renewable water resources	23.66	45
Land area per capita	0.41	127	1.3 Forest Resources	21.34	89
Percentage of arable land to total land area	18.45	73	Growing stock in forest and other wooded land	50.02	114
Arable land per capita	1.23	128	Proportion of land area covered by forest	15.68	86
1.2 Water Resources	23.99	44	Forest area per capita	0.22	116
Surface water	4.37	62	1.4 Energy Resources	0.45	122
Annual precipitation	22.89	79			

(continued)

Table 82.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
Fossil energy	0.00	64	Energy consumption per unit of land area	98.66	113
Energy production	0.05	123	Ratio of clean energy consumption	1.38	94
Proportion of combustible renewables and waste to total energy consumption	1.99	98	Elasticity of energy consumption	14.51	30
Net energy imports of the energy consumption	0.25	124	Elasticity of electric power consumption	5.64	120
2 Ecological Environment Competitiveness	50.38	54	3.4 Greenhouse Gas	61.88	64
2.1 Biodiversity	56.91	82	Growth rate of CO_2 emissions	66.81	24
Threatened fish species	89.62	61	Growth rate of Methane emissions	56.49	82
Threatened mammal species	94.57	59	CO_2 emissions per unit of land area	97.98	120
Threatened plant species	99.94	22	CO_2 emissions per unit of energy consumption	21.32	114
GEF benefits index for biodiversity	0.20	109	4 Environment Management Competitiveness	43.34	101
2.2 Ecological Safeguard	0.65	127	4.1 Environmental Governance	92.38	54
Terrestrial protected areas	1.09	124	Agricultural chemicals regulation	80.95	53
Marine protected areas	0.00	90	Percentage of the rural population with access to an improved water source	100.00	1
2.3 Air Quality	82.78	10	Percentage of the urban population with access to an improved water source	100.00	1
Inhalable particles (PM10)	81.75	55	4.2 Ecological Protection	10.52	122
Particulate matter (PM2.5)	100.00	1	Area of plantation and afforestation	0.01	111
Index of indoor air pollution	100.00	1	Biome protect	2.80	127
Nitrogen oxides emission	68.87	16	Overfishing of fishing resources	32.26	87
Sulfur dioxide emission	40.68	65	4.3 Resource Utilization	38.06	62
3 Environment Carrying Competitiveness	63.24	115	Utilization rate of water resources	1.14	32
3.1 Agricultural Carrying	67.02	62	Percentage of total internal renewable water resources to total water resources	65.41	65
Cereal yield per unit of arable land	26.72	69	Percentage of agricultural land to total land area	79.49	19
Fertilizer consumption per unit of arable land	98.39	36	Percentage of fossil fuel energy consumption to total energy consumption	6.21	106
Annual freshwater withdrawals for agriculture per unit of arable land	89.36	112			
3.2 Industrial Carrying	82.49	116			
Net exports as a percentage of GDP	93.13	10			
Electric power consumption per unit of value added of industry	45.95	125			
SO_2 emissions per unit of value added of industry	98.55	124			
Annual freshwater withdrawals for industry per value added of industry	92.31	106			
3.3 Energy Consumption	30.05	121			

(continued)

Table 82.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
5 Environment Harmony Competitiveness	67.57	65	CO_2 emissions (metric tons per capita)	88.16	81
5.1 Population and Environment	69.10	74	Energy consumption per capita	89.06	66
Improved sanitation facilities (% of population with access)	98.00	33	5.2 Economy and Environment	66.04	58
			Land resource utilization efficiency	1.14	19
Motor vehicles (per 1,000 people)	46.67	102	Sulfur dioxide emissions per unit of GDP	90.70	85
Renewable internal freshwater resources per capita	1.36	99	Carbon dioxide emissions per unit of GDP	82.48	84
SO_2 emissions (metric tons per capita)	89.19	98	Energy consumption per unit of GDP	89.85	44

Table 82.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	0	1	1	7	5
Ecological Environment Competitiveness	11	3	2	2	2	2
Environment Carrying Competitiveness	15	1	2	1	5	6
Environment Management Competitiveness	10	1	1	3	2	3
Environment Harmony Competitiveness	10	0	1	2	6	1
Total	60	5	7	9	22	17

Chapter 83
Report on the Global Environment Competitiveness of Lesotho

Lesotho is located in Southern Africa, surrounded by South Africa. It is subtropical steppe climate. It is poor in natural resources, and the economic foundation is weak. It covers 30 thousand square kilometres. It had a population of 2.2 million and domestic production the gross (GDP) of USD 24 billion in 2011. Through the evaluation of global environment competitiveness, we can know that the environment competitiveness index of Lesotho ranks at 132 in 133 countries.

Score: 35.72
Rank: 132

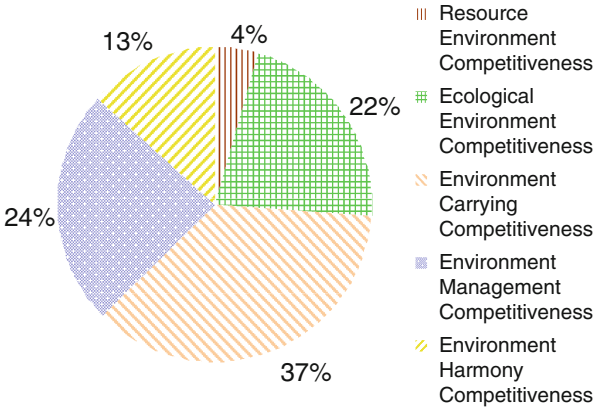

Fig. 83.1 Contribution of sub-index of GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_83,

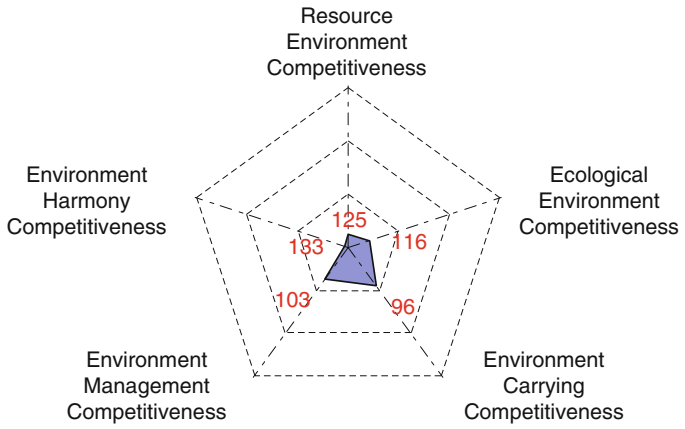

Fig. 83.2 Rank of sub-index of GEC

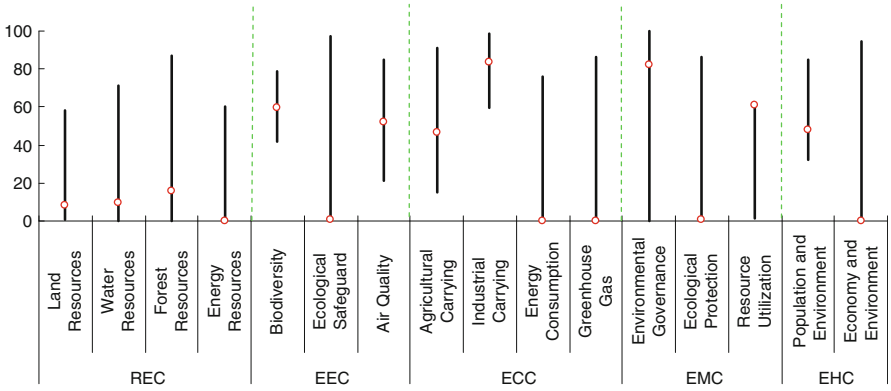

Fig. 83.3 Score and rank of the pillars of GEC

Table 83.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	7.73	125	Groundwater	2.33	100
1.1 Land Resources	8.08	98	Total internal renewable water resources	8.69	84
Land area per capita	2.47	64	1.3 Forest Resources	15.73	116
Percentage of arable land to total land area	17.08	77	Growing stock in forest and other wooded land	50.01	118
Arable land per capita	6.57	78	Proportion of land area covered by forest	1.71	119
1.2 Water Resources	9.90	93	Forest area per capita	0.14	122
Surface water	1.86	93	1.4 Energy Resources	0.00	125
Annual precipitation	26.71	69			

(continued)

Table 83.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
Fossil energy	0.00	64	3.3 Energy Consumption	N/A	N/A
Energy production	N/A	N/A	Energy consumption per unit of land area	N/A	N/A
Proportion of combustible renewables and waste to total energy consumption	N/A	N/A	Ratio of clean energy consumption	0.00	116
Net energy imports of the energy consumption	N/A	N/A	Elasticity of energy consumption	N/A	N/A
2 Ecological Environment Competitiveness	38.98	116	Elasticity of electric power consumption	N/A	N/A
2.1 Biodiversity	59.76	19	3.4 Greenhouse Gas	N/A	N/A
Threatened fish species	99.53	3	Growth rate of CO_2 emissions	N/A	N/A
Threatened mammal species	98.91	6	Growth rate of Methane emissions	N/A	N/A
Threatened plant species	99.77	43	CO_2 emissions per unit of land area	N/A	N/A
GEF benefits index for biodiversity	0.30	105	CO_2 emissions per unit of energy consumption	N/A	N/A
2.2 Ecological Safeguard	0.65	127	4 Environment Management Competitiveness	43.08	103
Terrestrial protected areas	1.09	124	4.1 Environmental Governance	82.00	85
Marine protected areas	N/A	N/A	Agricultural chemicals regulation	N/A	N/A
2.3 Air Quality	52.15	86	Percentage of the rural population with access to an improved water source	73.00	87
Inhalable particles (PM10)	72.26	84	Percentage of the urban population with access to an improved water source	91.00	106
Particulate matter (PM2.5)	90.12	32	4.2 Ecological Protection	0.61	132
Index of indoor air pollution	5.00	105	Area of plantation and afforestation	0.01	112
Nitrogen oxides emission	69.00	2	Biome protect	1.40	130
Sulfur dioxide emission	N/A	N/A	Overfishing of fishing resources	N/A	N/A
3 Environment Carrying Competitiveness	65.00	96	4.3 Resource Utilization	60.80	3
3.1 Agricultural Carrying	46.30	129	Utilization rate of water resources	0.06	99
Cereal yield per unit of arable land	6.05	122	Percentage of total internal renewable water resources to total water resources	91.27	12
Fertilizer consumption per unit of arable land	N/A	N/A	Percentage of agricultural land to total land area	91.06	6
Annual freshwater withdrawals for agriculture per unit of arable land	99.96	14	Percentage of fossil fuel energy consumption to total energy consumption	N/A	N/A
3.2 Industrial Carrying	83.70	115			
Net exports as a percentage of GDP	70.35	98			
Electric power consumption per unit of value added of industry	N/A	N/A			
SO_2 emissions per unit of value added of industry	N/A	N/A			
Annual freshwater withdrawals for industry per value added of industry	97.05	69			

(continued)

Table 83.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
5 Environment Harmony Competitiveness	23.81	133	CO_2 emissions (metric tons per capita)	N/A	N/A
5.1 Population and Environment	47.61	130	Energy consumption per capita	N/A	N/A
Improved sanitation facilities (% of population with access)	29.00	115	5.2 Economy and Environment	0.02	133
Motor vehicles (per 1,000 people)	99.75	4	Land resource utilization efficiency	0.02	99
Renewable internal freshwater resources per capita	2.88	73	Sulfur dioxide emissions per unit of GDP	N/A	N/A
SO_2 emissions (metric tons per capita)	N/A	N/A	Carbon dioxide emissions per unit of GDP	N/A	N/A
			Energy consumption per unit of GDP	N/A	N/A

Table 83.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	0	0	0	8	4
Ecological Environment Competitiveness	11	3	1	2	2	3
Environment Carrying Competitiveness	15	0	0	0	1	4
Environment Management Competitiveness	10	2	1	0	3	3
Environment Harmony Competitiveness	10	1	0	0	2	3
Total	60	6	2	2	16	17

Chapter 84
Report on the Global Environment Competitiveness of Libya

Score: 40.34
Rank: 126

Libya is located in North Africa. It covers 1.76 million square kilometres bordered by the Mediterranean Sea to the north, Egypt to the east, Sudan to the southeast, Chad and Niger to the south, and Algeria and Tunisia to the west. The climate is mostly dry and desert like in nature. However, the northern regions enjoy a milder Mediterranean climate. It had a population of 6.42 million and domestic production the gross (GDP) of USD 31 billion in 2011. Through the evaluation of global environment competitiveness, we can know that the environment competitiveness index of Libya ranks at 126 among 133 countries.

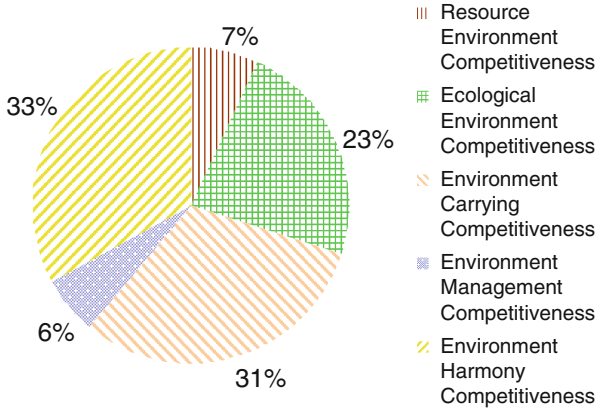

Fig. 84.1 Contribution of sub-index of GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_84,

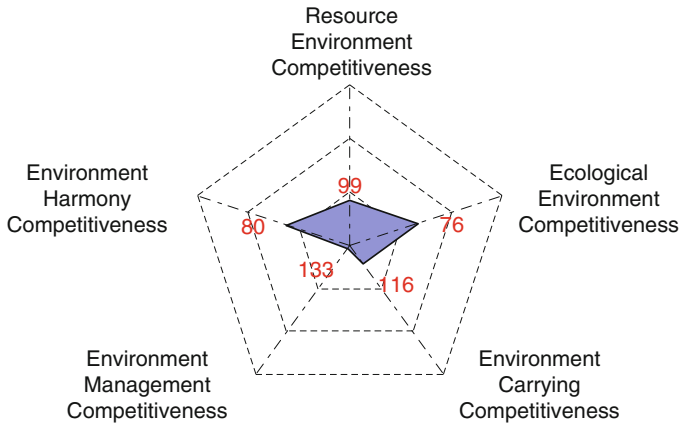

Fig. 84.2 Rank of sub-index of GEC

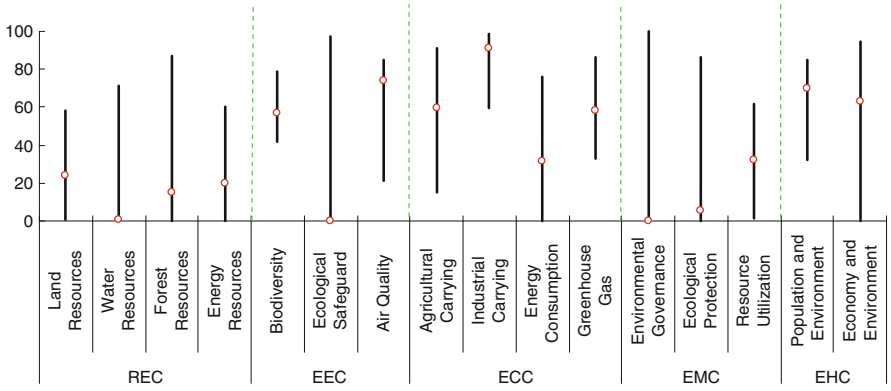

Fig. 84.3 Score and rank of the pillars of GEC

Table 84.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	13.87	99	Groundwater	0.01	127
1.1 Land Resources	24.03	19	Total internal renewable water resources	0.02	131
Land area per capita	49.36	6	1.3 Forest Resources	15.14	123
Percentage of arable land to total land area	1.52	125	Growing stock in forest and other wooded land	50.02	109
Arable land per capita	12.75	42	Proportion of land area covered by forest	0.14	128
1.2 Water Resources	0.48	132	Forest area per capita	0.24	115
Surface water	0.00	126	1.4 Energy Resources	19.63	15
Annual precipitation	1.90	129			

(continued)

Table 84.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
Fossil energy	18.76	9	3.3 Energy Consumption	31.63	94
Energy production	14.08	9	Energy consumption per unit of land area	99.98	9
Proportion of combustible renewables and waste to total energy consumption	0.95	107	Ratio of clean energy consumption	0.00	116
Net energy imports of the energy consumption	59.23	6	Elasticity of energy consumption	15.65	16
2 Ecological Environment Competitiveness	46.61	76	Elasticity of electric power consumption	10.88	54
2.1 Biodiversity	57.05	81	3.4 Greenhouse Gas	58.22	96
Threatened fish species	88.68	66	Growth rate of CO_2 emissions	52.55	63
Threatened mammal species	93.48	72	Growth rate of Methane emissions	59.22	67
Threatened plant species	99.88	30	CO_2 emissions per unit of land area	99.97	30
GEF benefits index for biodiversity	1.60	73	CO_2 emissions per unit of energy consumption	26.83	108
2.2 Ecological Safeguard	0.00	132	4 Environment Management Competitiveness	11.74	133
Terrestrial protected areas	0.00	130	4.1 Environmental Governance	0.00	131
Marine protected areas	0.00	90	Agricultural chemicals regulation	N/A	N/A
2.3 Air Quality	73.73	43	Percentage of the rural population with access to an improved water source	0.00	122
Inhalable particles (PM10)	52.55	116	Percentage of the urban population with access to an improved water source	0.00	131
Particulate matter (PM2.5)	83.97	72	4.2 Ecological Protection	5.15	128
Index of indoor air pollution	100.00	1	Area of plantation and afforestation	0.28	67
Nitrogen oxides emission	68.74	27	Biome protect	0.60	131
Sulfur dioxide emission	40.75	56	Overfishing of fishing resources	16.20	100
3 Environment Carrying Competitiveness	63.04	116	4.3 Resource Utilization	32.27	84
3.1 Agricultural Carrying	59.39	120	Utilization rate of water resources	29.12	4
Cereal yield per unit of arable land	3.27	126	Percentage of total internal renewable water resources to total water resources	87.50	19
Fertilizer consumption per unit of arable land	96.75	50	Percentage of agricultural land to total land area	10.45	123
Annual freshwater withdrawals for agriculture per unit of arable land	96.88	82	Percentage of fossil fuel energy consumption to total energy consumption	2.03	118
3.2 Industrial Carrying	90.83	75			
Net exports as a percentage of GDP	66.69	107			
Electric power consumption per unit of value added of industry	97.42	11			
SO_2 emissions per unit of value added of industry	99.97	23			
Annual freshwater withdrawals for industry per value added of industry	99.25	30			

(continued)

Table 84.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
5 Environment Harmony Competitiveness	66.44	80	CO_2 emissions (metric tons per capita)	78.08	106
5.1 Population and Environment	69.79	70	Energy consumption per capita	77.32	94
Improved sanitation facilities (% of population with access)	97.00	39	5.2 Economy and Environment	63.09	81
			Land resource utilization efficiency	0.00	126
Motor vehicles (per 1,000 people)	64.44	91	Sulfur dioxide emissions per unit of GDP	96.33	52
Renewable internal freshwater resources per capita	0.13	126	Carbon dioxide emissions per unit of GDP	73.67	105
SO_2 emissions (metric tons per capita)	94.45	77	Energy consumption per unit of GDP	82.34	73

Table 84.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	3	2	0	0	9
Ecological Environment Competitiveness	11	1	2	1	4	3
Environment Carrying Competitiveness	15	1	4	1	5	4
Environment Management Competitiveness	10	1	1	0	2	5
Environment Harmony Competitiveness	10	0	0	2	4	4
Total	60	6	9	4	15	25

Chapter 85
Report on the Global Environment Competitiveness of Lithuania

Score: 51.3
Rank: 55

Lithuania is located in Northeastern Europe. It is situated along the southeastern shore of the Baltic Sea. It covers 62,670 square kilometres and borders to the east of Sweden and Denmark. It borders Latvia to the north, Belarus to the east and south, Poland to the south, and Russia to the southwest. Lithuania's climate, which ranges between maritime and continental, is relatively mild. It had a population of 3.03 million and domestic production the gross (GDP) of USD 42.7 billion in 2011. Through the evaluation of global environment competitiveness, we can know that the environment competitiveness index of Lithuania ranks at 55 among 133 countries.

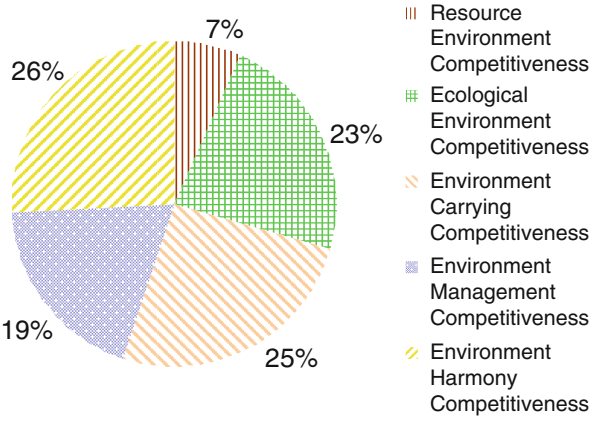

Fig. 85.1 Contribution of sub-index of GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_85,

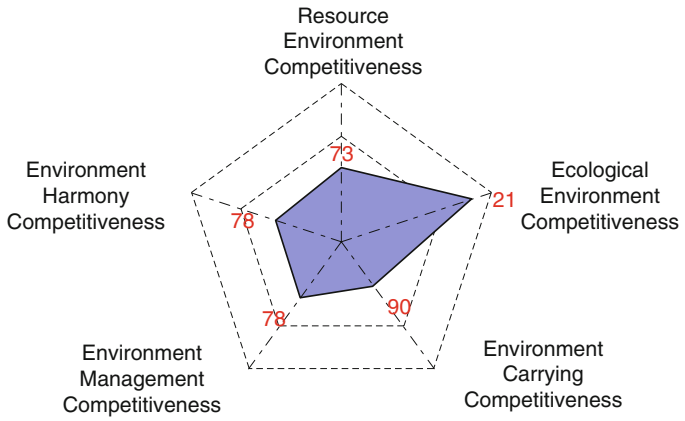

Fig. 85.2 Rank of sub-index of GEC

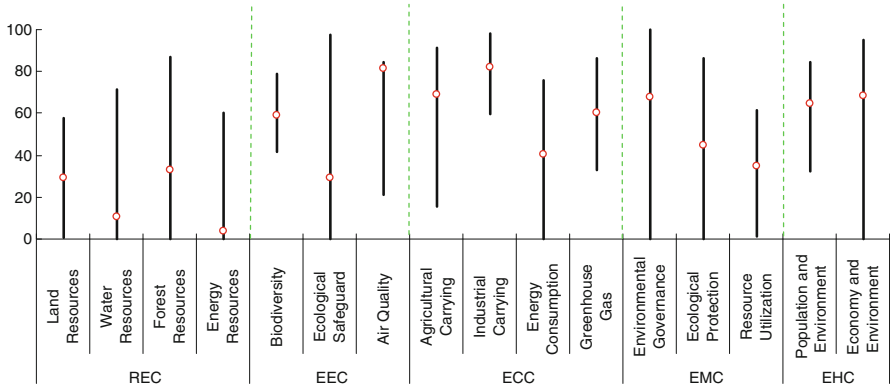

Fig. 85.3 Score and rank of the pillars of GEC

Table 85.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	16.79	73	Groundwater	2.72	97
1.1 Land Resources	29.35	12	Total internal renewable water resources	12.52	71
Land area per capita	3.70	48	1.3 Forest Resources	33.13	53
Percentage of arable land to total land area	59.14	15	Growing stock in forest and other wooded land	51.42	62
Arable land per capita	33.77	7	Proportion of land area covered by forest	40.51	45
1.2 Water Resources	10.67	90	Forest area per capita	4.99	32
Surface water	4.25	63	1.4 Energy Resources	3.64	84
Annual precipitation	23.18	78			

(continued)

Table 85.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
Fossil energy	0.00	64	Energy consumption per unit of land area	99.77	68
Energy production	0.47	88	Ratio of clean energy consumption	59.60	6
Proportion of combustible renewables and waste to total energy consumption	15.37	51	Elasticity of energy consumption	0.00	126
Net energy imports of the energy consumption	2.66	111	Elasticity of electric power consumption	2.08	121
2 Ecological Environment Competitiveness	59.07	21	3.4 Greenhouse Gas	60.17	77
2.1 Biodiversity	59.11	31	Growth rate of CO_2 emissions	44.05	94
Threatened fish species	97.17	17	Growth rate of Methane emissions	64.01	27
Threatened mammal species	98.37	11	CO_2 emissions per unit of land area	99.76	73
Threatened plant species	100.00	1	CO_2 emissions per unit of energy consumption	48.98	51
GEF benefits index for biodiversity	0.00	128	4 Environment Management Competitiveness	48.61	78
2.2 Ecological Safeguard	29.11	47	4.1 Environmental Governance	67.50	111
Terrestrial protected areas	39.13	50	Agricultural chemicals regulation	95.24	20
Marine protected areas	14.08	23	Percentage of the rural population with access to an improved water source	0.00	122
2.3 Air Quality	81.51	16	Percentage of the urban population with access to an improved water source	98.00	70
Inhalable particles (PM10)	88.32	23	4.2 Ecological Protection	44.76	25
Particulate matter (PM2.5)	87.21	52	Area of plantation and afforestation	0.68	48
Index of indoor air pollution	100.00	1	Biome protect	85.80	33
Nitrogen oxides emission	68.49	40	Overfishing of fishing resources	62.50	32
Sulfur dioxide emission	40.88	40	4.3 Resource Utilization	34.85	75
3 Environment Carrying Competitiveness	65.53	90	Utilization rate of water resources	0.38	61
3.1 Agricultural Carrying	69.24	51	Percentage of total internal renewable water resources to total water resources	60.08	75
Cereal yield per unit of arable land	25.90	74	Percentage of agricultural land to total land area	50.72	67
Fertilizer consumption per unit of arable land	96.33	54	Percentage of fossil fuel energy consumption to total energy consumption	28.22	58
Annual freshwater withdrawals for agriculture per unit of arable land	99.95	15			
3.2 Industrial Carrying	82.16	118			
Net exports as a percentage of GDP	58.50	119			
Electric power consumption per unit of value added of industry	92.04	64			
SO_2 emissions per unit of value added of industry	99.89	47			
Annual freshwater withdrawals for industry per value added of industry	78.21	124			
3.3 Energy Consumption	40.36	24			

(continued)

Table 85.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
5 Environment Harmony Competitiveness	66.51	78	CO_2 emissions (metric tons per capita)	89.20	76
5.1 Population and Environment	64.75	100	Energy consumption per capita	84.47	77
Improved sanitation facilities (% of population with access)	86.00	70	5.2 Economy and Environment	68.27	43
			Land resource utilization efficiency	0.20	47
Motor vehicles (per 1,000 people)	31.73	116	Sulfur dioxide emissions per unit of GDP	96.50	46
Renewable internal freshwater resources per capita	6.21	48	Carbon dioxide emissions per unit of GDP	87.87	67
SO_2 emissions (metric tons per capita)	94.81	74	Energy consumption per unit of GDP	88.49	49

Table 85.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	0	2	4	8	0
Ecological Environment Competitiveness	11	2	4	5	0	0
Environment Carrying Competitiveness	15	1	2	3	6	3
Environment Management Competitiveness	10	0	2	2	4	2
Environment Harmony Competitiveness	10	0	0	4	5	1
Total	60	3	10	18	23	6

Chapter 86
Report on the Global Environment Competitiveness of Luxembourg

Score: 51.66
Rank: 48

Luxembourg is a landlocked country in western Europe. It covers 2,590 square kilometres and borders by Belgium, France, and Germany. Luxembourg has an oceanic climate, marked by high precipitation, particularly in late summer. It had a population of 0.52 million and domestic production the gross (GDP) of USD 59.2 billion in 2011. Through the evaluation of global environment competitiveness, we can know that the environment competitiveness index of Luxembourg ranks at 48 among 133 countries.

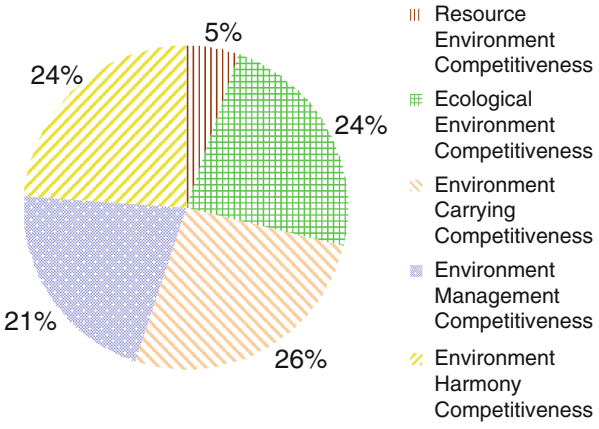

Fig. 86.1 Contribution of sub-index of GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_86,

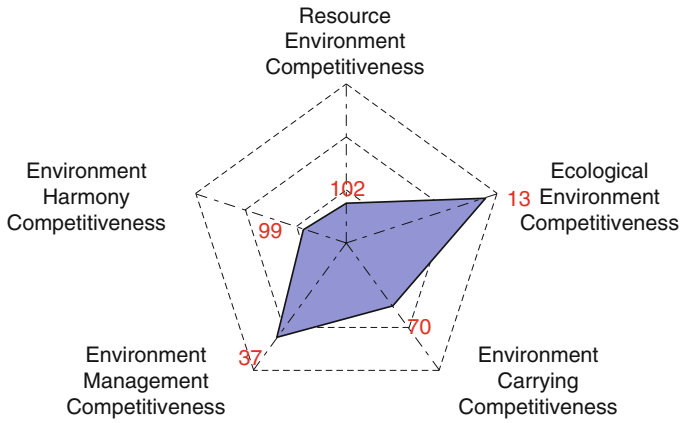

Fig. 86.2 Rank of sub-index of GEC

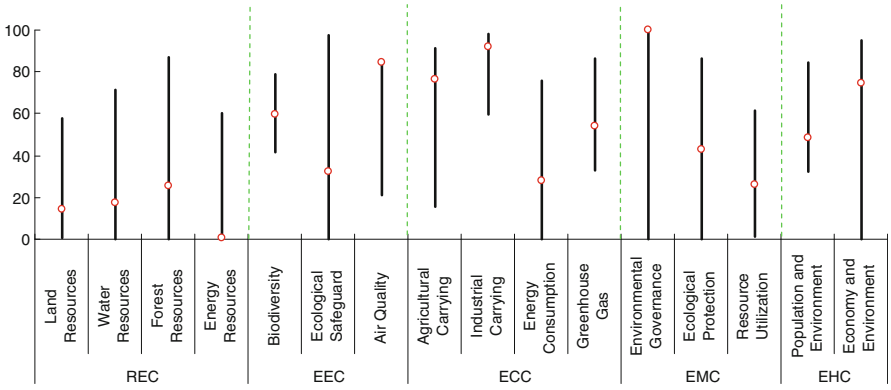

Fig. 86.3 Score and rank of the pillars of GEC

Table 86.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	13.37	102	Groundwater	4.41	90
1.1 Land Resources	14.17	57	Total internal renewable water resources	19.47	53
Land area per capita	0.88	111	1.3 Forest Resources	25.62	81
Percentage of arable land to total land area	40.47	31	Growing stock in forest and other wooded land	50.08	102
Arable land per capita	5.59	90	Proportion of land area covered by forest	N/A	N/A
1.2 Water Resources	17.12	59	Forest area per capita	1.17	79
Surface water	12.92	24	1.4 Energy Resources	0.91	116
Annual precipitation	31.67	63			

(continued)

Table 86.1 (continued)

Indicators	Score	Rank
Fossil energy	0.00	64
Energy production	0.26	108
Proportion of combustible renewables and waste to total energy consumption	3.92	91
Net energy imports of the energy consumption	0.24	125
2 Ecological Environment Competitiveness	61.60	13
2.1 Biodiversity	59.91	18
Threatened fish species	99.53	3
Threatened mammal species	100.00	1
Threatened plant species	100.00	1
GEF benefits index for biodiversity	0.00	128
2.2 Ecological Safeguard	32.45	38
Terrestrial protected areas	54.08	28
Marine protected areas	N/A	N/A
2.3 Air Quality	84.73	1
Inhalable particles (PM10)	91.24	9
Particulate matter (PM2.5)	100.00	1
Index of indoor air pollution	100.00	1
Nitrogen oxides emission	68.92	8
Sulfur dioxide emission	40.99	5
3 Environment Carrying Competitiveness	66.88	70
3.1 Agricultural Carrying	76.25	23
Cereal yield per unit of arable land	58.94	18
Fertilizer consumption per unit of arable land	75.59	117
Annual freshwater withdrawals for agriculture per unit of arable land	100.00	1
3.2 Industrial Carrying	91.94	60
Net exports as a percentage of GDP	82.46	58
Electric power consumption per unit of value added of industry	85.82	101
SO_2 emissions per unit of value added of industry	99.98	16
Annual freshwater withdrawals for industry per value added of industry	99.50	20
3.3 Energy Consumption	27.82	124
Energy consumption per unit of land area	96.52	120
Ratio of clean energy consumption	0.72	101
Elasticity of energy consumption	12.58	115
Elasticity of electric power consumption	1.46	122
3.4 Greenhouse Gas	54.30	116
Growth rate of CO_2 emissions	46.90	82
Growth rate of Methane emissions	50.06	112
CO_2 emissions per unit of land area	95.44	127
CO_2 emissions per unit of energy consumption	32.18	97
4 Environment Management Competitiveness	55.05	37
4.1 Environmental Governance	100.00	1
Agricultural chemicals regulation	N/A	N/A
Percentage of the rural population with access to an improved water source	100.00	1
Percentage of the urban population with access to an improved water source	100.00	1
4.2 Ecological Protection	42.88	29
Area of plantation and afforestation	0.04	102
Biome protect	100.00	1
Overfishing of fishing resources	N/A	N/A
4.3 Resource Utilization	26.32	112
Utilization rate of water resources	0.07	95
Percentage of total internal renewable water resources to total water resources	31.45	107
Percentage of agricultural land to total land area	59.78	50
Percentage of fossil fuel energy consumption to total energy consumption	13.99	85

(continued)

Table 86.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
5 Environment Harmony Competitiveness	61.39	99	CO_2 emissions (metric tons per capita)	43.20	130
5.1 Population and Environment	48.18	129	Energy consumption per capita	35.21	124
Improved sanitation facilities (% of population with access)	100.00	1	5.2 Economy and Environment	74.60	3
Motor vehicles (per 1,000 people)	7.78	132	Land resource utilization efficiency	6.67	3
Renewable internal freshwater resources per capita	2.33	82	Sulfur dioxide emissions per unit of GDP	99.85	6
SO_2 emissions (metric tons per capita)	96.74	57	Carbon dioxide emissions per unit of GDP	94.55	21
			Energy consumption per unit of GDP	97.34	5

Table 86.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	0	1	3	5	4
Ecological Environment Competitiveness	11	8	2	1	0	0
Environment Carrying Competitiveness	15	0	3	2	1	9
Environment Management Competitiveness	10	3	1	1	1	3
Environment Harmony Competitiveness	10	4	1	1	1	3
Total	60	15	8	8	8	19

Chapter 87
Report on the Global Environment Competitiveness of Macedonia

Score: 47.58
Rank: 93

Macedonia is located in the central Balkan Peninsula in Southeast Europe. It covers 25,220 square kilometres and borders by Kosovo to the northwest, Serbia to the north, Bulgaria to the east, Greece to the south and Albania to the west. Macedonia has a transitional climate from Mediterranean to continental. There are three main climatic zones in the country: Temperate Mediterranean, Mountainous and Mildly Continental. It had a population of 2.06 million and domestic production the gross (GDP) of USD 10.1 billion in 2011. Through the evaluation of global environment competitiveness, we can know that the environment competitiveness index of Macedonia ranks at 93 among 133 countries.

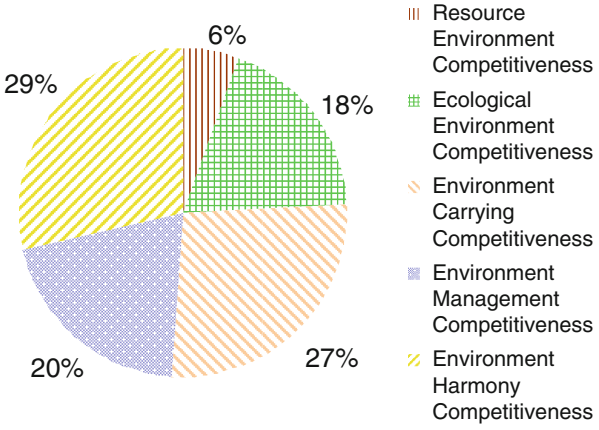

Fig. 87.1 Contribution of sub-index of GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_87,

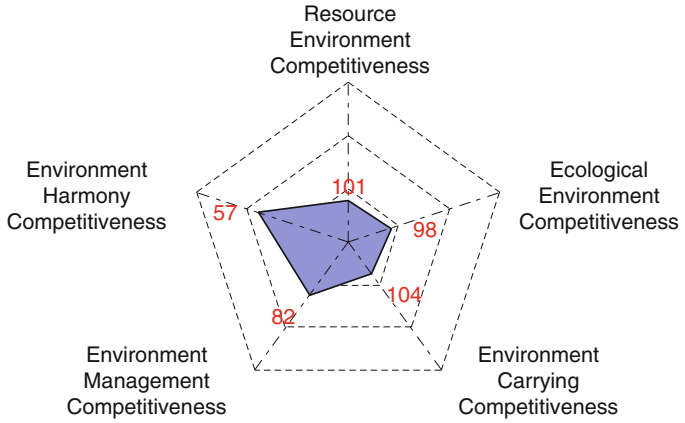

Fig. 87.2 Rank of sub-index of GEC

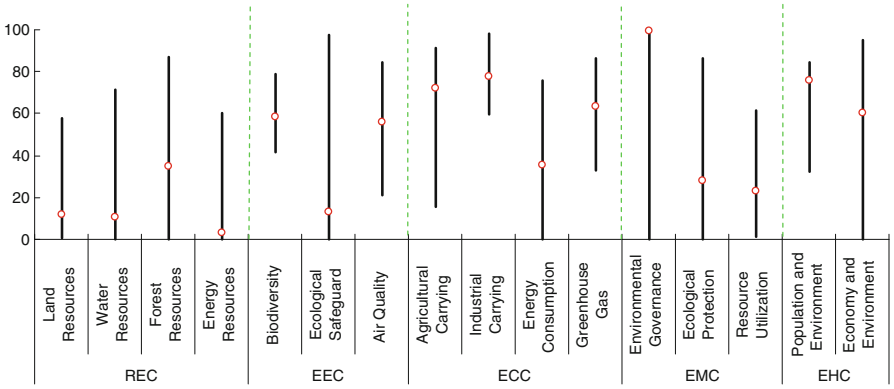

Fig. 87.3 Score and rank of the pillars of GEC

Table 87.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	13.44	101	Groundwater	N/A	N/A
1.1 Land Resources	12.01	71	Total internal renewable water resources	10.80	77
Land area per capita	2.18	73	1.3 Forest Resources	34.71	44
Percentage of arable land to total land area	27.74	52	Growing stock in forest and other wooded land	50.23	92
Arable land per capita	9.39	67	Proportion of land area covered by forest	46.56	36
1.2 Water Resources	10.80	88	Forest area per capita	3.39	53
Surface water	N/A	N/A	1.4 Energy Resources	2.86	103
Annual precipitation	N/A	N/A			

(continued)

Table 87.1 (continued)

Indicators	Score	Rank
Fossil energy	0.00	64
Energy production	0.79	67
Proportion of combustible renewables and waste to total energy consumption	7.62	68
Net energy imports of the energy consumption	7.02	81
2 Ecological Environment Competitiveness	43.78	98
2.1 Biodiversity	58.31	59
Threatened fish species	93.87	36
Threatened mammal species	97.28	22
Threatened plant species	100.00	1
GEF benefits index for biodiversity	0.20	109
2.2 Ecological Safeguard	13.04	88
Terrestrial protected areas	13.04	100
Marine protected areas	N/A	N/A
2.3 Air Quality	55.94	77
Inhalable particles (PM10)	87.59	28
Particulate matter (PM2.5)	87.95	47
Index of indoor air pollution	14.50	84
Nitrogen oxides emission	68.89	12
Sulfur dioxide emission	40.97	9
3 Environment Carrying Competitiveness	64.51	104
3.1 Agricultural Carrying	71.83	38
Cereal yield per unit of arable land	33.37	56
Fertilizer consumption per unit of arable land	95.40	62
Annual freshwater withdrawals for agriculture per unit of arable land	99.54	43
3.2 Industrial Carrying	77.43	125
Net exports as a percentage of GDP	72.24	95
Electric power consumption per unit of value added of industry	73.40	116
SO_2 emissions per unit of value added of industry	99.86	52
Annual freshwater withdrawals for industry per value added of industry	64.23	128
3.3 Energy Consumption	35.19	45
Energy consumption per unit of land area	99.76	70
Ratio of clean energy consumption	7.30	60
Elasticity of energy consumption	15.71	14
Elasticity of electric power consumption	18.01	14
3.4 Greenhouse Gas	63.44	54
Growth rate of CO_2 emissions	66.56	25
Growth rate of Methane emissions	61.88	39
CO_2 emissions per unit of land area	99.64	86
CO_2 emissions per unit of energy consumption	22.57	112
4 Environment Management Competitiveness	48.04	82
4.1 Environmental Governance	99.50	17
Agricultural chemicals regulation	N/A	N/A
Percentage of the rural population with access to an improved water source	99.00	30
Percentage of the urban population with access to an improved water source	100.00	1
4.2 Ecological Protection	28.20	86
Area of plantation and afforestation	N/A	N/A
Biome protect	28.20	103
Overfishing of fishing resources	N/A	N/A
4.3 Resource Utilization	23.04	121
Utilization rate of water resources	0.65	50
Percentage of total internal renewable water resources to total water resources	N/A	N/A
Percentage of agricultural land to total land area	47.48	75
Percentage of fossil fuel energy consumption to total energy consumption	20.99	74

(continued)

Table 87.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
5 Environment Harmony Competitiveness	68.13	57	CO_2 emissions (metric tons per capita)	89.30	75
5.1 Population and Environment	75.88	36	Energy consumption per capita	90.04	63
Improved sanitation facilities (% of population with access)	88.00	66	5.2 Economy and Environment	60.37	88
Motor vehicles (per 1,000 people)	81.11	73	Land resource utilization efficiency	0.12	60
Renewable internal freshwater resources per capita	3.17	70	Sulfur dioxide emissions per unit of GDP	96.48	47
SO_2 emissions (metric tons per capita)	97.91	42	Carbon dioxide emissions per unit of GDP	66.47	110
			Energy consumption per unit of GDP	78.41	83

Table 87.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	0	0	3	7	1
Ecological Environment Competitiveness	11	1	3	3	4	0
Environment Carrying Competitiveness	15	0	2	7	4	2
Environment Management Competitiveness	10	0	2	1	2	2
Environment Harmony Competitiveness	10	0	0	4	5	1
Total	60	1	7	18	22	6

Chapter 88
Report on the Global Environment Competitiveness of Madagascar

Score: 44.06
Rank: 119

Madagascar is located in the Indian Ocean, off the southeastern coast of Africa. It is the fourth-largest island and covers 581,240 square kilometres. Madagascar is a biodiversity hotspot. The combination of southeastern trade winds and northwestern monsoons produces a hot rainy season and a relatively cooler dry season. It had a population of 21.3 million and domestic production the gross (GDP) of USD 9.9 billion in 2011. Through the evaluation of global environment competitiveness, we can know that the environment competitiveness index of Madagascar ranks at 119 among 133 countries.

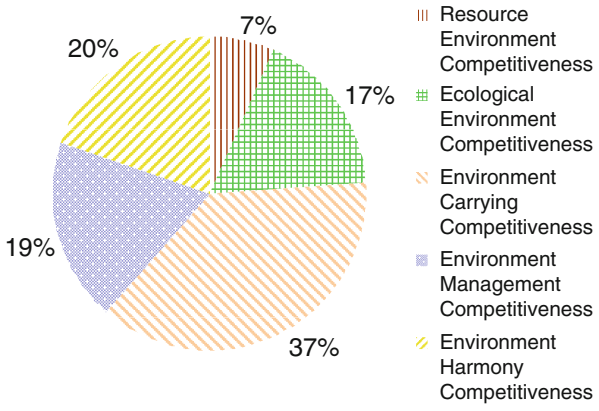

Fig. 88.1 Contribution of sub-index of GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_88,

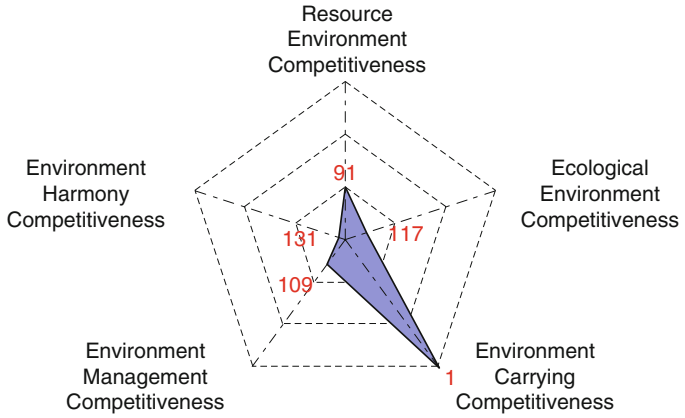

Fig. 88.2 Rank of sub-index of GEC

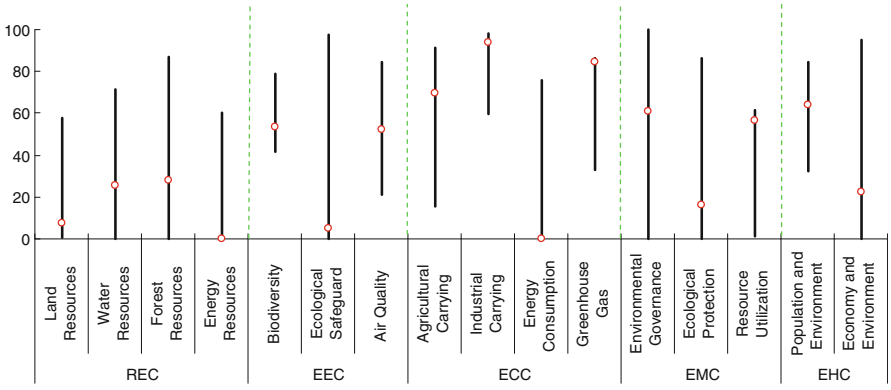

Fig. 88.3 Score and rank of the pillars of GEC

Table 88.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	14.66	91	Total internal renewable water resources	29.23	41
1.1 Land Resources	7.28	108	1.3 Forest Resources	28.24	74
Land area per capita	4.89	39	Growing stock in forest and other wooded land	56.50	27
Percentage of arable land to total land area	10.06	100	Proportion of land area covered by forest	25.17	76
Arable land per capita	7.68	72	Forest area per capita	4.09	44
1.2 Water Resources	25.19	40	1.4 Energy Resources	0.00	125
Surface water	6.16	52	Fossil energy	0.00	64
Annual precipitation	51.79	35	Energy production	N/A	N/A
Groundwater	13.59	53			

(continued)

Table 88.1 (continued)

Indicators	Score	Rank
Proportion of combustible renewables and waste to total energy consumption	N/A	N/A
Net energy imports of the energy consumption	N/A	N/A
2 Ecological Environment Competitiveness	38.24	117
2.1 Biodiversity	53.41	117
Threatened fish species	59.91	123
Threatened mammal species	64.67	127
Threatened plant species	84.07	124
GEF benefits index for biodiversity	29.20	14
2.2 Ecological Safeguard	4.89	112
Terrestrial protected areas	8.15	107
Marine protected areas	0.00	90
2.3 Air Quality	51.87	87
Inhalable particles (PM10)	79.56	66
Particulate matter (PM2.5)	97.32	9
Index of indoor air pollution	0.10	129
Nitrogen oxides emission	68.96	6
Sulfur dioxide emission	40.83	47
3 Environment Carrying Competitiveness	82.41	1
3.1 Agricultural Carrying	69.87	46
Cereal yield per unit of arable land	29.51	65
Fertilizer consumption per unit of arable land	99.79	10
Annual freshwater withdrawals for agriculture per unit of arable land	93.76	100
3.2 Industrial Carrying	93.61	39
Net exports as a percentage of GDP	90.58	19
Electric power consumption per unit of value added of industry	N/A	N/A
SO_2 emissions per unit of value added of industry	99.02	119
Annual freshwater withdrawals for industry per value added of industry	91.22	111
3.3 Energy Consumption	N/A	N/A
Energy consumption per unit of land area	N/A	N/A
Ratio of clean energy consumption	0.00	116
Elasticity of energy consumption	N/A	N/A
Elasticity of electric power consumption	N/A	N/A
3.4 Greenhouse Gas	84.44	2
Growth rate of CO_2 emissions	76.67	7
Growth rate of Methane emissions	N/A	N/A
CO_2 emissions per unit of land area	100.00	5
CO_2 emissions per unit of energy consumption	N/A	N/A
4 Environment Management Competitiveness	41.80	109
4.1 Environmental Governance	60.97	119
Agricultural chemicals regulation	71.43	63
Percentage of the rural population with access to an improved water source	34.00	118
Percentage of the urban population with access to an improved water source	74.00	125
4.2 Ecological Protection	16.20	113
Area of plantation and afforestation	0.54	52
Biome protect	18.00	108
Overfishing of fishing resources	35.29	82
4.3 Resource Utilization	56.76	5
Utilization rate of water resources	0.17	82
Percentage of total internal renewable water resources to total water resources	87.08	23
Percentage of agricultural land to total land area	83.02	15

(continued)

Table 88.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
Percentage of fossil fuel energy consumption to total energy consumption	N/A	N/A	SO_2 emissions (metric tons per capita)	98.86	23
			CO_2 emissions (metric tons per capita)	99.89	3
5 Environment Harmony Competitiveness	43.17	131	Energy consumption per capita	N/A	N/A
5.1 Population and Environment	63.87	107	5.2 Economy and Environment	22.47	131
Improved sanitation facilities (% of population with access)	11.00	128	Land resource utilization efficiency	0.00	127
			Sulfur dioxide emissions per unit of GDP	79.51	114
Motor vehicles (per 1,000 people)	97.04	26	Carbon dioxide emissions per unit of GDP	94.94	15
Renewable internal freshwater resources per capita	19.13	24			
			Energy consumption per unit of GDP	N/A	N/A

Table 88.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	0	1	5	4	2
Ecological Environment Competitiveness	11	2	0	0	2	7
Environment Carrying Competitiveness	15	4	1	2	1	2
Environment Management Competitiveness	10	1	2	1	2	4
Environment Harmony Competitiveness	10	1	4	0	0	5
Total	60	8	8	8	9	20

Chapter 89
Report on the Global Environment Competitiveness of Malaysia

Malaysia is located in Southeast Asia. It covers 328,550 square kilometres and land borders are shared with Thailand, Indonesia, and Brunei, and maritime borders exist with Singapore, Vietnam, and the Philippines. Local climates are tropical rainy climate. It had a population of 28.8 million and domestic production the gross (GDP) of USD 287.9 billion in 2011. Through the evaluation of global environment competitiveness, we can know that the environment competitiveness index of Slovenia ranks at 50 among 133 countries.

Score: 51.53
Rank: 50

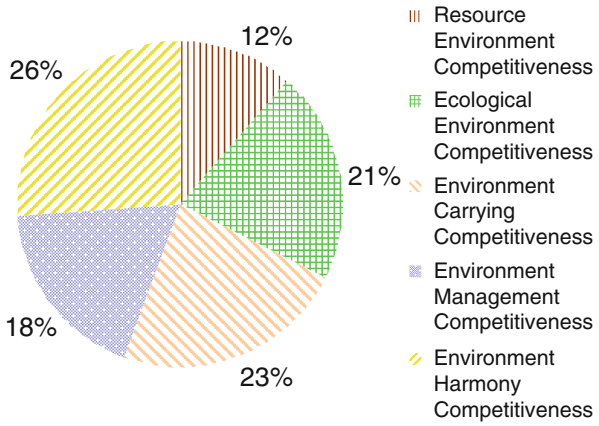

Fig. 89.1 Contribution of sub-index of GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_89,

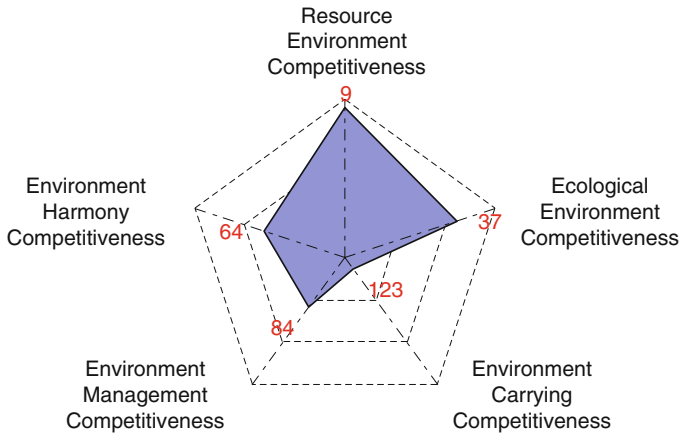

Fig. 89.2 Rank of sub-index of GEC

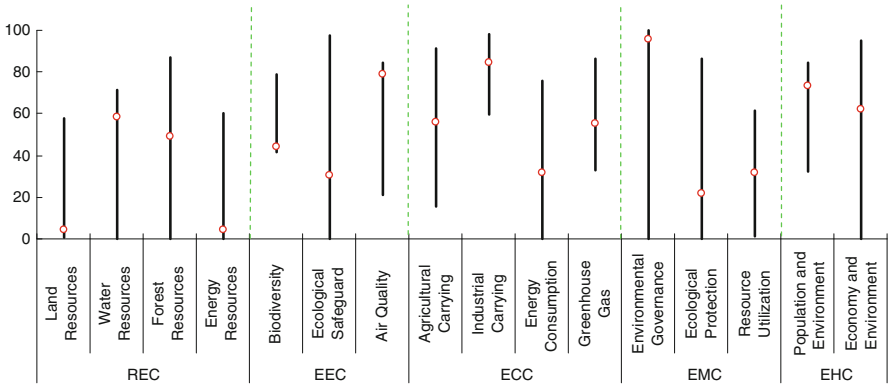

Fig. 89.3 Score and rank of the pillars of GEC

Table 89.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	29.64	9	Total internal renewable water resources	89.03	3
1.1 Land Resources	4.43	124	1.3 Forest Resources	49.38	14
Land area per capita	2.03	79	Growing stock in forest and other wooded land	62.84	13
Percentage of arable land to total land area	9.14	103	Proportion of land area covered by forest	72.61	9
Arable land per capita	2.91	113	Forest area per capita	4.92	35
1.2 Water Resources	58.45	10	1.4 Energy Resources	4.49	77
Surface water	18.59	10	Fossil energy	0.55	36
Annual precipitation	98.15	2	Energy production	3.05	31
Groundwater	28.03	29			

(continued)

Table 89.1 (continued)

Indicators	Score	Rank
Proportion of combustible renewables and waste to total energy consumption	5.03	82
Net energy imports of the energy consumption	15.02	39
2 Ecological Environment Competitiveness	53.89	37
2.1 Biodiversity	44.05	130
Threatened fish species	69.81	113
Threatened mammal species	61.96	128
Threatened plant species	60.68	132
GEF benefits index for biodiversity	13.90	23
2.2 Ecological Safeguard	30.36	44
Terrestrial protected areas	48.91	34
Marine protected areas	2.52	57
2.3 Air Quality	78.92	31
Inhalable particles (PM10)	86.86	30
Particulate matter (PM2.5)	78.38	92
Index of indoor air pollution	100.00	1
Nitrogen oxides emission	65.78	96
Sulfur dioxide emission	40.00	89
3 Environment Carrying Competitiveness	59.42	123
3.1 Agricultural Carrying	55.64	124
Cereal yield per unit of arable land	38.69	46
Fertilizer consumption per unit of arable land	37.72	126
Annual freshwater withdrawals for agriculture per unit of arable land	96.17	85
3.2 Industrial Carrying	84.62	112
Net exports as a percentage of GDP	50.01	126
Electric power consumption per unit of value added of industry	92.88	56
SO_2 emissions per unit of value added of industry	99.92	34
Annual freshwater withdrawals for industry per value added of industry	95.65	88
3.3 Energy Consumption	31.40	97
Energy consumption per unit of land area	99.53	93
Ratio of clean energy consumption	1.46	93
Elasticity of energy consumption	13.94	65
Elasticity of electric power consumption	10.66	68
3.4 Greenhouse Gas	55.33	112
Growth rate of CO_2 emissions	39.41	110
Growth rate of Methane emissions	67.33	16
CO_2 emissions per unit of land area	99.37	104
CO_2 emissions per unit of energy consumption	31.12	100
4 Environment Management Competitiveness	47.11	84
4.1 Environmental Governance	95.89	38
Agricultural chemicals regulation	90.48	37
Percentage of the rural population with access to an improved water source	99.00	30
Percentage of the urban population with access to an improved water source	100.00	1
4.2 Ecological Protection	21.99	101
Area of plantation and afforestation	2.34	25
Biome protect	48.40	76
Overfishing of fishing resources	21.78	95
4.3 Resource Utilization	31.82	85
Utilization rate of water resources	0.08	94
Percentage of total internal renewable water resources to total water resources	92.06	11
Percentage of agricultural land to total land area	28.31	107

(continued)

Table 89.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
Percentage of fossil fuel energy consumption to total energy consumption	6.81	104	SO_2 emissions (metric tons per capita)	95.00	72
			CO_2 emissions (metric tons per capita)	82.44	95
5 Environment Harmony Competitiveness	67.58	64	Energy consumption per capita	80.91	83
5.1 Population and Environment	73.01	50	5.2 Economy and Environment	62.15	82
Improved sanitation facilities (% of population with access)	96.00	42	Land resource utilization efficiency	0.25	39
			Sulfur dioxide emissions per unit of GDP	95.70	59
Motor vehicles (per 1,000 people)	57.04	98	Carbon dioxide emissions per unit of GDP	72.49	106
Renewable internal freshwater resources per capita	24.32	19	Energy consumption per unit of GDP	80.17	79

Table 89.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	4	3	2	3	2
Ecological Environment Competitiveness	11	1	1	3	2	4
Environment Carrying Competitiveness	15	0	1	3	4	7
Environment Management Competitiveness	10	0	3	2	3	2
Environment Harmony Competitiveness	10	0	1	4	4	1
Total	60	5	9	14	16	16

Chapter 90
Report on the Global Environment Competitiveness of Mali

Score: 38.93
Rank: 130

Mali is located in West Africa. It covers 1,220,190 square kilometres and borders Algeria to the north, Niger to the east, Burkina Faso and to the south, Guinea to the south-west, and Senegal and Mauritania to the west. Mali's climate ranges from tropical in the south to arid in the north. Most of the country receives negligible rainfall and droughts are frequent. It had a population of 15.8 million and domestic production the gross (GDP) of USD 10.5 billion in 2011. Through the evaluation of global environment competitiveness, we can know that the environment competitiveness index of Mali ranks at 130 among 133 countries.

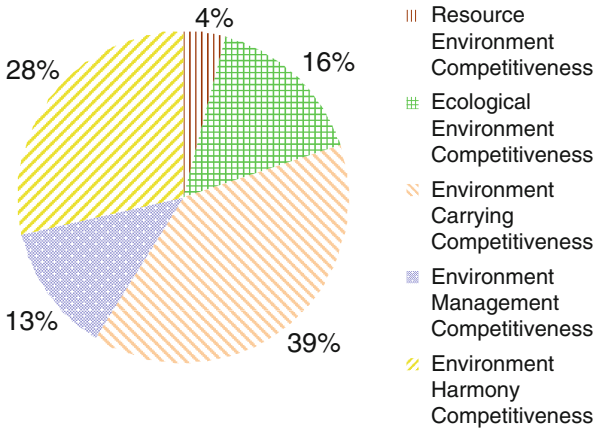

Fig. 90.1 Contribution of sub-index of GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_90,

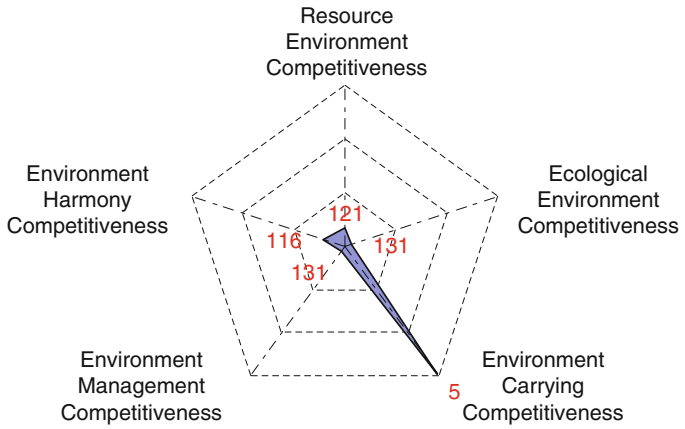

Fig. 90.2 Rank of sub-index of GEC

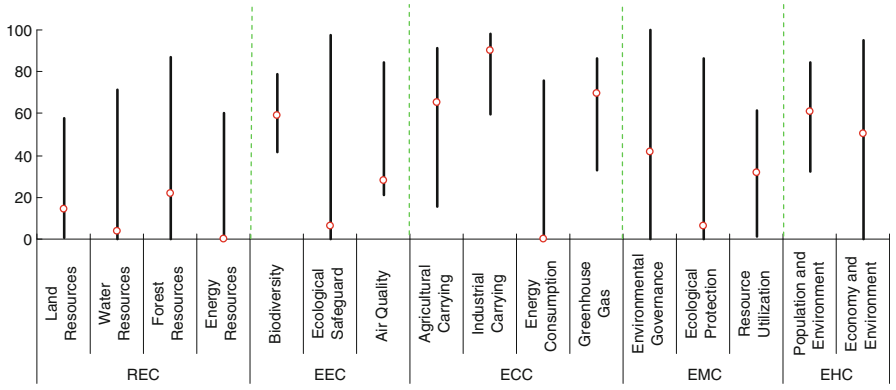

Fig. 90.3 Score and rank of the pillars of GEC

Table 90.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	8.36	121	1.3 Forest Resources	21.63	88
1.1 Land Resources	14.44	55	Growing stock in forest and other wooded land	50.75	79
Land area per capita	13.86	16	Proportion of land area covered by forest	11.91	98
Percentage of arable land to total land area	9.39	102	Forest area per capita	5.46	31
Arable land per capita	20.28	21	1.4 Energy Resources	0.00	125
1.2 Water Resources	3.83	112	Fossil energy	0.00	64
Surface water	0.80	102	Energy production	N/A	N/A
Annual precipitation	9.72	110	Proportion of combustible renewables and waste to total energy consumption	N/A	N/A
Groundwater	2.32	101			
Total internal renewable water resources	2.48	106			

(continued)

Table 90.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
Net energy imports of the energy consumption	N/A	N/A	Ratio of clean energy consumption	0.00	116
2 Ecological Environment Competitiveness	30.68	131	Elasticity of energy consumption	N/A	N/A
2.1 Biodiversity	58.93	34	Elasticity of electric power consumption	N/A	N/A
Threatened fish species	98.58	9	3.4 Greenhouse Gas	69.45	23
Threatened mammal species	93.48	72	Growth rate of CO_2 emissions	54.18	55
Threatened plant species	99.59	54	Growth rate of Methane emissions	N/A	N/A
GEF benefits index for biodiversity	1.50	75	CO_2 emissions per unit of land area	100.00	1
2.2 Ecological Safeguard	6.25	109	CO_2 emissions per unit of energy consumption	N/A	N/A
Terrestrial protected areas	6.25	111	4 Environment Management Competitiveness	24.49	131
Marine protected areas	N/A	N/A	4.1 Environmental Governance	41.40	127
2.3 Air Quality	27.82	130	Agricultural chemicals regulation	0.00	86
Inhalable particles (PM10)	18.98	130	Percentage of the rural population with access to an improved water source	51.00	107
Particulate matter (PM2.5)	67.95	113	Percentage of the urban population with access to an improved water source	87.00	114
Index of indoor air pollution	0.30	126	4.2 Ecological Protection	6.52	126
Nitrogen oxides emission	68.97	4	Area of plantation and afforestation	0.69	47
Sulfur dioxide emission	N/A	N/A	Biome protect	14.30	110
3 Environment Carrying Competitiveness	75.67	5	Overfishing of fishing resources	N/A	N/A
3.1 Agricultural Carrying	65.14	80	4.3 Resource Utilization	31.54	87
Cereal yield per unit of arable land	14.02	101	Utilization rate of water resources	0.26	69
Fertilizer consumption per unit of arable land	99.75	12	Percentage of total internal renewable water resources to total water resources	54.55	82
Annual freshwater withdrawals for agriculture per unit of arable land	98.69	67	Percentage of agricultural land to total land area	39.81	91
3.2 Industrial Carrying	90.36	80	Percentage of fossil fuel energy consumption to total energy consumption	N/A	N/A
Net exports as a percentage of GDP	84.19	51			
Electric power consumption per unit of value added of industry	N/A	N/A			
SO_2 emissions per unit of value added of industry	N/A	N/A			
Annual freshwater withdrawals for industry per value added of industry	96.53	78			
3.3 Energy Consumption	N/A	N/A			
Energy consumption per unit of land area	N/A	N/A			

(continued)

Table 90.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
5 Environment Harmony Competitiveness	55.42	116	CO_2 emissions (metric tons per capita)	100.00	1
5.1 Population and Environment	60.84	115	Energy consumption per capita	N/A	N/A
Improved sanitation facilities (% of population with access)	36.00	106	5.2 Economy and Environment	50.00	112
			Land resource utilization efficiency	0.00	130
Motor vehicles (per 1,000 people)	98.52	16	Sulfur dioxide emissions per unit of GDP	N/A	N/A
Renewable internal freshwater resources per capita	4.58	57	Carbon dioxide emissions per unit of GDP	100.00	1
SO_2 emissions (metric tons per capita)	N/A	N/A	Energy consumption per unit of GDP	N/A	N/A

Table 90.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	0	1	1	4	6
Ecological Environment Competitiveness	11	2	0	2	1	6
Environment Carrying Competitiveness	15	1	2	2	2	2
Environment Management Competitiveness	10	0	0	1	5	4
Environment Harmony Competitiveness	10	2	1	1	0	4
Total	60	5	4	7	12	22

Chapter 91
Report on the Global Environment Competitiveness of Mauritania

Mauritania is located in West Africa. It covers 1,030,700 square kilometres and is bordered by Atlantic Ocean in the west, by Western Sahara in the north, by Algeria in the northeast, by Mali in the east and southeast, and by Senegal in the southwest. It is located in tropical desert climate. It had a population of 3.54 million and domestic production the gross (GDP) of USD 4.08 billion in 2011. Through the evaluation of global environment competitiveness Mauritania, we can know that the environment competitiveness index of Slovenia ranks at 129 among 133 countries.

Score: 39.27
Rank: 129

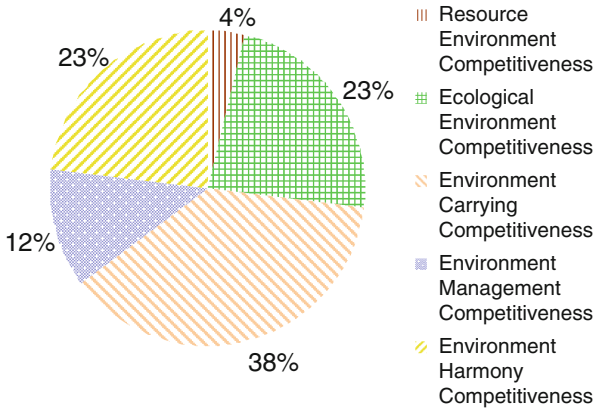

Fig. 91.1 Contribution of sub-index of GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_91,

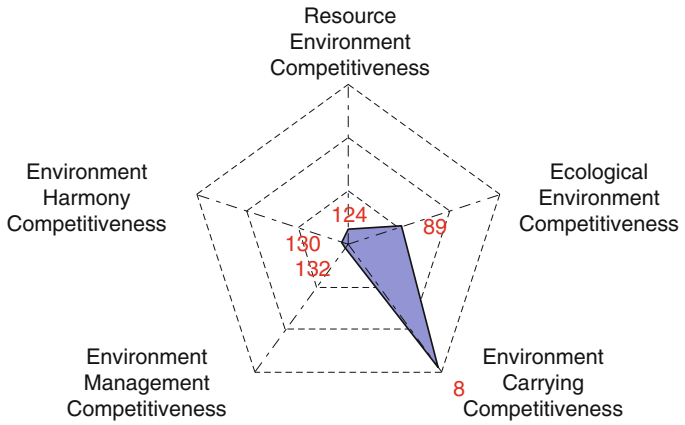

Fig. 91.2 Rank of sub-index of GEC

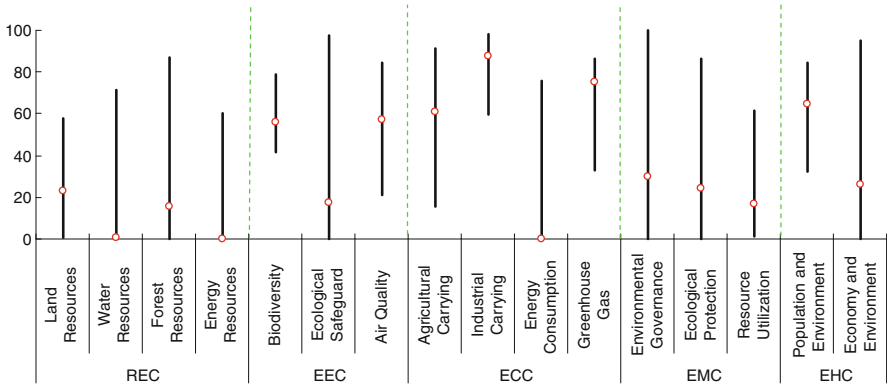

Fig. 91.3 Score and rank of the pillars of GEC

Table 91.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	7.88	124	1.3 Forest Resources	15.25	122
1.1 Land Resources	22.93	24	Growing stock in forest and other wooded land	50.02	114
Land area per capita	52.44	4	Proportion of land area covered by forest	0.27	127
Percentage of arable land to total land area	0.57	131	Forest area per capita	0.47	104
Arable land per capita	5.94	84	1.4 Energy Resources	0.00	125
1.2 Water Resources	0.81	128	Fossil energy	0.00	64
Surface water	0.12	120	Energy production	0.00	126
Annual precipitation	3.12	125	Proportion of combustible renewables and waste to total energy consumption	N/A	N/A
Groundwater	0.00	128			
Total internal renewable water resources	0.02	132			

(continued)

Table 91.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
Net energy imports of the energy consumption	N/A	N/A	Ratio of clean energy consumption	0.00	116
2 Ecological Environment Competitiveness	44.87	89	Elasticity of energy consumption	N/A	N/A
2.1 Biodiversity	55.87	101	Elasticity of electric power consumption	N/A	N/A
Threatened fish species	84.91	78	3.4 Greenhouse Gas	75.11	10
Threatened mammal species	91.85	84	Growth rate of CO_2 emissions	62.67	30
Threatened plant species	100.00	1	Growth rate of Methane emissions	N/A	N/A
GEF benefits index for biodiversity	1.30	78	CO_2 emissions per unit of land area	100.00	3
2.2 Ecological Safeguard	17.65	76	CO_2 emissions per unit of energy consumption	N/A	N/A
Terrestrial protected areas	1.09	124	4 Environment Management Competitiveness	23.73	132
Marine protected areas	42.50	6	4.1 Environmental Governance	30.00	130
2.3 Air Quality	57.04	71	Agricultural chemicals regulation	0.00	86
Inhalable particles (PM10)	50.36	118	Percentage of the rural population with access to an improved water source	48.00	109
Particulate matter (PM2.5)	74.49	98	Percentage of the urban population with access to an improved water source	52.00	130
Index of indoor air pollution	6.90	103	4.2 Ecological Protection	24.43	94
Nitrogen oxides emission	100.00	1	Area of plantation and afforestation	0.03	104
Sulfur dioxide emission	100.00	1	Biome protect	3.20	125
3 Environment Carrying Competitiveness	74.52	8	Overfishing of fishing resources	78.21	7
3.1 Agricultural Carrying	60.96	111	4.3 Resource Utilization	16.51	130
Cereal yield per unit of arable land	6.47	121	Utilization rate of water resources	0.56	54
Fertilizer consumption per unit of arable land	99.66	15	Percentage of total internal renewable water resources to total water resources	3.51	125
Annual freshwater withdrawals for agriculture per unit of arable land	94.91	94	Percentage of agricultural land to total land area	45.47	80
3.2 Industrial Carrying	87.69	97	Percentage of fossil fuel energy consumption to total energy consumption	N/A	N/A
Net exports as a percentage of GDP	64.94	110			
Electric power consumption per unit of value added of industry	N/A	N/A			
SO_2 emissions per unit of value added of industry	100.00	1			
Annual freshwater withdrawals for industry per value added of industry	98.13	57			
3.3 Energy Consumption	N/A	N/A			
Energy consumption per unit of land area	N/A	N/A			

(continued)

Table 91.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
5 Environment Harmony Competitiveness	45.37	130	CO_2 emissions (metric tons per capita)	98.51	26
5.1 Population and Environment	64.62	101	Energy consumption per capita	N/A	N/A
Improved sanitation facilities (% of population with access)	26.00	117	5.2 Economy and Environment	26.13	128
			Land resource utilization efficiency	0.00	133
Motor vehicles (per 1,000 people)	99.63	5	Sulfur dioxide emissions per unit of GDP	100.00	1
Renewable internal freshwater resources per capita	0.14	124			
			Carbon dioxide emissions per unit of GDP	79.72	92
SO_2 emissions (metric tons per capita)	100.00	1	Energy consumption per unit of GDP	N/A	N/A

Table 91.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	1	1	0	1	10
Ecological Environment Competitiveness	11	2	0	0	5	4
Environment Carrying Competitiveness	15	3	2	0	1	4
Environment Management Competitiveness	10	0	0	1	3	6
Environment Harmony Competitiveness	10	3	1	0	1	5
Total	60	9	4	1	11	29

Chapter 92
Report on Global Environment Competitiveness of Mauritius

Mauritius is located in the southwest Indian Ocean. It borders Madagascar to the east. Mauritius has a tropical climate and it is some of the world's rarest plants and animals' home. It covers 2.0 thousand of square kilometers and has a population of 1.29 million. Its GDP reaches $11.26 billion in 2011. Through the index system and evaluation model, the environment competitiveness index of Mauritius ranks at 45 in 133 countries.

Score: 51.81
Rank: 45

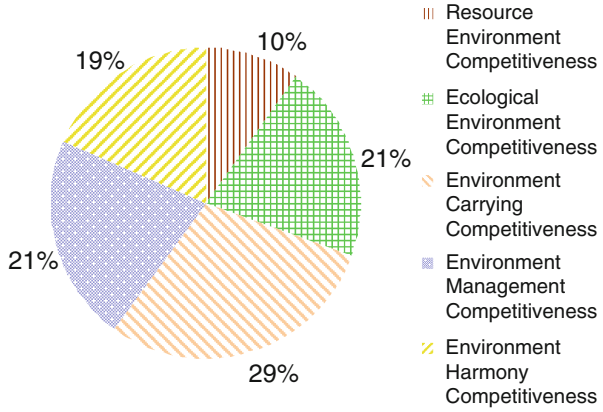

Fig. 92.1 Contribution of sub-index to GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_92,

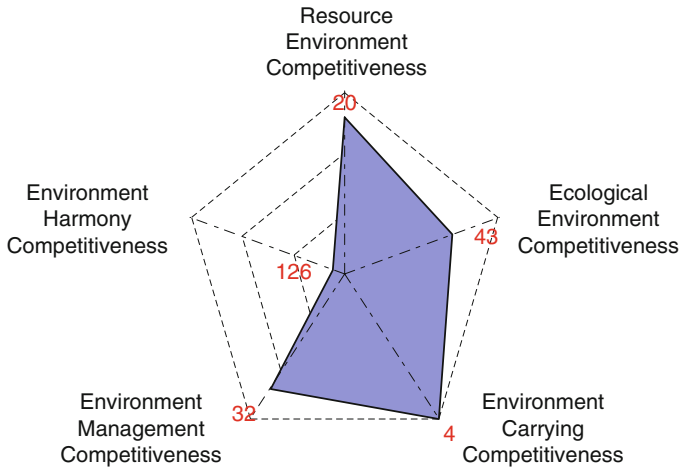

Fig. 92.2 Rank of sub-index of GEC

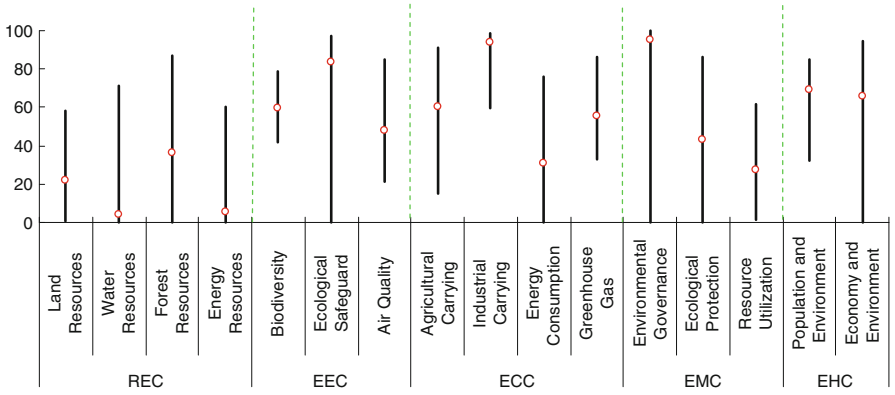

Fig. 92.3 Score and rank of the pillars of GEC

Table 92.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	25.69	20	Groundwater	63.35	7
1.1 Land Resources	20.51	29	Total internal renewable water resources	68.35	9
Land area per capita	0.26	131	1.3 Forest Resources	23.14	87
Percentage of arable land to total land area	65.18	11	Growing stock in forest and other wooded land	50.01	118
Arable land per capita	2.83	114	Proportion of land area covered by forest	20.21	81
1.2 Water Resources	53.45	11	Forest area per capita	0.19	117
Surface water	12.54	25	1.4 Energy Resources	3.08	98
Annual precipitation	69.55	11			

(continued)

Table 92.1 (continued)

Indicators	Score	Rank
Fossil energy	3.08	22
Energy production	N/A	N/A
Proportion of combustible renewable and waste to total energy consumption	N/A	N/A
Net energy imports of the energy consumption	N/A	N/A
2 Ecological Environment Competitiveness	53.37	43
2.1 Biodiversity	58.41	55
Threatened fish species	93.87	36
Threatened mammal species	96.74	30
Threatened plant species	94.87	105
GEF benefits index for biodiversity	3.30	59
2.2 Ecological Safeguard	7.28	108
Terrestrial protected areas	11.96	102
Marine protected areas	0.27	83
2.3 Air Quality	84.15	3
Inhalable particles (PM10)	88.32	23
Particulate matter (PM2.5)	100.00	1
Index of indoor air pollution	100.00	1
Nitrogen oxides emission	68.99	3
Sulfur dioxide emission	40.90	29
3 Environment Carrying Competitiveness	76.02	4
3.1 Agricultural Carrying	54.87	125
Cereal yield per unit of arable land	7.08	119
Fertilizer consumption per unit of arable land	83.06	106
Annual freshwater withdrawals for agriculture per unit of arable land	90.39	110
3.2 Industrial Carrying	95.35	14
Net exports of goods as a percentage of GDP	87.41	31
Electric power consumption per unit of value added of industry	N/A	N/A
SO_2 emissions per unit of value added of industry	99.59	93
Annual freshwater withdrawals for industry per value added of industry	99.04	38
3.3 Energy Consumption	N/A	N/A
Energy consumption per unit of land area	N/A	N/A
Ratio of clean energy consumption	0.00	116
Elasticity of energy consumption	N/A	N/A
Elasticity of electric power consumption	N/A	N/A
3.4 Greenhouse Gas	78.77	5
Growth rate of CO_2 emissions	69.17	18
Growth rate of Methane emissions	N/A	N/A
CO_2 emissions per unit of land area	97.98	119
CO_2 emissions per unit of energy consumption	N/A	N/A
4 Environment Management Competitiveness	55.58	32
4.1 Environmental Governance	95.89	38
Agricultural chemicals regulation	90.48	37
Percentage of the rural population with access to an improved water source	99.00	30
Percentage of the urban population with access to an improved water source	100.00	1
4.2 Ecological Protection	31.35	77
Area of plantation and afforestation	0.02	108
Biome protect	28.30	102
Overfishing of fishing resources	76.19	11
4.3 Resource Utilization	47.58	19
Utilization rate of water resources	1.06	34
Percentage of total internal renewable water resources to total water resources	84.62	27

(continued)

Table 92.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
Percentage of agricultural land to total land area	57.06	54	Renewable internal freshwater resources per capita	2.59	77
Percentage of fossil fuel energy consumption to total energy consumption	N/A	N/A	SO_2 emissions per capita	89.38	97
			CO_2 emissions per capita	92.79	62
			Energy consumption per capita	N/A	N/A
5 Environment Harmony Competitiveness	48.37	126	5.2 Economy and Environment	23.96	129
5.1 Population and Environment	72.78	51	Land resource utilization efficiency	1.62	15
Percentage of population with access to Improved sanitation facilities	91.00	58	Sulfur dioxide emissions per unit of GDP	89.40	89
			Carbon dioxide emissions per unit of GDP	87.37	69
Motor vehicles per 1,000 people	79.75	78	Energy consumption per unit of GDP	N/A	N/A

Table 92.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	1	6	0	3	2
Ecological Environment Competitiveness	11	4	2	2	0	3
Environment Carrying Competitiveness	15	1	2	1	1	5
Environment Management Competitiveness	10	0	3	4	1	2
Environment Harmony Competitiveness	10	0	1	2	6	1
Total	60	6	14	9	11	13

Chapter 93
Report on Global Environment Competitiveness of Mexico

Score: 50.52
Rank: 61

Mexico is located in North America. It borders on the north by the United States of America; on the south and west by the Pacific Ocean; on the southeast by Guatemala, Belize, and the Caribbean Sea; and on the east by the Gulf of Mexico. Mexico is located in the tropics, tropical desert climate covers by the northern parts, tropical rainforest climate covers by southern parts. It covers 1,944 thousand of square kilometers and has a population of 114.79 million. Its GDP reaches $1,153.34 billion in 2011. Through the index system and evaluation model, the environment competitiveness index of Mexico ranks at 61 in 133 countries.

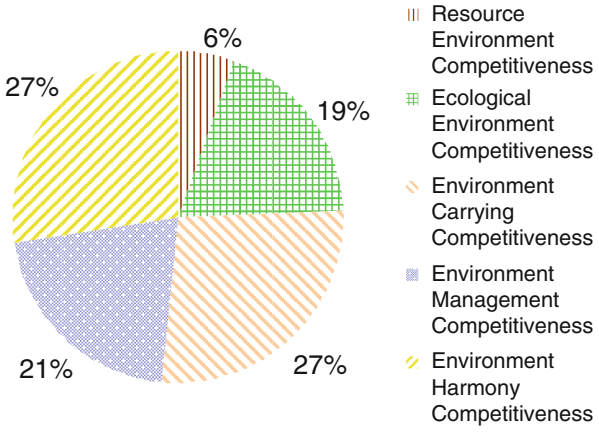

Fig. 93.1 Contribution of sub-index to GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_93,

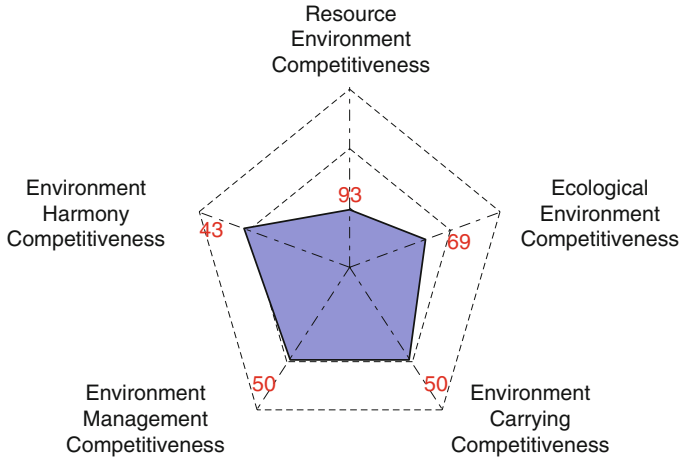

Fig. 93.2 Rank of sub-index of GEC

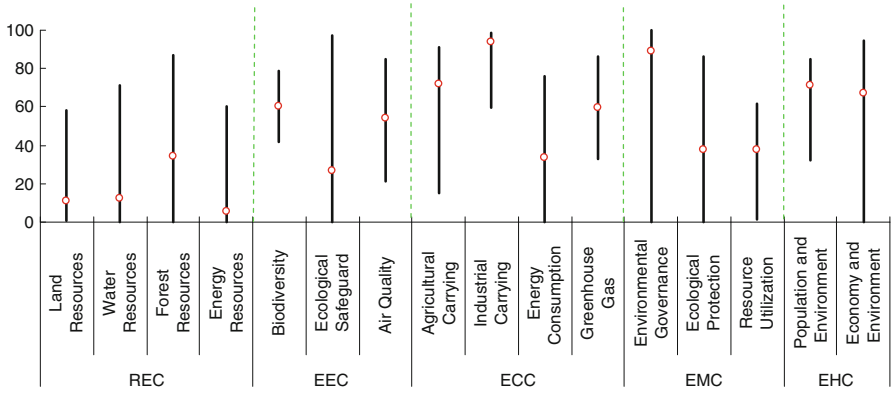

Fig. 93.3 Score and rank of the pillars of GEC

Table 93.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	14.38	93	Total internal renewable water resources	10.61	79
1.1 Land Resources	10.97	77	1.3 Forest Resources	34.37	46
Land area per capita	3.03	53	Growing stock in forest and other wooded land	58.70	19
Percentage of arable land to total land area	22.13	64	Proportion of land area covered by forest	38.95	52
Arable land per capita	10.39	56	Forest area per capita	3.93	46
1.2 Water Resources	12.23	75	1.4 Energy Resources	5.47	66
Surface water	2.27	88	Fossil energy	0.42	41
Annual precipitation	25.76	71	Energy production	N/A	N/A
Groundwater	10.26	65			

(continued)

Table 93.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
Proportion of combustible renewable and waste to total energy consumption	5.03	83	Energy consumption per unit of land area	99.81	62
Net energy imports of the energy consumption	16.16	32	Ratio of clean energy consumption	10.79	54
2 Ecological Environment Competitiveness	47.58	69	Elasticity of energy consumption	14.03	54
2.1 Biodiversity	60.04	17	Elasticity of electric power consumption	10.95	53
Threatened fish species	28.30	130	3.4 Greenhouse Gas	59.74	81
Threatened mammal species	45.65	132	Growth rate of CO_2 emissions	50.81	73
Threatened plant species	88.86	116	Growth rate of Methane emissions	60.23	55
GEF benefits index for biodiversity	68.70	5	CO_2 emissions per unit of land area	99.76	74
2.2 Ecological Safeguard	26.75	56	CO_2 emissions per unit of energy consumption	37.06	81
Terrestrial protected areas	29.89	63	4 Environment Management Competitiveness	52.95	50
Marine protected areas	22.05	14	4.1 Environmental Governance	88.78	66
2.3 Air Quality	53.87	83	Agricultural chemicals regulation	80.95	53
Inhalable particles (PM10)	78.10	69	Percentage of the rural population with access to an improved water source	91.00	59
Particulate matter (PM2.5)	79.55	88	Percentage of the urban population with access to an improved water source	97.00	80
Index of indoor air pollution	27.40	69	4.2 Ecological Protection	37.64	50
Nitrogen oxides emission	59.91	121	Area of plantation and afforestation	4.15	16
Sulfur dioxide emission	34.19	122	Biome protect	63.00	62
3 Environment Carrying Competitiveness	68.32	50	Overfishing of fishing resources	56.94	42
3.1 Agricultural Carrying	71.76	39	4.3 Resource Utilization	37.51	65
Cereal yield per unit of arable land	35.29	50	Utilization rate of water resources	0.70	46
Fertilizer consumption per unit of arable land	95.82	60	Percentage of total internal renewable water resources to total water resources	74.61	51
Annual freshwater withdrawals for agriculture per unit of arable land	96.34	84	Percentage of agricultural land to total land area	62.53	46
3.2 Industrial Carrying	93.55	42	Percentage of fossil fuel energy consumption to total energy consumption	12.22	92
Net exports of goods as a percentage of GDP	80.86	68			
Electric power consumption per unit of value added of industry	95.63	28			
SO_2 emissions per unit of value added of industry	99.82	65			
Annual freshwater withdrawals for industry per value added of industry	97.88	61			
3.3 Energy Consumption	33.89	61			

(continued)

Table 93.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
5 Environment Harmony Competitiveness	69.38	43	CO_2 emissions per capita	89.67	74
5.1 Population and Environment	71.36	61	Energy consumption per capita	88.71	68
Percentage of population with access to Improved sanitation facilities	85.00	71	5.2 Economy and Environment	67.40	50
Motor vehicles per 1,000 people	66.17	89	Land resource utilization efficiency	0.17	52
Renewable internal freshwater resources per capita	4.31	59	Sulfur dioxide emissions per unit of GDP	92.97	72
SO_2 emissions per capita	91.48	88	Carbon dioxide emissions per unit of GDP	86.46	73
			Energy consumption per unit of GDP	89.99	43

Table 93.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	0	1	4	8	0
Ecological Environment Competitiveness	11	0	1	1	5	4
Environment Carrying Competitiveness	15	0	1	7	7	0
Environment Management Competitiveness	10	0	1	6	3	0
Environment Harmony Competitiveness	10	0	0	3	7	0
Total	60	0	4	21	30	4

Chapter 94
Report on Global Environment Competitiveness of Moldova

Moldova is a landlocked nation in Eastern Europe located between Romania to the west and Ukraine to the north, east and south. It covers 32.9 thousand of square kilometers and has a population of 3.56 million. Its GDP reaches $7 billion in 2011. Through the index system and evaluation model, the environment competitiveness index of Moldova ranks at 115 in 133 countries.

Score: 44.87
Rank: 115

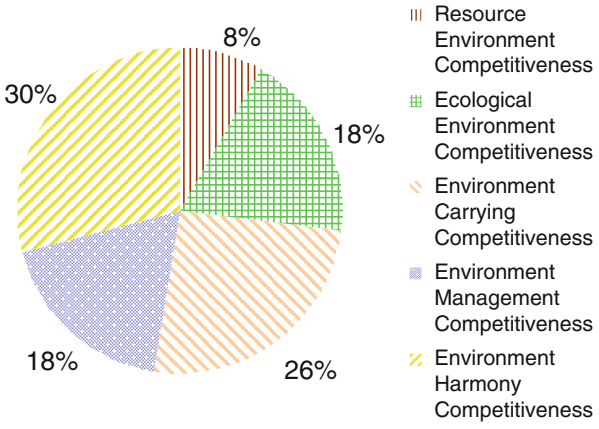

Fig. 94.1 Contribution of sub-index to GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_94,

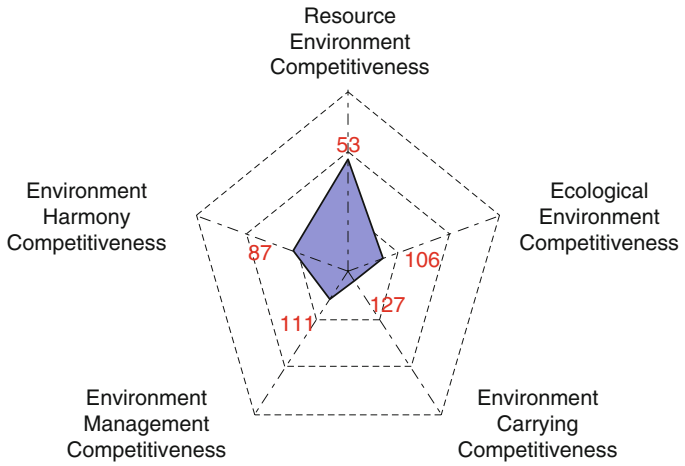

Fig. 94.2 Rank of sub-index of GEC

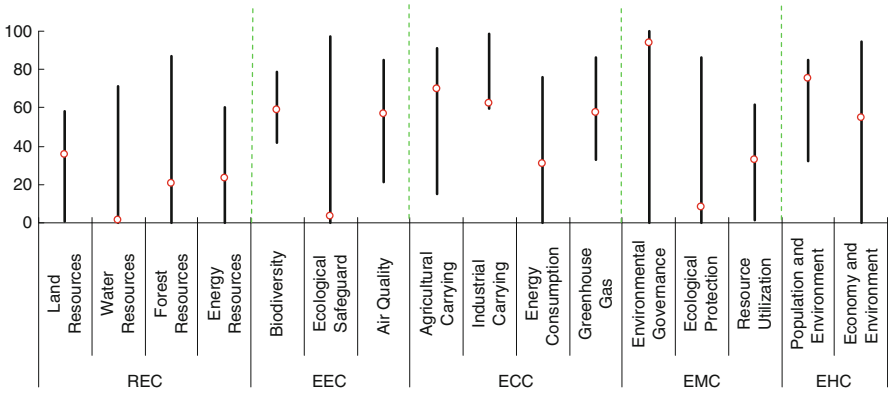

Fig. 94.3 Score and rank of the pillars of GEC

Table 94.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	18.76	53	Groundwater	N/A	N/A
1.1 Land Resources	35.86	7	Total internal renewable water resources	1.53	113
Land area per capita	1.64	88	1.3 Forest Resources	20.84	95
Percentage of arable land to total land area	93.53	4	Growing stock in forest and other wooded land	50.15	98
Arable land per capita	23.81	14	Proportion of land area covered by forest	13.92	90
1.2 Water Resources	1.53	122	Forest area per capita	0.77	95
Surface water	N/A	N/A	1.4 Energy Resources	23.21	8
Annual precipitation	N/A	N/A			

(continued)

Table 94.1 (continued)

Indicators	Score	Rank
Fossil energy	0.00	64
Energy production	64.20	2
Proportion of combustible renewable and waste to total energy consumption	3.45	93
Net energy imports of the energy consumption	0.34	121
2 Ecological Environment Competitiveness	41.41	106
2.1 Biodiversity	58.79	40
Threatened fish species	96.23	23
Threatened mammal species	97.83	17
Threatened plant species	99.88	30
GEF benefits index for biodiversity	0.00	128
2.2 Ecological Safeguard	3.53	116
Terrestrial protected areas	3.53	119
Marine protected areas	N/A	N/A
2.3 Air Quality	56.79	73
Inhalable particles (PM10)	73.72	82
Particulate matter (PM2.5)	86.50	58
Index of indoor air pollution	27.60	68
Nitrogen oxides emission	68.83	17
Sulfur dioxide emission	40.96	14
3 Environment Carrying Competitiveness	57.46	127
3.1 Agricultural Carrying	70.08	44
Cereal yield per unit of arable land	26.23	73
Fertilizer consumption per unit of arable land	99.25	27
Annual freshwater withdrawals for agriculture per unit of arable land	99.36	51
3.2 Industrial Carrying	62.65	131
Net exports of goods as a percentage of GDP	79.96	71
Electric power consumption per unit of value added of industry	71.07	120
SO_2 emissions per unit of value added of industry	99.58	98
Annual freshwater withdrawals for industry per value added of industry	0.00	132
3.3 Energy Consumption	30.61	117
Energy consumption per unit of land area	99.84	55
Ratio of clean energy consumption	0.33	107
Elasticity of energy consumption	13.14	105
Elasticity of electric power consumption	9.13	106
3.4 Greenhouse Gas	57.60	103
Growth rate of CO_2 emissions	45.89	87
Growth rate of Methane emissions	59.57	61
CO_2 emissions per unit of land area	99.79	67
CO_2 emissions per unit of energy consumption	36.85	83
4 Environment Management Competitiveness	41.35	111
4.1 Environmental Governance	93.79	50
Agricultural chemicals regulation	90.48	37
Percentage of the rural population with access to an improved water source	93.00	51
Percentage of the urban population with access to an improved water source	99.00	51
4.2 Ecological Protection	8.20	124
Area of plantation and afforestation	N/A	N/A
Biome protect	8.20	120
Overfishing of fishing resources	N/A	N/A
4.3 Resource Utilization	33.11	83
Utilization rate of water resources	0.66	49
Percentage of total internal renewable water resources to total water resources	N/A	N/A
Percentage of agricultural land to total land area	88.84	9

(continued)

Table 94.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
Percentage of fossil fuel energy consumption to total energy consumption	9.81	99	SO_2 emissions per capita	98.28	34
			CO_2 emissions per capita	95.46	50
			Energy consumption per capita	95.35	39
5 Environment Harmony Competitiveness	65.35	87	5.2 Economy and Environment	55.05	105
5.1 Population and Environment	75.66	39	Land resource utilization efficiency	0.06	86
Percentage of population with access to Improved sanitation facilities	79.00	79	Sulfur dioxide emissions per unit of GDP	91.98	77
Motor vehicles per 1,000 people	82.22	69	Carbon dioxide emissions per unit of GDP	60.31	117
Renewable internal freshwater resources per capita	0.34	120	Energy consumption per unit of GDP	67.83	104

Table 94.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	4	0	0	6	1
Ecological Environment Competitiveness	11	0	4	2	3	2
Environment Carrying Competitiveness	15	0	1	2	6	6
Environment Management Competitiveness	10	1	0	4	1	2
Environment Harmony Competitiveness	10	0	0	3	4	3
Total	60	5	5	11	20	14

Chapter 95
Report on Global Environment Competitiveness of Mongolia

Mongolia is a landlocked country in East and Central Asia. It borders Russia to the north and China to the south, east and west. It has an extreme continental climate with long, cold winters and short summers, during which most of its annual precipitation falls. It covers 1,553.6 thousand of square kilometers and has a population of 2.8million. Its GDP reaches $8.76 billion in 2011. Through the index system and evaluation model, the environment competitiveness index of Mongolia ranks at 91 in 133 countries.

Score: 47.69
Rank: 91

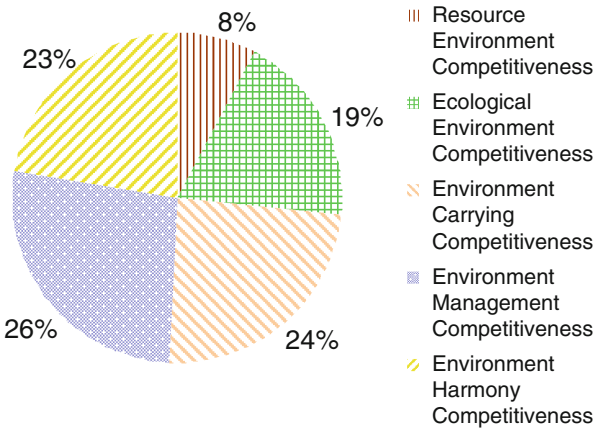

Fig. 95.1 Contribution of sub-index to GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_95,

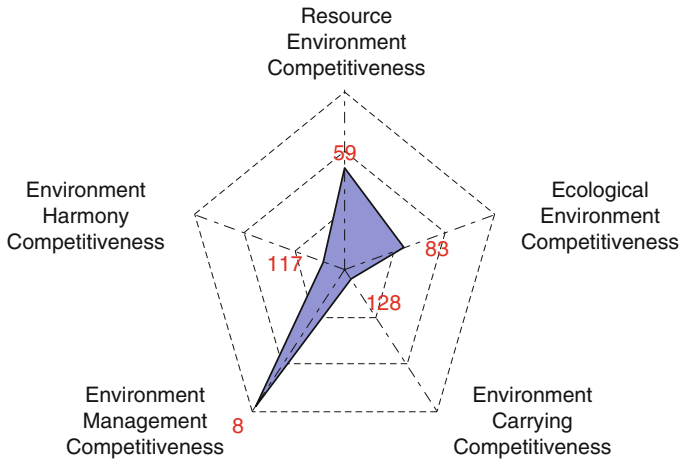

Fig. 95.2 Rank of sub-index of GEC

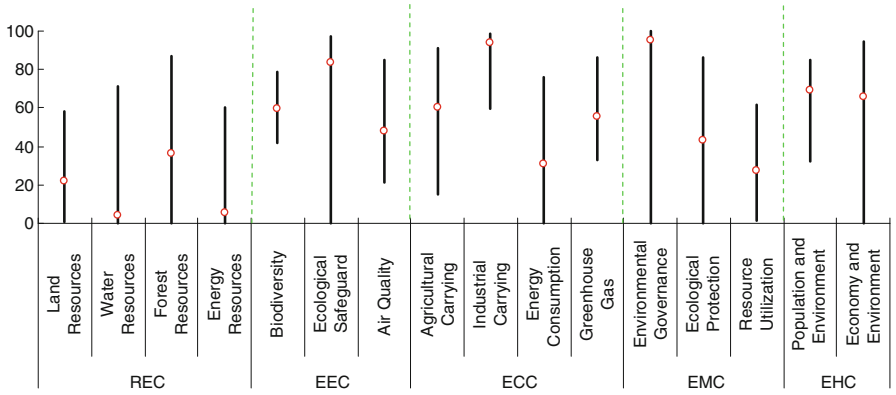

Fig. 95.3 Score and rank of the pillars of GEC

Table 95.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	18.43	59	Groundwater	0.52	115
1.1 Land Resources	43.22	2	Total internal renewable water resources	1.13	117
Land area per capita	100.00	1	1.3 Forest Resources	27.64	76
Percentage of arable land to total land area	0.49	132	Growing stock in forest and other wooded land	54.32	33
Arable land per capita	10.23	60	Proportion of land area covered by forest	8.15	106
1.2 Water Resources	2.53	119	Forest area per capita	26.94	9
Surface water	0.23	117	1.4 Energy Resources	11.66	39
Annual precipitation	8.23	115			

(continued)

Table 95.1 (continued)

Indicators	Score	Rank
Fossil energy	0.00	64
Energy production	5.49	18
Proportion of combustible renewable and waste to total energy consumption	4.78	85
Net energy imports of the energy consumption	58.54	7
2 Ecological Environment Competitiveness	45.50	83
2.1 Biodiversity	60.39	15
Threatened fish species	99.53	3
Threatened mammal species	94.02	64
Threatened plant species	100.00	1
GEF benefits index for biodiversity	4.20	51
2.2 Ecological Safeguard	36.14	29
Terrestrial protected areas	36.14	54
Marine protected areas	N/A	N/A
2.3 Air Quality	41.34	124
Inhalable particles (PM10)	29.93	127
Particulate matter(PM2.5)	89.29	38
Index of indoor air pollution	3.80	110
Nitrogen oxides emission	68.27	50
Sulfur dioxide emission	40.78	53
3 Environment Carrying Competitiveness	57.28	128
3.1 Agricultural Carrying	49.02	127
Cereal yield per unit of arable land	11.26	109
Fertilizer consumption per unit of arable land	99.37	24
Annual freshwater withdrawals for agriculture per unit of arable land	N/A	N/A
3.2 Industrial Carrying	82.15	119
Net exports of goods as a percentage of GDP	59.81	116
Electric power consumption per unit of value added of industry	87.49	94
SO_2 emissions per unit of value added of industry	99.14	116
Annual freshwater withdrawals for industry per value added of industry	N/A	N/A
3.3 Energy Consumption	31.20	102
Energy consumption per unit of land area	100.00	2
Ratio of clean energy consumption	0.00	116
Elasticity of energy consumption	14.15	45
Elasticity of electric power consumption	10.65	69
3.4 Greenhouse Gas	58.43	94
Growth rate of CO_2 emissions	57.89	44
Growth rate of Methane emissions	76.38	6
CO_2 emissions per unit of land area	99.99	14
CO_2 emissions per unit of energy consumption	0.00	126
4 Environment Management Competitiveness	63.39	8
4.1 Environmental Governance	72.57	100
Agricultural chemicals regulation	66.67	65
Percentage of the rural population with access to an improved water source	53.00	103
Percentage of the urban population with access to an improved water source	100.00	1
4.2 Ecological Protection	69.50	5
Area of plantation and afforestation	N/A	N/A
Biome protect	69.50	56
Overfishing of fishing resources	N/A	N/A
4.3 Resource Utilization	46.07	27
Utilization rate of water resources	0.05	108

(continued)

Table 95.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
Percentage of total internal renewable water resources to total water resources	89.69	15	Renewable internal freshwater resources per capita	15.04	28
Percentage of agricultural land to total land area	88.11	10	SO_2 emissions per capita	88.44	100
Percentage of fossil fuel energy consumption to total energy consumption	6.44	105	CO_2 emissions per capita	88.42	80
5 Environment Harmony Competitiveness	53.88	117	Energy consumption per capita	91.73	58
5.1 Population and Environment	70.82	64	5.2 Economy and Environment	36.95	122
Percentage of population with access to Improved sanitation facilities	50.00	100	Land resource utilization efficiency	0.00	131
Motor vehicles per 1,000 people	91.36	47	Sulfur dioxide emissions per unit of GDP	60.91	123
			Carbon dioxide emissions per unit of GDP	25.52	129
			Energy consumption per unit of GDP	61.36	113

Table 95.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	2	1	2	3	6
Ecological Environment Competitiveness	11	2	2	3	1	3
Environment Carrying Competitiveness	15	2	2	2	2	7
Environment Management Competitiveness	10	2	2	1	2	2
Environment Harmony Competitiveness	10	0	1	1	4	4
Total	60	8	8	9	12	22

Chapter 96
Report on Global Environment Competitiveness of Morocco

Morocco is located in North Africa. It borders Spain to the north, Algeria to the east, and Western Sahara to the south. The climate is Mediterranean in the North and in some mountains, which becomes more extreme towards the interior regions. It covers 446.3 thousand of square kilometers and has a population of 32.27 million. Its GDP reaches $100.22 billion in 2011. Through the index system and evaluation model, the environment competitiveness index of Morocco ranks at 95 in 133 countries.

Score: 47.45
Rank: 95

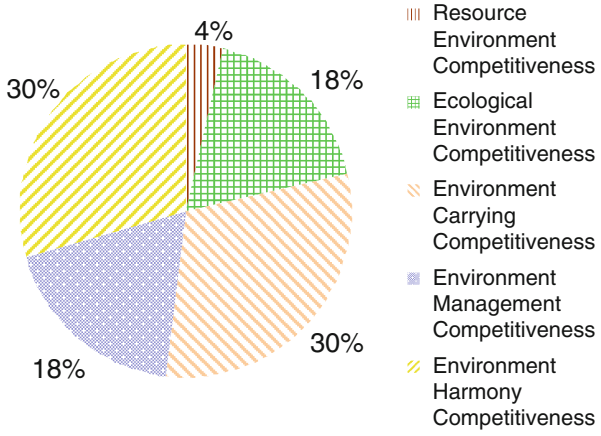

Fig. 96.1 Contribution of sub-index to GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_96,

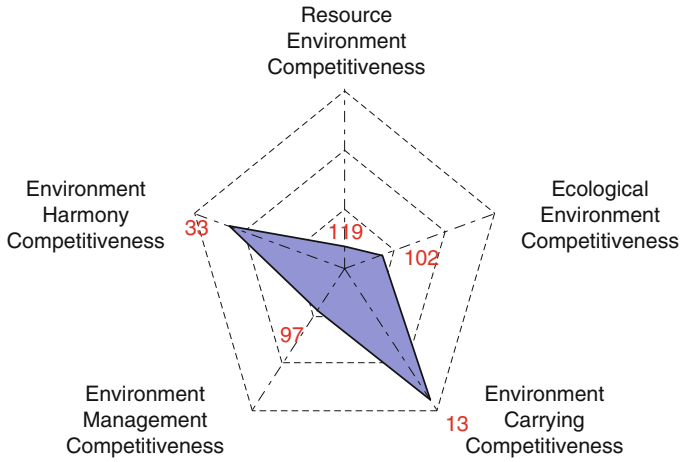

Fig. 96.2 Rank of sub-index of GEC

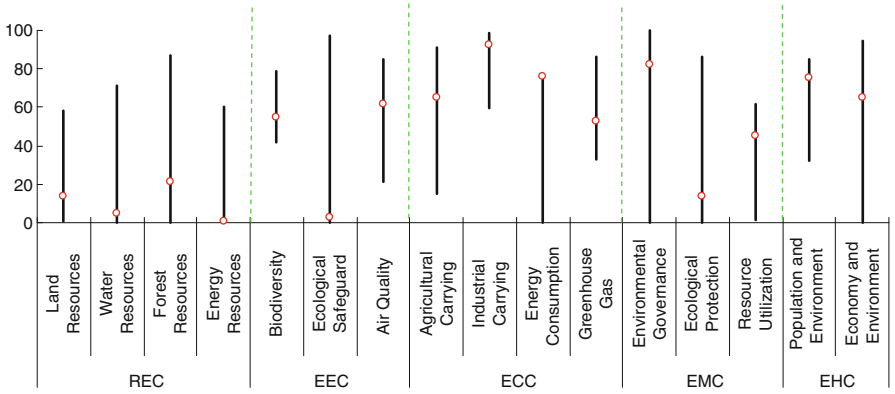

Fig. 96.3 Score and rank of the pillars of GEC

Table 96.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	8.50	119	Groundwater	3.19	93
1.1 Land Resources	13.47	65	Total internal renewable water resources	3.28	104
Land area per capita	2.47	65	1.3 Forest Resources	20.90	94
Percentage of arable land to total land area	30.10	46	Growing stock in forest and other wooded land	50.57	80
Arable land per capita	11.52	49	Proportion of land area covered by forest	13.49	91
1.2 Water Resources	4.68	108	Forest area per capita	1.11	81
Surface water	0.53	110	1.4 Energy Resources	0.72	119
Annual precipitation	11.74	109			

(continued)

Table 96.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
Fossil energy	0.00	64	Energy consumption per unit of land area	99.93	37
Energy production	0.03	125	Ratio of clean energy consumption	2.91	82
Proportion of combustible renewable and waste to total energy consumption	3.15	94	Elasticity of energy consumption	100.00	1
Net energy imports of the energy consumption	0.54	120	Elasticity of electric power consumption	100.00	1
2 Ecological Environment Competitiveness	42.03	102	3.4 Greenhouse Gas	53.00	121
2.1 Biodiversity	54.68	112	Growth rate of CO_2 emissions	43.15	97
Threatened fish species	77.83	103	Growth rate of Methane emissions	54.53	90
Threatened mammal species	90.22	98	CO_2 emissions per unit of land area	99.89	52
Threatened plant species	98.37	87	CO_2 emissions per unit of energy consumption	24.27	111
GEF benefits index for biodiversity	3.50	55	4 Environment Management Competitiveness	43.66	97
2.2 Ecological Safeguard	2.92	118	4.1 Environmental Governance	81.99	86
Terrestrial protected areas	3.80	118	Agricultural chemicals regulation	85.71	46
Marine protected areas	1.59	67	Percentage of the rural population with access to an improved water source	61.00	98
2.3 Air Quality	61.88	58	Percentage of the urban population with access to an improved water source	98.00	70
Inhalable particles (PM10)	83.21	50	4.2 Ecological Protection	13.80	117
Particulate matter (PM2.5)	87.34	50	Area of plantation and afforestation	0.80	45
Index of indoor air pollution	38.70	55	Biome protect	9.10	118
Nitrogen oxides emission	67.77	66	Overfishing of fishing resources	35.82	80
Sulfur dioxide emission	39.95	90	4.3 Resource Utilization	45.14	29
3 Environment Carrying Competitiveness	72.90	13	Utilization rate of water resources	1.76	22
3.1 Agricultural Carrying	64.80	85	Percentage of total internal renewable water resources to total water resources	90.63	13
Cereal yield per unit of arable land	13.27	105	Percentage of agricultural land to total land area	79.60	18
Fertilizer consumption per unit of arable land	98.33	37	Percentage of fossil fuel energy consumption to total energy consumption	8.58	101
Annual freshwater withdrawals for agriculture per unit of arable land	99.96	12			
3.2 Industrial Carrying	92.41	54			
Net exports of goods as a percentage of GDP	78.22	82			
Electric power consumption per unit of value added of industry	92.36	60			
SO_2 emissions per unit of value added of industry	99.58	95			
Annual freshwater withdrawals for industry per value added of industry	99.46	22			
3.3 Energy Consumption	75.71	1			

(continued)

Table 96.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
5 Environment Harmony Competitiveness	70.18	33	CO_2 emissions per capita	96.21	45
5.1 Population and Environment	75.57	40	Energy consumption per capita	97.04	24
Percentage of population with access to Improved sanitation facilities	69.00	88	5.2 Economy and Environment	64.79	71
Motor vehicles per 1,000 people	91.60	46	Land resource utilization efficiency	0.06	85
Renewable internal freshwater resources per capita	1.09	104	Sulfur dioxide emissions per unit of GDP	87.59	97
SO_2 emissions per capita	95.35	69	Carbon dioxide emissions per unit of GDP	82.30	85
			Energy consumption per unit of GDP	89.21	47

Table 96.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	0	0	1	8	5
Ecological Environment Competitiveness	11	0	0	4	3	4
Environment Carrying Competitiveness	15	2	0	5	6	2
Environment Management Competitiveness	10	0	4	2	2	2
Environment Harmony Competitiveness	10	0	0	3	6	1
Total	60	2	4	15	25	14

Chapter 97
Report on Global Environment Competitiveness of Mozambique

Score: 46.37
Rank: 105

Mozambique is located in Southeast Africa. It borders by the Indian Ocean to the east, Tanzania to the north, Malawi and Zambia to the northwest, Zimbabwe to the west and Swaziland and South Africa to the southwest. Mozambique has a tropical climate with a wet season and a dry season. It covers 786.4 thousand of square kilometers and has a population of 23.93 million. Its GDP reaches $12.8 billion in 2011. Through the index system and evaluation model, the environment competitiveness index of Mozambique ranks at 105 in 133 countries.

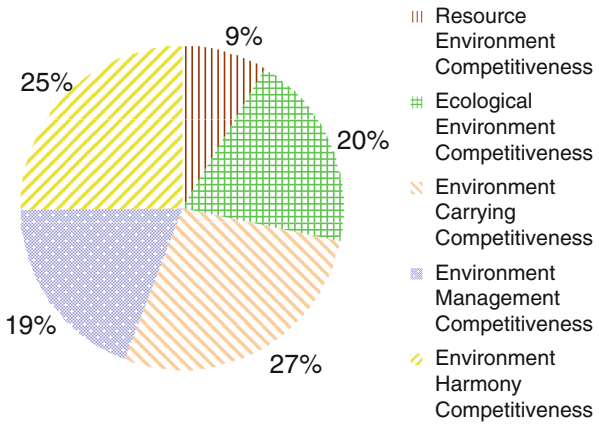

Fig. 97.1 Contribution of sub-index of GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_97,

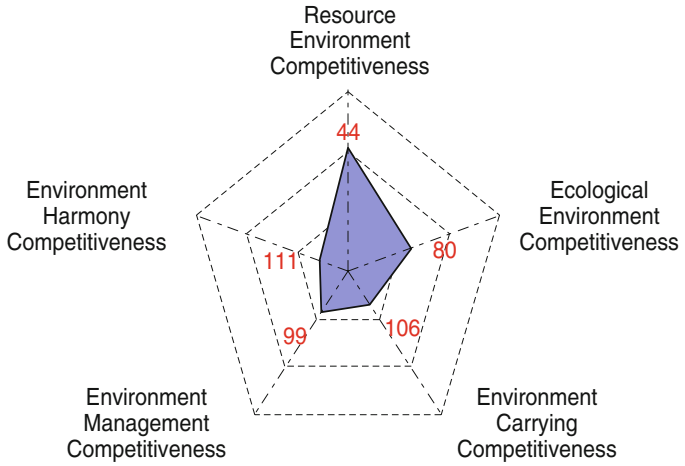

Fig. 97.2 Rank of sub-index of GEC

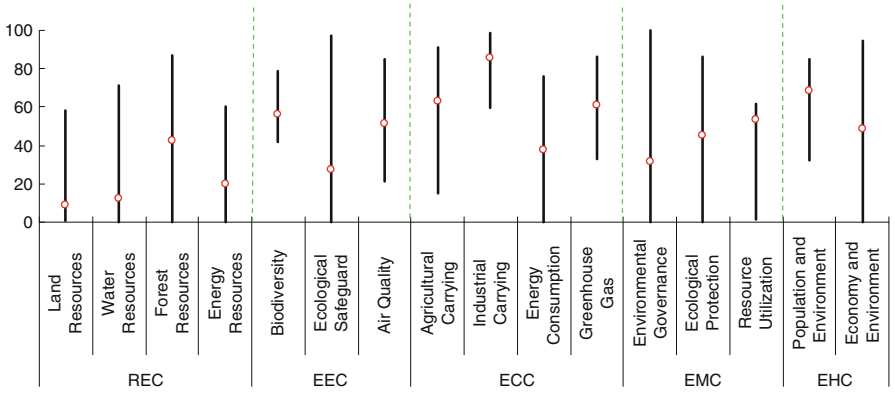

Fig. 97.3 Score and rank of the pillars of GEC

Table 97.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	19.91	44	Groundwater	3.07	94
1.1 Land Resources	8.73	92	Total internal renewable water resources	6.43	89
Land area per capita	5.90	33	1.3 Forest Resources	42.81	22
Percentage of arable land to total land area	11.07	96	Growing stock in forest and other wooded land	54.30	34
Arable land per capita	10.17	61	Proportion of land area covered by forest	57.80	20
1.2 Water Resources	12.00	78	Forest area per capita	11.31	21
Surface water	2.94	75	1.4 Energy Resources	20.01	14
Annual precipitation	35.57	56			

(continued)

Table 97.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
Fossil energy	0.00	64	Energy consumption per unit of land area	99.98	13
Energy production	0.54	78	Ratio of clean energy consumption	25.47	28
Proportion of combustible renewable and waste to total energy consumption	87.43	6	Elasticity of energy consumption	15.09	20
Net energy imports of the energy consumption	15.57	34	Elasticity of electric power consumption	10.06	91
2 Ecological Environment Competitiveness	45.63	80	3.4 Greenhouse Gas	60.97	73
2.1 Biodiversity	55.92	99	Growth rate of CO_2 emissions	33.56	118
Threatened fish species	74.06	109	Growth rate of Methane emissions	40.15	125
Threatened mammal species	93.48	72	CO_2 emissions per unit of land area	100.00	6
Threatened plant species	97.67	94	CO_2 emissions per unit of energy consumption	97.58	3
GEF benefits index for biodiversity	7.20	38	4 Environment Management Competitiveness	43.58	99
2.2 Ecological Safeguard	27.30	55	4.1 Environmental Governance	31.80	129
Terrestrial protected areas	42.66	43	Agricultural chemicals regulation	0.00	86
Marine protected areas	4.25	46	Percentage of the rural population with access to an improved water source	29.00	121
2.3 Air Quality	51.66	88	Percentage of the urban population with access to an improved water source	77.00	124
Inhalable particles (PM10)	83.94	47	4.2 Ecological Protection	44.92	24
Particulate matter (PM2.5)	92.85	23	Area of plantation and afforestation	0.08	90
Index of indoor air pollution	0.40	124	Biome protect	90.80	24
Nitrogen oxides emission	66.98	86	Overfishing of fishing resources	58.82	35
Sulfur dioxide emission	40.90	36	4.3 Resource Utilization	53.58	9
3 Environment Carrying Competitiveness	64.23	106	Utilization rate of water resources	0.01	127
3.1 Agricultural Carrying	62.74	100	Percentage of total internal renewable water resources to total water resources	43.40	93
Cereal yield per unit of arable land	7.15	118	Percentage of agricultural land to total land area	74.10	25
Fertilizer consumption per unit of arable land	99.77	11	Percentage of fossil fuel energy consumption to total energy consumption	96.81	2
Annual freshwater withdrawals for agriculture per unit of arable land	99.84	27			
3.2 Industrial Carrying	85.62	109			
Net exports of goods as a percentage of GDP	82.23	61			
Electric power consumption per unit of value added of industry	61.73	123			
SO_2 emissions per unit of value added of industry	99.52	101			
Annual freshwater withdrawals for industry per value added of industry	99.02	39			
3.3 Energy Consumption	37.65	33			

(continued)

Table 97.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
5 Environment Harmony Competitiveness	58.52	111	CO_2 emissions per capita	99.82	6
5.1 Population and Environment	68.44	78	Energy consumption per capita	97.68	17
Percentage of population with access to Improved sanitation facilities	17.00	121	5.2 Economy and Environment	48.59	114
Motor vehicles per 1,000 people	98.77	12	Land resource utilization efficiency	0.00	128
Renewable internal freshwater resources per capita	5.07	52	Sulfur dioxide emissions per unit of GDP	87.77	96
SO_2 emissions per capita	99.38	18	Carbon dioxide emissions per unit of GDP	91.75	43
			Energy consumption per unit of GDP	14.85	123

Table 97.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	1	3	3	7	0
Ecological Environment Competitiveness	11	0	1	3	5	2
Environment Carrying Competitiveness	15	1	4	1	3	6
Environment Management Competitiveness	10	1	3	0	3	3
Environment Harmony Competitiveness	10	1	2	2	2	3
Total	60	4	13	9	20	14

Chapter 98
Report on Global Environment Competitiveness of Myanmar

Myanmar is located in in Southeast Asia. It borders India, Bangladesh, China, Laos and Thailand. The climate is tropical monsoon. It covers 653.5 thousand of square kilometers and has a population of 48.34 million. Its GDP reaches $53.32 billion in 2011. Through the index system and evaluation model, the environment competitiveness index of Myanmar ranks at 41 in 133 countries.

Score: 52.47
Rank: 41

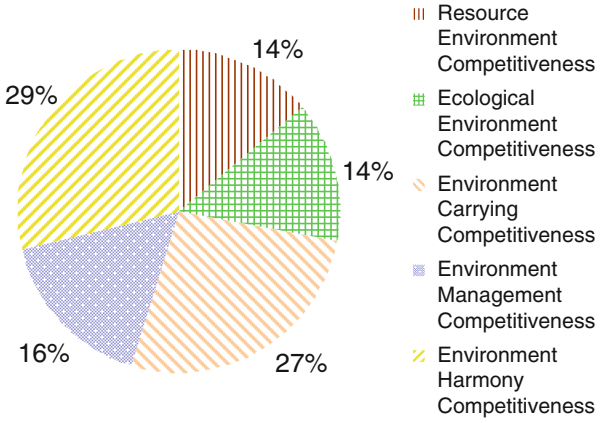

Fig. 98.1 Contribution of sub-index of GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_98,

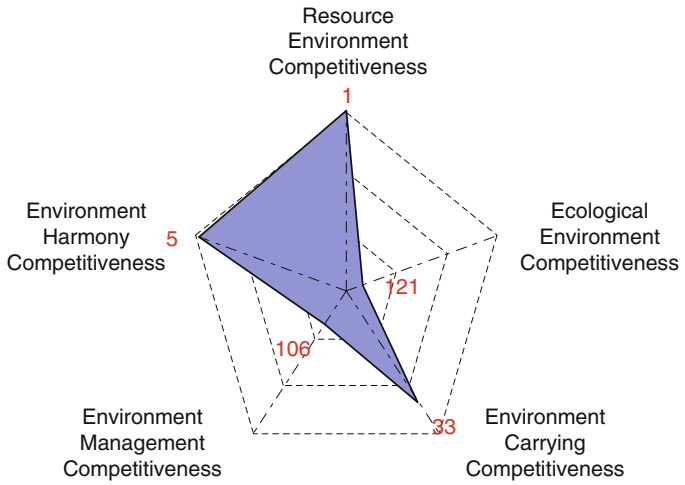

Fig. 98.2 Rank of sub-index of GEC

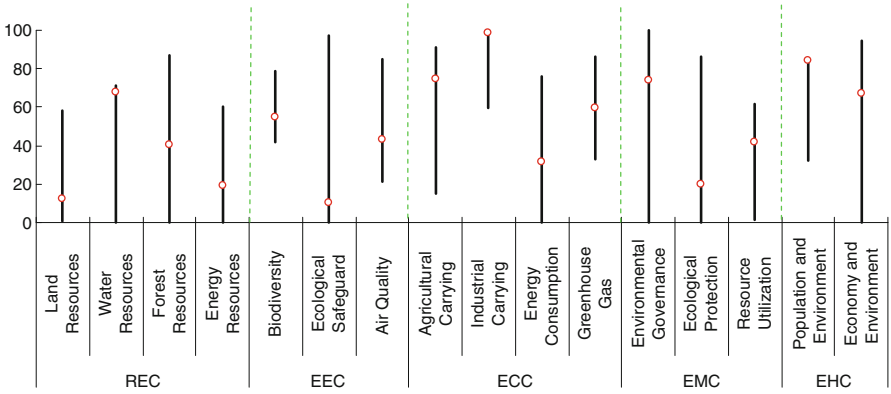

Fig. 98.3 Score and rank of the pillars of GEC

Table 98.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	36.59	1	Groundwater	100.00	2
1.1 Land Resources	12.47	68	Total internal renewable water resources	77.40	7
Land area per capita	2.41	68	1.3 Forest Resources	40.22	25
Percentage of arable land to total land area	27.91	50	Growing stock in forest and other wooded land	54.33	32
Arable land per capita	10.44	55	Proportion of land area covered by forest	56.41	21
1.2 Water Resources	67.48	2	Forest area per capita	4.54	40
Surface water	19.11	8	1.4 Energy Resources	19.37	18
Annual precipitation	73.42	8			

(continued)

Table 98.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
Fossil energy	0.00	62	Energy consumption per unit of land area	99.96	22
Energy production	0.47	86	Ratio of clean energy consumption	4.07	73
Proportion of combustible renewable and waste to total energy consumption	80.63	10	Elasticity of energy consumption	14.26	38
Net energy imports of the energy consumption	20.51	27	Elasticity of electric power consumption	8.76	110
2 Ecological Environment Competitiveness	36.79	121	3.4 Greenhouse Gas	59.58	82
2.1 Biodiversity	55.00	109	Growth rate of CO_2 emissions	26.75	124
Threatened fish species	81.60	90	Growth rate of Methane emissions	56.27	84
Threatened mammal species	75.54	121	CO_2 emissions per unit of land area	99.99	19
Threatened plant species	97.84	92	CO_2 emissions per unit of energy consumption	88.15	9
GEF benefits index for biodiversity	10.00	29	4 Environment Management Competitiveness	42.71	106
2.2 Ecological Safeguard	10.21	99	4.1 Environmental Governance	74.16	94
Terrestrial protected areas	16.85	88	Agricultural chemicals regulation	57.14	74
Marine protected areas	0.27	83	Percentage of the rural population with access to an improved water source	78.00	82
2.3 Air Quality	43.07	119	Percentage of the urban population with access to an improved water source	93.00	98
Inhalable particles (PM10)	70.80	87	4.2 Ecological Protection	19.69	104
Particulate matter (PM2.5)	66.02	115	Area of plantation and afforestation	1.28	34
Index of indoor air pollution	0.70	122	Biome protect	34.10	93
Nitrogen oxides emission	62.39	117	Overfishing of fishing resources	29.82	88
Sulfur dioxide emission	40.90	34	4.3 Resource Utilization	41.97	40
3 Environment Carrying Competitiveness	70.25	33	Utilization rate of water resources	0.11	89
3.1 Agricultural Carrying	74.95	26	Percentage of total internal renewable water resources to total water resources	62.27	70
Cereal yield per unit of arable land	40.83	40	Percentage of agricultural land to total land area	22.50	116
Fertilizer consumption per unit of arable land	99.57	17	Percentage of fossil fuel energy consumption to total energy consumption	83.01	9
Annual freshwater withdrawals for agriculture per unit of arable land	95.82	87			
3.2 Industrial Carrying	98.32	1			
Net exports of goods as a percentage of GDP	100.00	1			
Electric power consumption per unit of value added of industry	96.26	24			
SO_2 emissions per unit of value added of industry	99.92	37			
Annual freshwater withdrawals for industry per value added of industry	97.09	68			
3.3 Energy Consumption	31.76	91			

(continued)

Table 98.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
5 Environment Harmony Competitiveness	75.99	5	CO_2 emissions per capita	99.66	11
5.1 Population and Environment	84.57	2	Energy consumption per capita	98.81	5
Percentage of population with access to Improved sanitation facilities	81.00	77	5.2 Economy and Environment	67.42	49
Motor vehicles per 1,000 people	99.38	7	Land resource utilization efficiency	0.02	97
Renewable internal freshwater resources per capita	25.11	18	Sulfur dioxide emissions per unit of GDP	97.43	31
SO_2 emissions per capita	99.71	7	Carbon dioxide emissions per unit of GDP	95.05	14
			Energy consumption per unit of GDP	77.17	85

Table 98.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	5	3	2	4	0
Ecological Environment Competitiveness	11	0	0	0	5	6
Environment Carrying Competitiveness	15	2	5	3	4	1
Environment Management Competitiveness	10	0	0	2	6	2
Environment Harmony Competitiveness	10	3	3	2	2	0
Total	60	10	11	9	21	9

Chapter 99
Report on Global Environment Competitiveness of Namibia

Score: 49.28
Rank: 73

Namibia is located in southern Africa whose western border is the Atlantic Ocean. It borders with Angola and Zambia to the north, Botswana to the east and South Africa to the south and east. Namibia is located in subtropical and half desert climate with less rain. It covers 823.3 thousand of square kilometers and has a population of 2.32 million. Its GDP reaches $12.3 billion in 2011. Through the index system and evaluation model, the environment competitiveness index of Namibia ranks at 73 in 133 countries.

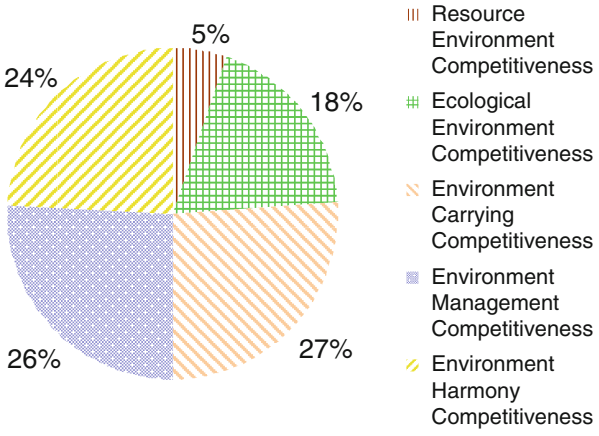

Fig. 99.1 Contribution of sub-index of GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_99,

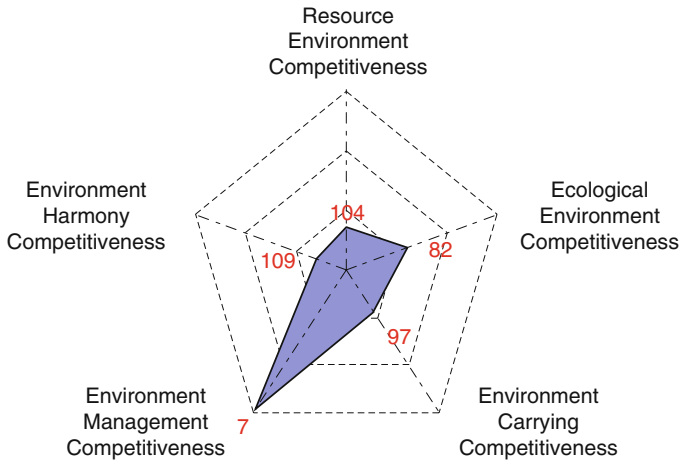

Fig. 99.2 Rank of sub-index of GEC

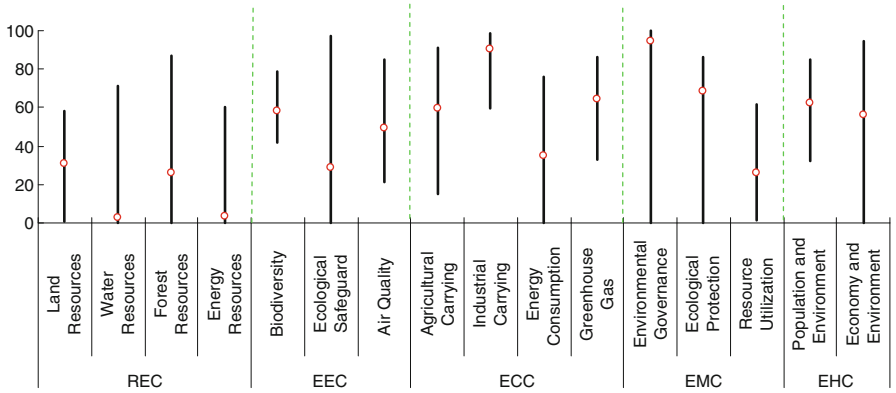

Fig. 99.3 Score and rank of the pillars of GEC

Table 99.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	13.09	104	Groundwater	0.33	119
1.1 Land Resources	30.81	9	Total internal renewable water resources	0.38	120
Land area per capita	63.84	2	1.3 Forest Resources	25.76	80
Percentage of arable land to total land area	1.48	126	Growing stock in forest and other wooded land	50.53	83
Arable land per capita	16.11	28	Proportion of land area covered by forest	10.27	102
1.2 Water Resources	2.74	117	Forest area per capita	21.65	11
Surface water	0.57	109	1.4 Energy Resources	3.18	96
Annual precipitation	9.67	111			

(continued)

Table 99.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
Fossil energy	0.00	64	Energy consumption per unit of land area	100.00	1
Energy production	0.14	118	Ratio of clean energy consumption	12.25	44
Proportion of combustible renewable and waste to total energy consumption	13.89	54	Elasticity of energy consumption	14.08	49
Net energy imports of the energy consumption	2.38	112	Elasticity of electric power consumption	12.05	32
2 Ecological Environment Competitiveness	45.51	82	3.4 Greenhouse Gas	64.20	46
2.1 Biodiversity	57.94	69	Growth rate of CO_2 emissions	58.22	43
Threatened fish species	87.26	71	Growth rate of Methane emissions	59.81	57
Threatened mammal species	93.48	72	CO_2 emissions per unit of land area	100.00	7
Threatened plant species	98.54	82	CO_2 emissions per unit of energy consumption	44.75	59
GEF benefits index for biodiversity	5.20	45	4 Environment Management Competitiveness	63.60	7
2.2 Ecological Safeguard	28.43	51	4.1 Environmental Governance	94.50	46
Terrestrial protected areas	40.22	47	Agricultural chemicals regulation	N/A	N/A
Marine protected areas	10.76	27	Percentage of the rural population with access to an improved water source	90.00	60
2.3 Air Quality	48.99	100	Percentage of the urban population with access to an improved water source	99.00	51
Inhalable particles (PM10)	69.34	89	4.2 Ecological Protection	68.67	6
Particulate matter (PM2.5)	82.02	83	Area of plantation and afforestation	N/A	N/A
Index of indoor air pollution	8.10	98	Biome protect	82.80	40
Nitrogen oxides emission	68.20	52	Overfishing of fishing resources	54.55	49
Sulfur dioxide emission	40.39	79	4.3 Resource Utilization	25.92	115
3 Environment Carrying Competitiveness	64.93	97	Utilization rate of water resources	0.06	98
3.1 Agricultural Carrying	59.84	119	Percentage of total internal renewable water resources to total water resources	13.54	119
Cereal yield per unit of arable land	0.00	132	Percentage of agricultural land to total land area	55.72	57
Fertilizer consumption per unit of arable land	99.88	7	Percentage of fossil fuel energy consumption to total energy consumption	34.37	48
Annual freshwater withdrawals for agriculture per unit of arable land	99.60	41			
3.2 Industrial Carrying	90.72	78			
Net exports of goods as a percentage of GDP	70.43	97			
Electric power consumption per unit of value added of industry	94.23	42			
SO_2 emissions per unit of value added of industry	98.60	123			
Annual freshwater withdrawals for industry per value added of industry	99.63	15			
3.3 Energy Consumption	34.59	51			

(continued)

Table 99.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
5 Environment Harmony Competitiveness	59.28	109	CO_2 emissions per capita	96.16	47
5.1 Population and Environment	62.65	110	Energy consumption per capita	95.57	35
Percentage of population with access to Improved sanitation facilities	33.00	108	5.2 Economy and Environment	55.91	98
Motor vehicles per 1,000 people	87.53	54	Land resource utilization efficiency	0.00	129
Renewable internal freshwater resources per capita	3.21	69	Sulfur dioxide emissions per unit of GDP	40.73	125
SO_2 emissions per capita	62.03	123	Carbon dioxide emissions per unit of GDP	90.65	49
			Energy consumption per unit of GDP	92.24	32

Table 99.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	2	0	1	4	7
Ecological Environment Competitiveness	11	0	0	3	8	0
Environment Carrying Competitiveness	15	3	0	7	2	3
Environment Management Competitiveness	10	1	0	4	1	2
Environment Harmony Competitiveness	10	0	0	3	2	5
Total	60	6	0	18	17	17

Chapter 100
Report on Global Environment Competitiveness of Nepal

Nepal is located in in South Asia. It borders the People's Republic of China to the north and to the south, east, and India to the west. Nepal has five climatic zones; broadly corresponding to the altitudes. It covers 143.4 thousand of square kilometers and has a population of 30.49 million. Its GDP reaches $18.88 billion in 2011. Through the index system and evaluation model, the environment competitiveness index of Nepal ranks at 56 in 133 countries.

Score: 51.7
Rank: 56

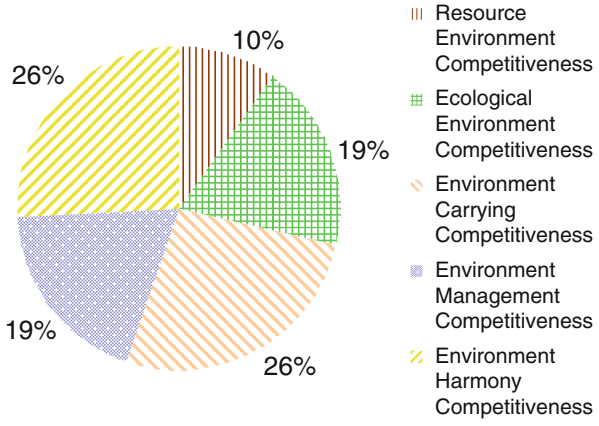

Fig. 100.1 Contribution of sub-index of GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_100,

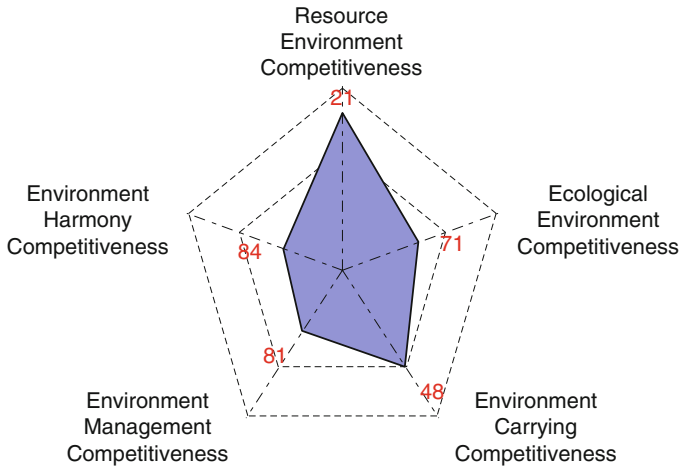

Fig. 100.2 Rank of sub-index of GEC

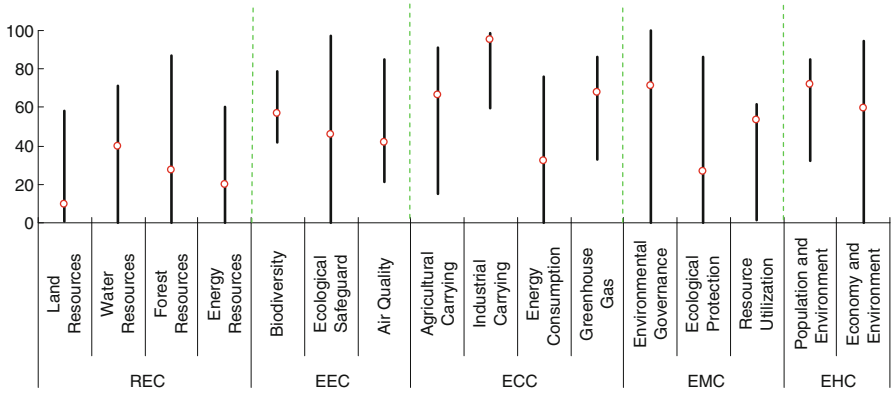

Fig. 100.3 Score and rank of the pillars of GEC

Table 100.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	25.34	21	Total internal renewable water resources	69.73	8
1.1 Land Resources	9.74	87	1.3 Forest Resources	27.72	75
Land area per capita	0.82	114	Growing stock in forest and other wooded land	51.96	52
Percentage of arable land to total land area	27.77	51	Proportion of land area covered by forest	29.71	69
Arable land per capita	3.61	107	Forest area per capita	0.83	93
1.2 Water Resources	39.46	23	1.4 Energy Resources	20.02	13
Surface water	15.83	17	Fossil energy	0.00	64
Annual precipitation	52.23	33	Energy production	0.30	100
Groundwater	20.06	39			

(continued)

Table 100.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
Proportion of combustible renewable and waste to total energy consumption	91.20	3	Ratio of clean energy consumption	4.58	70
Net energy imports of the energy consumption	11.13	52	Elasticity of energy consumption	14.03	55
2 Ecological Environment Competitiveness	47.42	71	Elasticity of electric power consumption	10.78	60
2.1 Biodiversity	56.79	87	3.4 Greenhouse Gas	68.02	28
Threatened fish species	96.70	20	Growth rate of CO_2 emissions	43.71	95
Threatened mammal species	83.15	109	Growth rate of Methane emissions	58.38	69
Threatened plant species	99.88	30	CO_2 emissions per unit of land area	99.97	28
GEF benefits index for biodiversity	2.10	69	CO_2 emissions per unit of energy consumption	94.34	5
2.2 Ecological Safeguard	45.92	19	4 Environment Management Competitiveness	48.22	81
Terrestrial protected areas	45.92	37	4.1 Environmental Governance	71.44	105
Marine protected areas	N/A	N/A	Agricultural chemicals regulation	42.86	80
2.3 Air Quality	41.53	122	Percentage of the rural population with access to an improved water source	88.00	67
Inhalable particles (PM10)	80.29	58	Percentage of the urban population with access to an improved water source	93.00	98
Particulate matter (PM2.5)	41.31	129	4.2 Ecological Protection	26.69	89
Index of indoor air pollution	2.90	113	Area of plantation and afforestation	0.06	96
Nitrogen oxides emission	68.05	57	Biome protect	62.20	63
Sulfur dioxide emission	40.88	41	Overfishing of fishing resources	N/A	N/A
3 Environment Carrying Competitiveness	68.69	48	4.3 Resource Utilization	53.69	8
3.1 Agricultural Carrying	66.78	64	Utilization rate of water resources	0.19	77
Cereal yield per unit of arable land	21.70	85	Percentage of total internal renewable water resources to total water resources	86.10	24
Fertilizer consumption per unit of arable land	99.89	6	Percentage of agricultural land to total land area	35.04	101
Annual freshwater withdrawals for agriculture per unit of arable land	93.77	99	Percentage of fossil fuel energy consumption to total energy consumption	93.44	5
3.2 Industrial Carrying	95.31	15			
Net exports of goods as a percentage of GDP	96.96	3			
Electric power consumption per unit of value added of industry	87.09	95			
SO_2 emissions per unit of value added of industry	99.27	111			
Annual freshwater withdrawals for industry per value added of industry	97.92	60			
3.3 Energy Consumption	32.31	76			
Energy consumption per unit of land area	99.85	51			

(continued)

Table 100.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
5 Environment Harmony Competitiveness	65.67	84	CO_2 emissions per capita	99.78	7
5.1 Population and Environment	71.85	59	Energy consumption per capita	98.43	8
Percentage of population with access to Improved sanitation facilities	31.00	111	5.2 Economy and Environment	59.49	93
Motor vehicles per 1,000 people	99.14	10	Land resource utilization efficiency	0.04	94
Renewable internal freshwater resources per capita	7.87	46	Sulfur dioxide emissions per unit of GDP	91.87	79
SO_2 emissions per capita	99.44	17	Carbon dioxide emissions per unit of GDP	93.50	31
			Energy consumption per unit of GDP	52.55	118

Table 100.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	1	3	4	5	1
Ecological Environment Competitiveness	11	0	3	3	1	4
Environment Carrying Competitiveness	15	2	3	2	7	1
Environment Management Competitiveness	10	1	1	0	6	2
Environment Harmony Competitiveness	10	2	1	3	3	1
Total	60	6	11	12	22	9

Chapter 101
Report on Global Environment Competitiveness of Netherlands

Score: 52.78
Rank: 37

Netherlands locates mainly in North-West Europe and with some islands in the Caribbean. Mainland Netherlands borders the North Sea to the north and west, Belgium to the south, and Germany to the east, and shares maritime borders with Belgium. The predominant wind direction in the Netherlands is southwest, which causes a moderate maritime climate. It covers 33.7 thousand of square kilometers and has a population of 16.69 million. Its GDP reaches $836.07 billion in 2011. Through the index system and evaluation model, the environment competitiveness index of Netherlands ranks at 37 in 133 countries.

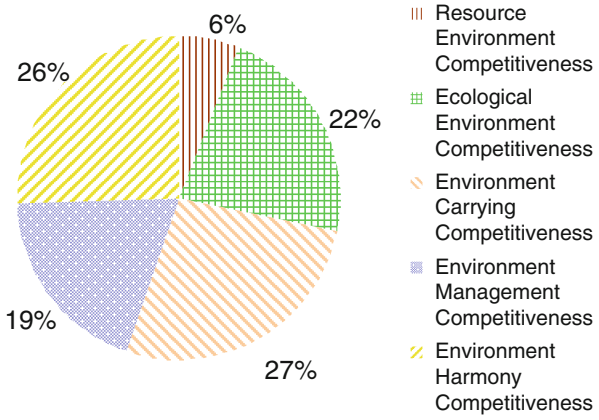

Fig. 101.1 Contribution of sub-index of GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_101,

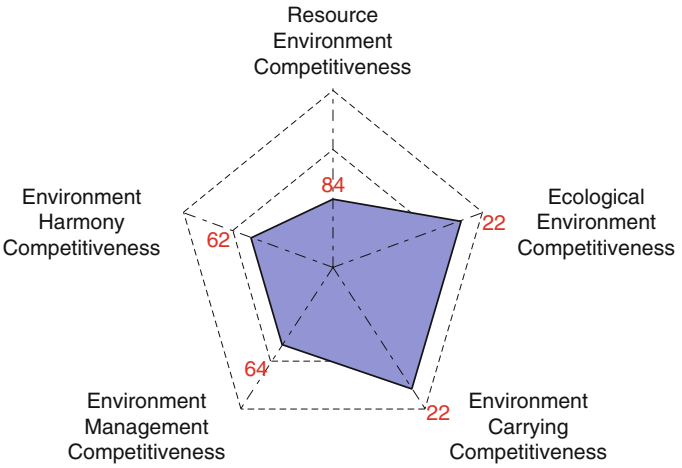

Fig. 101.2 Rank of sub-index of GEC

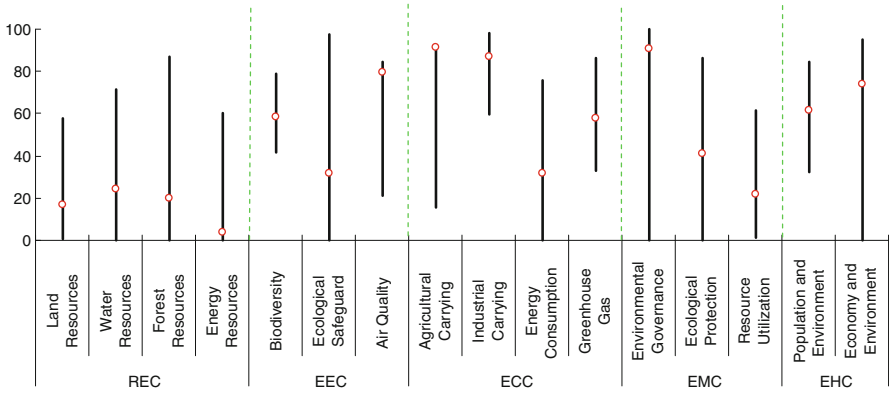

Fig. 101.3 Score and rank of the pillars of GEC

Table 101.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	15.86	84	Groundwater	19.18	41
1.1 Land Resources	16.73	40	Total internal renewable water resources	16.45	59
Land area per capita	0.34	129	1.3 Forest Resources	20.18	101
Percentage of arable land to total land area	52.39	20	Growing stock in forest and other wooded land	50.21	95
Arable land per capita	2.92	112	Proportion of land area covered by forest	12.67	95
1.2 Water Resources	24.31	43	Forest area per capita	0.15	121
Surface water	29.12	3	1.4 Energy Resources	3.96	82
Annual precipitation	32.49	61			

(continued)

Table 101.1 (continued)

Indicators	Score	Rank
Fossil energy	0.00	60
Energy production	4.24	24
Proportion of combustible renewable and waste to total energy consumption	4.45	88
Net energy imports of the energy consumption	10.58	54
2 Ecological Environment Competitiveness	58.80	22
2.1 Biodiversity	58.42	54
Threatened fish species	93.87	36
Threatened mammal species	97.83	17
Threatened plant species	100.00	1
GEF benefits index for biodiversity	0.20	109
2.2 Ecological Safeguard	31.74	41
Terrestrial protected areas	33.42	58
Marine protected areas	29.22	11
2.3 Air Quality	79.38	26
Inhalable particles (PM10)	78.10	69
Particulate matter (PM2.5)	88.77	41
Index of indoor air pollution	100.00	1
Nitrogen oxides emission	65.89	94
Sulfur dioxide emission	40.80	49
3 Environment Carrying Competitiveness	71.47	22
3.1 Agricultural Carrying	91.16	1
Cereal yield per unit of arable land	92.59	3
Fertilizer consumption per unit of arable land	80.51	111
Annual freshwater withdrawals for agriculture per unit of arable land	99.90	20
3.2 Industrial Carrying	87.18	100
Net exports of goods as a percentage of GDP	59.81	117
Electric power consumption per unit of value added of industry	95.09	33
SO_2 emissions per unit of value added of industry	99.99	11
Annual freshwater withdrawals for industry per value added of industry	93.83	98
3.3 Energy Consumption	31.98	85
Energy consumption per unit of land area	94.72	124
Ratio of clean energy consumption	3.37	78
Elasticity of energy consumption	16.73	11
Elasticity of electric power consumption	13.11	26
3.4 Greenhouse Gas	57.84	100
Growth rate of CO_2 emissions	46.47	84
Growth rate of Methane emissions	62.51	35
CO_2 emissions per unit of land area	93.83	129
CO_2 emissions per unit of energy consumption	39.93	71
4 Environment Management Competitiveness	50.05	64
4.1 Environmental Governance	90.48	61
Agricultural chemicals regulation	76.19	62
Percentage of the rural population with access to an improved water source	100.00	1
Percentage of the urban population with access to an improved water source	100.00	1
4.2 Ecological Protection	41.00	40
Area of plantation and afforestation	0.47	58
Biome protect	71.90	53
Overfishing of fishing resources	64.15	28
4.3 Resource Utilization	21.68	124
Utilization rate of water resources	0.47	59
Percentage of total internal renewable water resources to total water resources	11.52	121

(continued)

Table 101.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
Percentage of agricultural land to total land area	67.18	38	SO_2 emissions per capita	98.31	32
Percentage of fossil fuel energy consumption to total energy consumption	7.56	102	CO_2 emissions per capita	69.57	118
			Energy consumption per capita	61.45	111
5 Environment Harmony Competitiveness	67.73	62	5.2 Economy and Environment	73.79	6
5.1 Population and Environment	61.66	114	Land resource utilization efficiency	7.24	2
Percentage of population with access to Improved sanitation facilities	100.00	1	Sulfur dioxide emissions per unit of GDP	99.82	7
Motor vehicles per 1,000 people	35.68	110	Carbon dioxide emissions per unit of GDP	92.97	34
Renewable internal freshwater resources per capita	0.80	110	Energy consumption per unit of GDP	95.16	18

Table 101.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	1	2	4	5	2
Ecological Environment Competitiveness	11	2	2	5	2	0
Environment Carrying Competitiveness	15	2	2	2	5	4
Environment Management Competitiveness	10	1	0	5	2	2
Environment Harmony Competitiveness	10	4	0	2	0	4
Total	60	10	6	18	14	12

Chapter 102
Report on Global Environment Competitiveness of New Zealand

New Zealand is an island country located in the southwestern Pacific Ocean. New Zealand is situated some 1,500 km east of Australia across the Tasman Sea and the coastline is 15,134 km. It covers 263.3 thousand of square kilometers and has a population of 4.405 million. Its GDP reaches $159.71 billion in 2011. Through the index system and evaluation model, the environment competitiveness index of New Zealand ranks at 4 in 133 countries.

Score: 57.67
Rank: 4

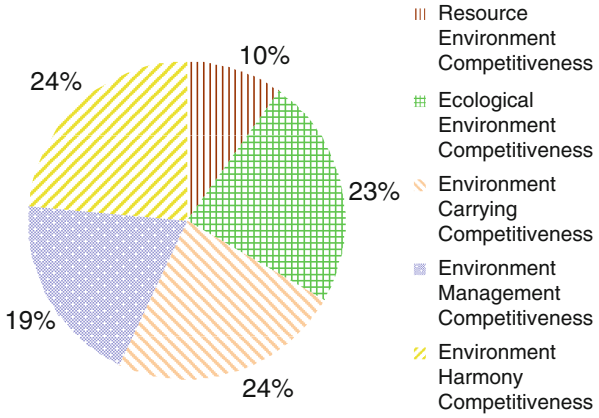

Fig. 102.1 Contribution of sub-index of GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_102,

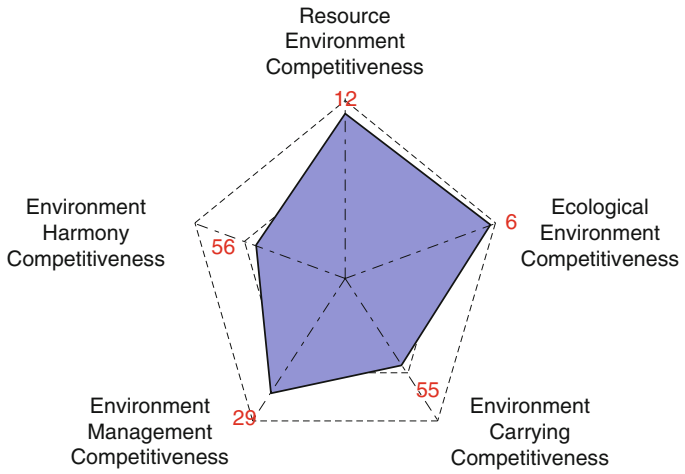

Fig. 102.2 Rank of sub-index of GEC

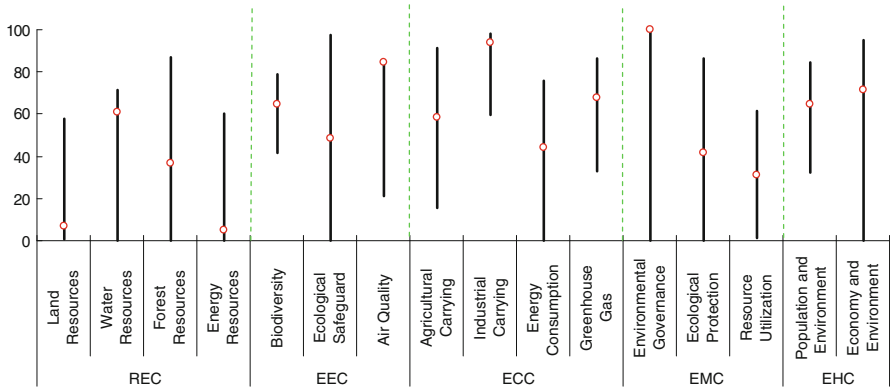

Fig. 102.3 Score and rank of the pillars of GEC

Table 102.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	28.57	12	Groundwater	N/A	N/A
1.1 Land Resources	6.66	110	Total internal renewable water resources	62.63	12
Land area per capita	10.75	24	1.3 Forest Resources	36.88	35
Percentage of arable land to total land area	2.87	119	Growing stock in forest and other wooded land	60.87	14
Arable land per capita	5.00	94	Proportion of land area covered by forest	36.74	56
1.2 Water Resources	61.17	8	Forest area per capita	13.08	18
Surface water	N/A	N/A	1.4 Energy Resources	5.05	70
Annual precipitation	59.71	21			

(continued)

Table 102.1 (continued)

Indicators	Score	Rank
Fossil energy	1.79	28
Energy production	3.90	26
Proportion of combustible renewable and waste to total energy consumption	6.93	70
Net energy imports of the energy consumption	11.74	47
2 Ecological Environment Competitiveness	67.58	6
2.1 Biodiversity	64.71	6
Threatened fish species	89.15	62
Threatened mammal species	95.11	49
Threatened plant species	98.89	78
GEF benefits index for biodiversity	20.20	18
2.2 Ecological Safeguard	48.24	17
Terrestrial protected areas	70.92	12
Marine protected areas	14.21	21
2.3 Air Quality	84.25	2
Inhalable particles (PM10)	91.97	7
Particulate matter (PM2.5)	99.03	8
Index of indoor air pollution	100.00	1
Nitrogen oxides emission	66.25	91
Sulfur dioxide emission	40.73	59
3 Environment Carrying Competitiveness	67.98	55
3.1 Agricultural Carrying	58.34	123
Cereal yield per unit of arable land	79.19	5
Fertilizer consumption per unit of arable land	0.35	129
Annual freshwater withdrawals for agriculture per unit of arable land	88.54	114
3.2 Industrial Carrying	93.76	34
Net exports of goods as a percentage of GDP	85.39	43
Electric power consumption per unit of value added of industry	90.38	80
SO_2 emissions per unit of value added of industry	99.92	33
Annual freshwater withdrawals for industry per value added of industry	99.33	27
3.3 Energy Consumption	43.91	15
Energy consumption per unit of land area	99.86	49
Ratio of clean energy consumption	50.80	8
Elasticity of energy consumption	13.91	67
Elasticity of electric power consumption	11.06	48
3.4 Greenhouse Gas	67.83	30
Growth rate of CO_2 emissions	62.70	29
Growth rate of Methane emissions	58.22	70
CO_2 emissions per unit of land area	99.87	56
CO_2 emissions per unit of energy consumption	55.69	40
4 Environment Management Competitiveness	56.11	29
4.1 Environmental Governance	100.00	1
Agricultural chemicals regulation	100.00	1
Percentage of the rural population with access to an improved water source	100.00	1
Percentage of the urban population with access to an improved water source	100.00	1
4.2 Ecological Protection	41.86	35
Area of plantation and afforestation	2.35	24
Biome protect	83.90	39
Overfishing of fishing resources	52.50	50
4.3 Resource Utilization	31.22	89
Utilization rate of water resources	0.05	107
Percentage of total internal renewable water resources to total water resources	N/A	N/A
Percentage of agricultural land to total land area	51.58	66
Percentage of fossil fuel energy consumption to total energy consumption	42.03	38

(continued)

Table 102.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
5 Environment Harmony Competitiveness	68.13	56	CO_2 emissions per capita	81.01	100
5.1 Population and Environment	64.85	99	Energy consumption per capita	68.20	106
Percentage of population with access to Improved sanitation facilities	N/A	N/A	5.2 Economy and Environment	71.41	22
Motor vehicles per 1,000 people	11.60	130	Land resource utilization efficiency	0.18	51
Renewable internal freshwater resources per capita	89.82	4	Sulfur dioxide emissions per unit of GDP	98.06	27
SO_2 emissions per capita	91.37	90	Carbon dioxide emissions per unit of GDP	93.91	28
			Energy consumption per unit of GDP	93.48	26

Table 102.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	1	5	2	2	2
Ecological Environment Competitiveness	11	5	2	1	3	0
Environment Carrying Competitiveness	15	2	3	5	3	2
Environment Management Competitiveness	10	3	1	2	2	1
Environment Harmony Competitiveness	10	1	3	1	3	1
Total	60	12	14	11	13	6

Chapter 103
Report on Global Environment Competitiveness of Nicaragua

Nicaragua is the largest country in the Central American isthmus, bordered by Honduras to the north and Costa Rica to the south. The country is situated between 11 and 14 degrees north of the Equator in the Northern Hemisphere, which places it entirely within the tropics. It covers 120.3 thousand of square kilometers and has a population of 5.87 million. Its GDP reaches $9.32 billion in 2011. Through the index system and evaluation model, the environment competitiveness index of Nicaragua ranks at 22 in 133 countries.

Score: 54.72
Rank: 22

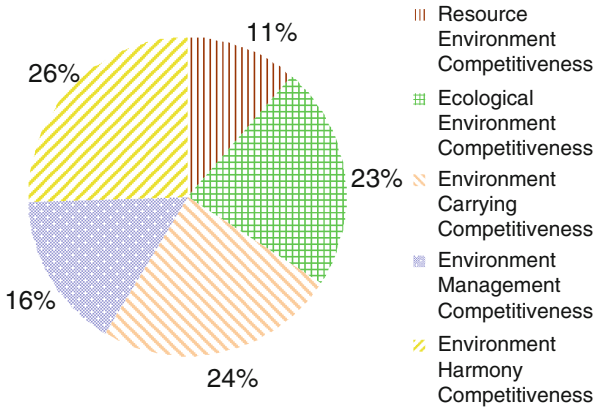

Fig. 103.1 Contribution of sub-index of GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_103,

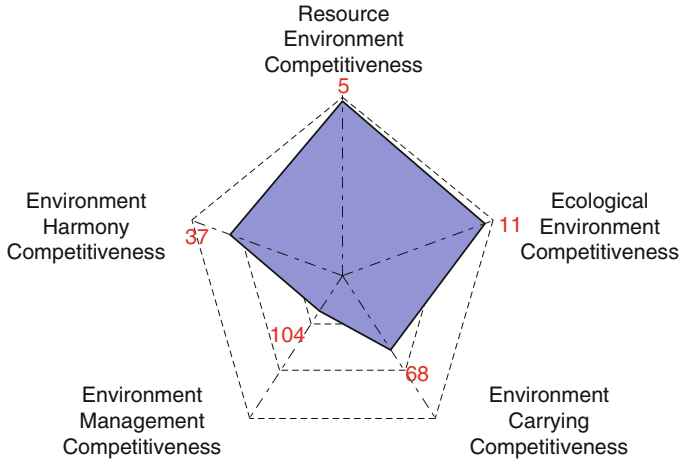

Fig. 103.2 Rank of sub-index of GEC

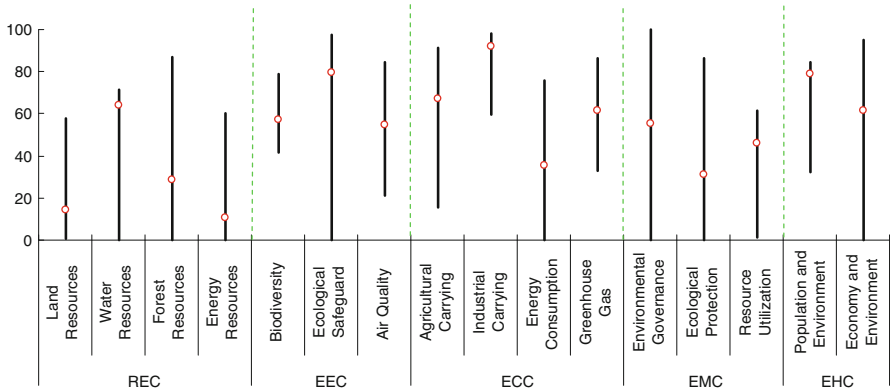

Fig. 103.3 Score and rank of the pillars of GEC

Table 103.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	30.86	5	Groundwater	70.61	6
1.1 Land Resources	14.02	60	Total internal renewable water resources	79.50	6
Land area per capita	3.67	49	1.3 Forest Resources	28.35	73
Percentage of arable land to total land area	26.68	54	Growing stock in forest and other wooded land	51.40	64
Arable land per capita	15.15	29	Proportion of land area covered by forest	29.63	70
1.2 Water Resources	63.80	6	Forest area per capita	3.62	50
Surface water	17.27	12	1.4 Energy Resources	10.83	42
Annual precipitation	87.83	5			

(continued)

Table 103.1 (continued)

Indicators	Score	Rank
Fossil energy	0.00	64
Energy production	0.30	101
Proportion of combustible renewable and waste to total energy consumption	48.40	26
Net energy imports of the energy consumption	6.94	82
2 Ecological Environment Competitiveness	62.77	11
2.1 Biodiversity	57.37	79
Threatened fish species	85.85	76
Threatened mammal species	96.74	30
Threatened plant species	97.67	94
GEF benefits index for biodiversity	3.30	59
2.2 Ecological Safeguard	79.38	4
Terrestrial protected areas	99.46	3
Marine protected areas	49.27	3
2.3 Air Quality	54.36	81
Inhalable particles (PM10)	84.67	42
Particulate matter (PM2.5)	92.59	25
Index of indoor air pollution	8.40	97
Nitrogen oxides emission	68.30	47
Sulfur dioxide emission	40.92	23
3 Environment Carrying Competitiveness	66.94	68
3.1 Agricultural Carrying	66.94	63
Cereal yield per unit of arable land	19.34	87
Fertilizer consumption per unit of arable land	98.21	39
Annual freshwater withdrawals for agriculture per unit of arable land	99.14	59
3.2 Industrial Carrying	91.78	62
Net exports of goods as a percentage of GDP	80.23	70
Electric power consumption per unit of value added of industry	88.93	87
SO_2 emissions per unit of value added of industry	99.58	97
Annual freshwater withdrawals for industry per value added of industry	98.40	54
3.3 Energy Consumption	35.39	44
Energy consumption per unit of land area	99.95	26
Ratio of clean energy consumption	16.06	39
Elasticity of energy consumption	13.44	97
Elasticity of electric power consumption	12.12	31
3.4 Greenhouse Gas	61.20	70
Growth rate of CO_2 emissions	42.51	99
Growth rate of Methane emissions	57.43	75
CO_2 emissions per unit of land area	99.96	34
CO_2 emissions per unit of energy consumption	63.59	31
4 Environment Management Competitiveness	43.01	104
4.1 Environmental Governance	55.51	124
Agricultural chemicals regulation	14.29	84
Percentage of the rural population with access to an improved water source	68.00	92
Percentage of the urban population with access to an improved water source	98.00	70
4.2 Ecological Protection	31.26	78
Area of plantation and afforestation	0.10	86
Biome protect	91.10	23
Overfishing of fishing resources	12.96	101
4.3 Resource Utilization	46.18	25
Utilization rate of water resources	0.02	120
Percentage of total internal renewable water resources to total water resources	75.40	48
Percentage of agricultural land to total land area	50.55	68
Percentage of fossil fuel energy consumption to total energy consumption	58.77	26

(continued)

Table 103.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
5 Environment Harmony Competitiveness	70.03	37	CO_2 emissions per capita	98.02	31
5.1 Population and Environment	78.81	23	Energy consumption per capita	96.84	26
Percentage of population with access to Improved sanitation facilities	52.00	95	5.2 Economy and Environment	61.24	85
Motor vehicles per 1,000 people	93.09	40	Land resource utilization efficiency	0.02	101
Renewable internal freshwater resources per capita	39.10	9	Sulfur dioxide emissions per unit of GDP	89.67	88
SO_2 emissions per capita	98.02	39	Carbon dioxide emissions per unit of GDP	81.35	90
			Energy consumption per unit of GDP	73.90	92

Table 103.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	3	2	4	4	1
Ecological Environment Competitiveness	11	2	2	2	5	0
Environment Carrying Competitiveness	15	0	1	4	10	0
Environment Management Competitiveness	10	0	2	1	5	2
Environment Harmony Competitiveness	10	1	1	3	4	1
Total	60	6	8	14	28	4

Chapter 104
Report on Global Environment Competitiveness of The Republic of Niger

Niger is a landlocked country in Western Africa, named after the Niger River. It borders Nigeria and Benin to the south, Burkina Faso and Mali to the west, Algeria and Libya to the north and Chad to the east. It covers 1,266.7 thousand of square kilometers and has a population of 16.07 million. Its GDP reaches $6.02 billion in 2011. Through the index system and evaluation model, the environment competitiveness index of The Republic of Niger ranks at 133 in 133 countries.

Score: 32.27
Rank: 133

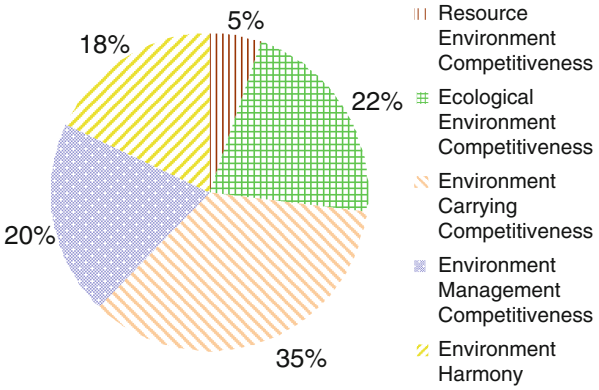

Fig. 104.1 Contribution of sub-index of GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_104,

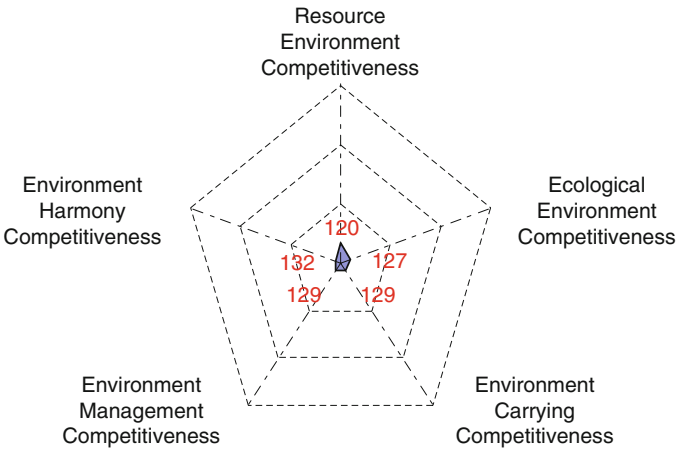

Fig. 104.2 Rank of sub-index of GEC

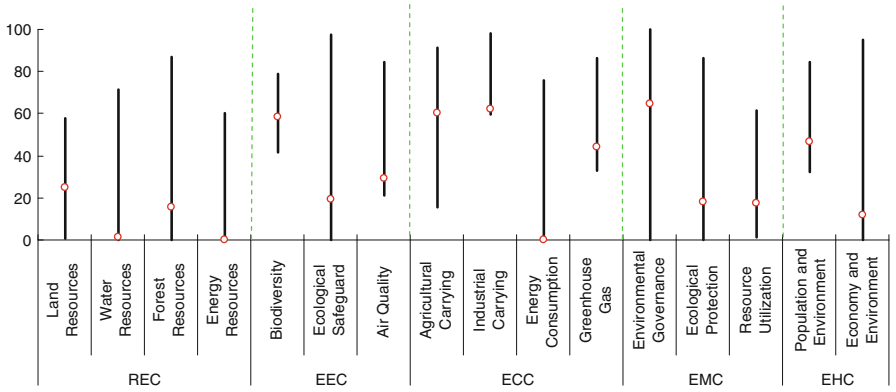

Fig. 104.3 Score and rank of the pillars of GEC

Table 104.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	8.49	120	Groundwater	0.24	120
1.1 Land Resources	24.70	18	Total internal renewable water resources	0.14	127
Land area per capita	14.19	15	1.3 Forest Resources	15.61	117
Percentage of arable land to total land area	19.88	69	Growing stock in forest and other wooded land	50.04	107
Arable land per capita	43.53	5	Proportion of land area covered by forest	1.10	123
1.2 Water Resources	1.44	123	Forest area per capita	0.52	103
Surface water	0.27	115	1.4 Energy Resources	0.00	125
Annual precipitation	5.12	121			

(continued)

Table 104.1 (continued)

Indicators	Score	Rank
Fossil energy	0.00	64
Energy production	N/A	N/A
Proportion of combustible renewable and waste to total energy consumption	N/A	N/A
Net energy imports of the energy consumption	N/A	N/A
2 Ecological Environment Competitiveness	34.89	127
2.1 Biodiversity	58.65	44
Threatened fish species	98.11	13
Threatened mammal species	93.48	72
Threatened plant species	99.88	30
GEF benefits index for biodiversity	0.90	84
2.2 Ecological Safeguard	19.02	71
Terrestrial protected areas	19.02	80
Marine protected areas	N/A	N/A
2.3 Air Quality	28.96	129
Inhalable particles (PM10)	29.93	127
Particulate matter (PM2.5)	69.00	111
Index of indoor air pollution	0.10	129
Nitrogen oxides emission	N/A	N/A
Sulfur dioxide emission	32.03	126
3 Environment Carrying Competitiveness	57.06	129
3.1 Agricultural Carrying	60.47	115
Cereal yield per unit of arable land	1.32	130
Fertilizer consumption per unit of arable land	100.00	1
Annual freshwater withdrawals for agriculture per unit of arable land	99.79	34
3.2 Industrial Carrying	62.29	132
Net exports of goods as a percentage of GDP	90.38	22
Electric power consumption per unit of value added of industry	N/A	N/A
SO_2 emissions per unit of value added of industry	0.00	131
Annual freshwater withdrawals for industry per value added of industry	96.50	79
3.3 Energy Consumption	N/A	N/A
Energy consumption per unit of land area	N/A	N/A
Ratio of clean energy consumption	0.00	116
Elasticity of energy consumption	N/A	N/A
Elasticity of electric power consumption	N/A	N/A
3.4 Greenhouse Gas	44.12	128
Growth rate of CO_2 emissions	16.18	131
Growth rate of Methane emissions	N/A	N/A
CO_2 emissions per unit of land area	100.00	2
CO_2 emissions per unit of energy consumption	N/A	N/A
4 Environment Management Competitiveness	31.70	129
4.1 Environmental Governance	64.56	113
Agricultural chemicals regulation	57.14	74
Percentage of the rural population with access to an improved water source	39.00	116
Percentage of the urban population with access to an improved water source	100.00	1
4.2 Ecological Protection	17.94	108
Area of plantation and afforestation	0.19	76
Biome protect	41.60	82
Overfishing of fishing resources	N/A	N/A
4.3 Resource Utilization	17.18	128
Utilization rate of water resources	0.28	68
Percentage of total internal renewable water resources to total water resources	10.40	122
Percentage of agricultural land to total land area	40.85	87
Percentage of fossil fuel energy consumption to total energy consumption	N/A	N/A

(continued)

Table 104.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
5 Environment Harmony Competitiveness	29.19	132	CO_2 emissions per capita	99.87	4
5.1 Population and Environment	46.29	131	Energy consumption per capita	N/A	N/A
Percentage of population with access to Improved sanitation facilities	9.00	129	5.2 Economy and Environment	12.10	132
Motor vehicles per 1,000 people	99.26	9	Land resource utilization efficiency	0.00	132
Renewable internal freshwater resources per capita	0.26	122	Sulfur dioxide emissions per unit of GDP	0.00	131
SO_2 emissions per capita	17.82	129	Carbon dioxide emissions per unit of GDP	92.41	36
			Energy consumption per unit of GDP	N/A	N/A

Table 104.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	0	2	0	2	8
Ecological Environment Competitiveness	11	0	2	1	3	4
Environment Carrying Competitiveness	15	2	1	0	0	7
Environment Management Competitiveness	10	0	0	0	5	5
Environment Harmony Competitiveness	10	2	0	1	0	7
Total	60	4	5	2	10	31

Chapter 105
Report on Global Environment Competitiveness of Nigeria

Nigeria is located in West Africa and shares land borders with the Republic of Benin in the west, Chad and Cameroon in the east, and Niger in the north. Its coast in the south lies on the Gulf of Guinea on the Atlantic Ocean. It covers 910.8 thousand of square kilometers and has a population of 162.47 million. Its GDP reaches $243.99 billion in 2011. Through the index system and evaluation model, the environment competitiveness index of Nigeria ranks at 80 in 133 countries.

Score: 48.54
Rank: 80

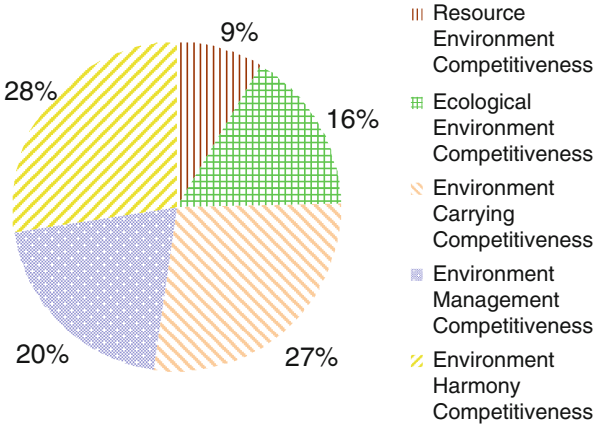

Fig. 105.1 Contribution of sub-index of GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_105,

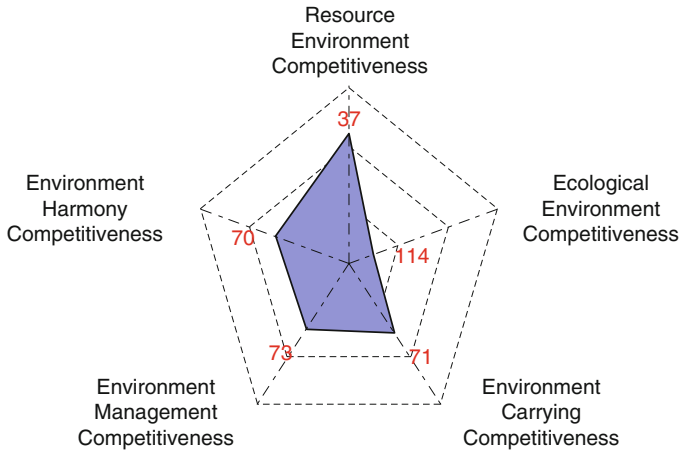

Fig. 105.2 Rank of sub-index of GEC

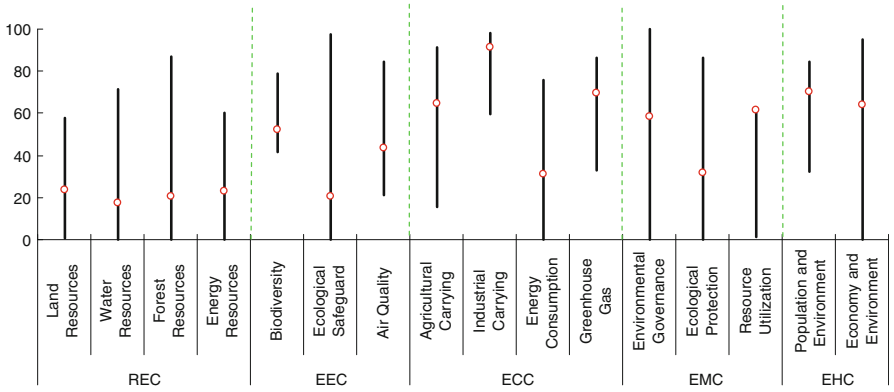

Fig. 105.3 Score and rank of the pillars of GEC

Table 105.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	20.94	37	Groundwater	13.72	52
1.1 Land Resources	23.62	21	Total internal renewable water resources	12.24	72
Land area per capita	0.99	109	1.3 Forest Resources	20.61	98
Percentage of arable land to total land area	67.05	9	Growing stock in forest and other wooded land	53.52	39
Arable land per capita	10.37	57	Proportion of land area covered by forest	11.10	99
1.2 Water Resources	17.20	58	Forest area per capita	0.37	108
Surface water	3.31	69	1.4 Energy Resources	23.11	9
Annual precipitation	39.54	48			

(continued)

Table 105.1 (continued)

Indicators	Score	Rank
Fossil energy	0.62	35
Energy production	1.65	44
Proportion of combustible renewable and waste to total energy consumption	89.86	4
Net energy imports of the energy consumption	29.19	18
2 Ecological Environment Competitiveness	39.11	114
2.1 Biodiversity	52.01	125
Threatened fish species	72.17	110
Threatened mammal species	85.87	105
Threatened plant species	90.02	115
GEF benefits index for biodiversity	6.00	42
2.2 Ecological Safeguard	20.76	66
Terrestrial protected areas	34.51	57
Marine protected areas	0.13	88
2.3 Air Quality	43.20	118
Inhalable particles (PM10)	72.26	84
Particulate matter (PM2.5)	58.80	122
Index of indoor air pollution	4.20	108
Nitrogen oxides emission	64.40	102
Sulfur dioxide emission	40.42	77
3 Environment Carrying Competitiveness	66.86	71
3.1 Agricultural Carrying	64.58	89
Cereal yield per unit of arable land	11.74	106
Fertilizer consumption per unit of arable land	99.83	8
Annual freshwater withdrawals for agriculture per unit of arable land	99.77	36
3.2 Industrial Carrying	91.16	72
Net exports of goods as a percentage of GDP	67.54	105
Electric power consumption per unit of value added of industry	98.89	6
SO_2 emissions per unit of value added of industry	99.95	29
Annual freshwater withdrawals for industry per value added of industry	98.25	55
3.3 Energy Consumption	31.16	103
Energy consumption per unit of land area	99.74	74
Ratio of clean energy consumption	0.61	103
Elasticity of energy consumption	14.03	56
Elasticity of electric power consumption	10.27	84
3.4 Greenhouse Gas	69.54	22
Growth rate of CO_2 emissions	41.04	105
Growth rate of Methane emissions	72.73	9
CO_2 emissions per unit of land area	99.94	41
CO_2 emissions per unit of energy consumption	92.94	6
4 Environment Management Competitiveness	48.75	73
4.1 Environmental Governance	58.50	122
Agricultural chemicals regulation	N/A	N/A
Percentage of the rural population with access to an improved water source	43.00	113
Percentage of the urban population with access to an improved water source	74.00	125
4.2 Ecological Protection	31.79	74
Area of plantation and afforestation	0.50	57
Biome protect	75.90	51
Overfishing of fishing resources	29.41	89
4.3 Resource Utilization	61.61	2
Utilization rate of water resources	0.14	84
Percentage of total internal renewable water resources to total water resources	60.35	74
Percentage of agricultural land to total land area	96.69	2
Percentage of fossil fuel energy consumption to total energy consumption	89.24	7

(continued)

Table 105.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
5 Environment Harmony Competitiveness	67.05	70	CO_2 emissions per capita	99.33	17
5.1 Population and Environment	70.08	68	Energy consumption per capita	95.48	37
Percentage of population with access to Improved sanitation facilities	32.00	110	5.2 Economy and Environment	64.03	75
Motor vehicles per 1,000 people	96.42	29	Land resource utilization efficiency	0.08	78
Renewable internal freshwater resources per capita	1.65	88	Sulfur dioxide emissions per unit of GDP	97.36	33
SO_2 emissions per capita	99.50	15	Carbon dioxide emissions per unit of GDP	94.60	18
			Energy consumption per unit of GDP	64.09	109

Table 105.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	3	1	6	3	1
Ecological Environment Competitiveness	11	0	0	1	2	8
Environment Carrying Competitiveness	15	3	2	2	3	5
Environment Management Competitiveness	10	2	0	2	3	2
Environment Harmony Competitiveness	10	0	4	1	4	1
Total	60	8	7	12	15	17

Chapter 106
Report on Global Environment Competitiveness of Norway

Officially the Kingdom of Norway, is a Nordic unitary constitutional monarchy whose territory comprises the western portion of the Scandinavian Peninsula, Jan Mayen, the Arctic archipelago of Svalbard and the sub Antarctic Bouvet Island. It covers 305.5 thousand of square kilometers and has a population of 4.95 million. Its GDP reaches $485.80 billion in 2011. Through the index system and evaluation model, the environment competitiveness index of Norway ranks at 3 in 133 countries.

Score: 58.20
Rank: 3

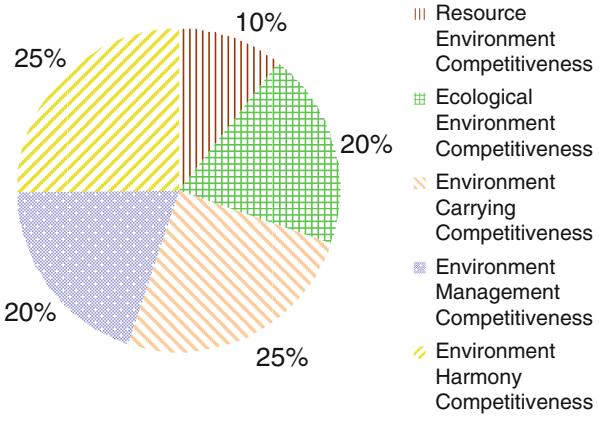

Fig. 106.1 Contribution of sub-index to GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_106,

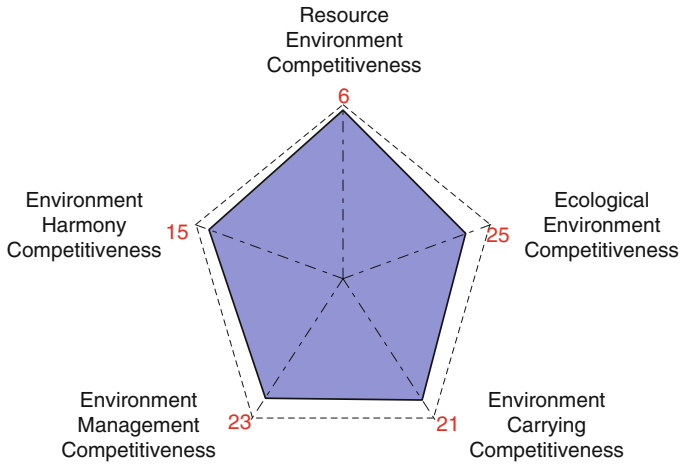

Fig. 106.2 Rank of sub-index of GEC

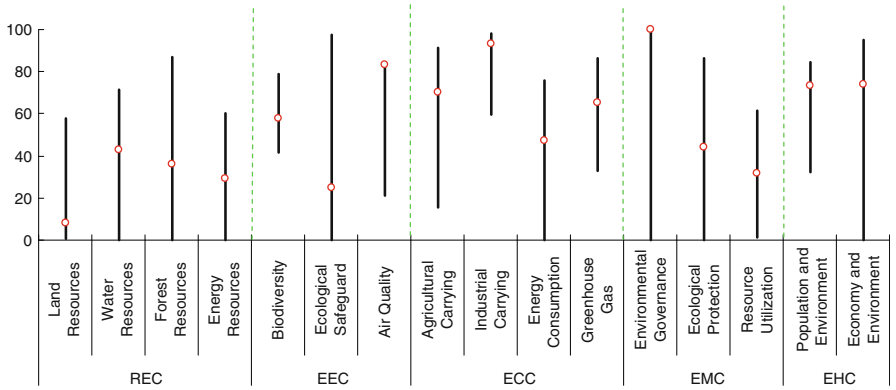

Fig. 106.3 Score and rank of the pillars of GEC

Table 106.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	30.43	6	Annual precipitation	50.82	36
1.1 Land Resources	8.07	99	Groundwater	45.25	12
Land area per capita	11.09	22	Total internal renewable water resources	63.07	11
Percentage of arable land to total land area	4.39	115	1.3 Forest Resources	35.80	39
Arable land per capita	7.72	71	Growing stock in forest and other wooded land	52.99	41
1.2 Water Resources	43.10	17	Proportion of land area covered by forest	39.04	50
Surface water	13.29	22			

(continued)

Table 106.1 (continued)

Indicators	Score	Rank
Forest area per capita	14.28	17
1.4 Energy Resources	29.09	3
Fossil energy	3.20	21
Energy production	42.46	4
Proportion of combustible renewable and waste to total energy consumption	5.49	78
Net energy imports of the energy consumption	81.16	4
2 Ecological Environment Competitiveness	58.06	25
2.1 Biodiversity	57.94	68
Threatened fish species	91.04	47
Threatened mammal species	96.20	37
Threatened plant species	99.88	30
GEF benefits index for biodiversity	1.30	78
2.2 Ecological Safeguard	24.86	57
Terrestrial protected areas	39.40	49
Marine protected areas	3.05	55
2.3 Air Quality	83.05	8
Inhalable particles (PM10)	88.32	23
Particulate matter (PM2.5)	95.22	13
Index of indoor air pollution	100.00	1
Nitrogen oxides emission	68.00	60
Sulfur dioxide emission	40.93	21
3 Environment Carrying Competitiveness	71.54	21
3.1 Agricultural Carrying	70.37	43
Cereal yield per unit of arable land	38.72	45
Fertilizer consumption per unit of arable land	84.53	103
Annual freshwater withdrawals for agriculture per unit of arable land	98.43	69
3.2 Industrial Carrying	93.24	45
Net exports of goods as a percentage of GDP	79.23	76
Electric power consumption per unit of value added of industry	94.50	40
SO_2 emissions per unit of value added of industry	100.00	3
Annual freshwater withdrawals for industry per value added of industry	99.23	32
3.3 Energy Consumption	47.11	8
Energy consumption per unit of land area	99.78	66
Ratio of clean energy consumption	66.09	5
Elasticity of energy consumption	12.60	114
Elasticity of electric power consumption	9.95	95
3.4 Greenhouse Gas	65.18	41
Growth rate of CO_2 emissions	47.44	81
Growth rate of Methane emissions	61.35	43
CO_2 emissions per unit of land area	99.86	59
CO_2 emissions per unit of energy consumption	69.81	23
4 Environment Management Competitiveness	57.11	23
4.1 Environmental Governance	100.00	1
Agricultural chemicals regulation	100.00	1
Percentage of the rural population with access to an improved water source	100.00	1
Percentage of the urban population with access to an improved water source	100.00	1
4.2 Ecological Protection	44.07	27
Area of plantation and afforestation	1.91	29
Biome protect	74.50	52
Overfishing of fishing resources	69.86	19
4.3 Resource Utilization	31.61	86
Utilization rate of water resources	0.03	116

(continued)

Table 106.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
Percentage of total internal renewable water resources to total water resources	80.93	34	Renewable internal freshwater resources per capita	93.32	3
Percentage of agricultural land to total land area	3.92	132	SO_2 emissions per capita	97.84	45
Percentage of fossil fuel energy consumption to total energy consumption	41.55	39	CO_2 emissions per capita	78.38	105
5 Environment Harmony Competitiveness	73.86	15	Energy consumption per capita	48.68	118
5.1 Population and Environment	73.51	46	5.2 Economy and Environment	74.21	5
Percentage of population with access to Improved sanitation facilities	100.00	1	Land resource utilization efficiency	0.46	30
Motor vehicles per 1,000 people	28.89	122	Sulfur dioxide emissions per unit of GDP	99.90	3
			Carbon dioxide emissions per unit of GDP	98.92	3
			Energy consumption per unit of GDP	97.57	4

Table 106.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	2	5	4	2	1
Ecological Environment Competitiveness	11	2	3	5	1	0
Environment Carrying Competitiveness	15	3	0	7	3	2
Environment Management Competitiveness	10	3	2	2	1	2
Environment Harmony Competitiveness	10	5	1	2	0	2
Total	60	15	11	20	7	7

Chapter 107
Report on Global Environment Competitiveness of Oman

Oman is an Arab state in southwest Asia on the southeast coast of the Arabian Peninsula. It is bordered by the United Arab Emirates to the northwest, Saudi Arabia to the west, and Yemen to the southwest. It covers 309.5 thousand of square kilometers and has a population of 2.85 million. Its GDP reaches $71.78 billion in 2011. Through the index system and evaluation model, the environment competitiveness index of Oman ranks at 109 in 133 countries.

Score: 46.02
Rank: 109

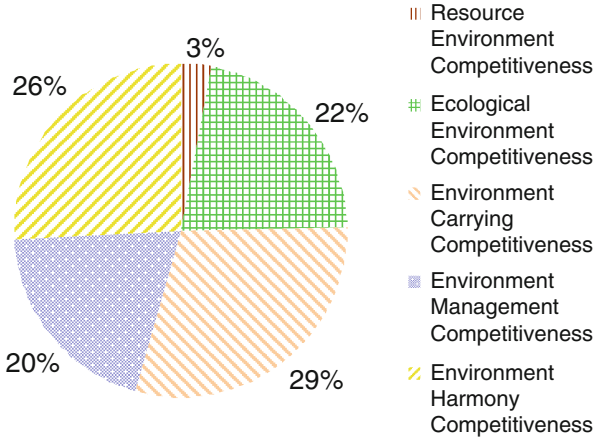

Fig. 107.1 Contribution of sub-index to GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_107,

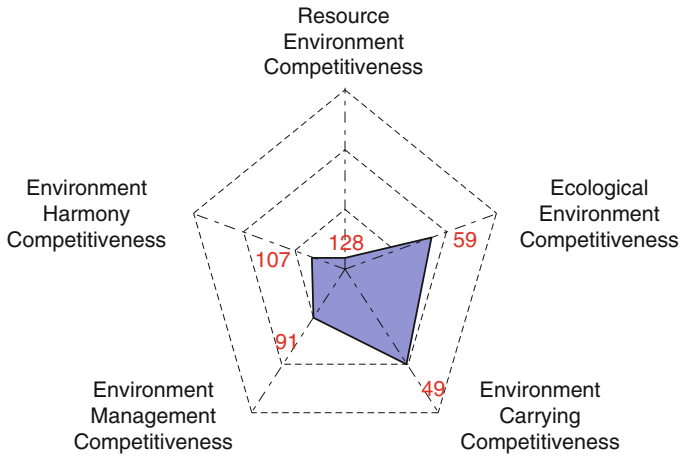

Fig. 107.2 Rank of sub-index of GEC

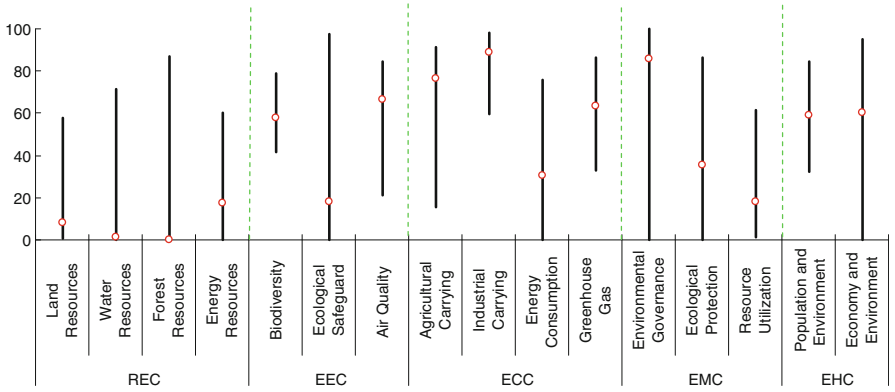

Fig. 107.3 Score and rank of the pillars of GEC

Table 107.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	7.25	128	Groundwater	0.56	113
1.1 Land Resources	7.99	100	Total internal renewable water resources	0.23	123
Land area per capita	19.58	11	1.3 Forest Resources	0.00	132
Percentage of arable land to total land area	0.00	133	Growing stock in forest and other wooded land	0.00	121
Arable land per capita	0.52	129	Proportion of land area covered by forest	0.01	130
1.2 Water Resources	1.27	125	Forest area per capita	0.00	130
Surface water	0.04	123	1.4 Energy Resources	17.57	22
Annual precipitation	4.24	122			

(continued)

Table 107.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
Fossil energy	4.92	18	Energy consumption per unit of land area	99.87	48
Energy production	26.19	5	Ratio of clean energy consumption	0.00	116
Proportion of combustible renewable and waste to total energy consumption	0.00	120	Elasticity of energy consumption	12.26	117
Net energy imports of the energy consumption	46.16	10	Elasticity of electric power consumption	10.61	73
2 Ecological Environment Competitiveness	49.48	59	3.4 Greenhouse Gas	63.48	53
2.1 Biodiversity	57.98	67	Growth rate of CO_2 emissions	59.10	39
Threatened fish species	87.74	70	Growth rate of Methane emissions	52.82	102
Threatened mammal species	95.11	49	CO_2 emissions per unit of land area	99.86	61
Threatened plant species	99.65	51	CO_2 emissions per unit of energy consumption	46.52	54
GEF benefits index for biodiversity	3.70	54	4 Environment Management Competitiveness	45.19	91
2.2 Ecological Safeguard	17.92	75	4.1 Environmental Governance	85.50	76
Terrestrial protected areas	28.80	66	Agricultural chemicals regulation	N/A	N/A
Marine protected areas	1.59	67	Percentage of the rural population with access to an improved water source	78.00	82
2.3 Air Quality	66.77	51	Percentage of the urban population with access to an improved water source	93.00	98
Inhalable particles (PM10)	30.66	126	4.2 Ecological Protection	35.49	61
Particulate matter (PM2.5)	71.14	107	Area of plantation and afforestation	0.00	115
Index of indoor air pollution	100.00	1	Biome protect	62.20	63
Nitrogen oxides emission	68.89	10	Overfishing of fishing resources	56.10	44
Sulfur dioxide emission	40.49	75	4.3 Resource Utilization	17.80	127
3 Environment Carrying Competitiveness	68.49	49	Utilization rate of water resources	3.51	14
3.1 Agricultural Carrying	76.43	22	Percentage of total internal renewable water resources to total water resources	59.57	77
Cereal yield per unit of arable land	97.25	2	Percentage of agricultural land to total land area	7.01	129
Fertilizer consumption per unit of arable land	80.88	109	Percentage of fossil fuel energy consumption to total energy consumption	1.12	124
Annual freshwater withdrawals for agriculture per unit of arable land	44.24	128			
3.2 Industrial Carrying	89.09	89			
Net exports of goods as a percentage of GDP	58.93	118			
Electric power consumption per unit of value added of industry	97.57	10			
SO_2 emissions per unit of value added of industry	99.89	42			
Annual freshwater withdrawals for industry per value added of industry	99.97	5			
3.3 Energy Consumption	30.68	112			

(continued)

Table 107.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
5 Environment Harmony Competitiveness	59.72	107	CO_2 emissions per capita	60.84	124
5.1 Population and Environment	59.11	120	Energy consumption per capita	44.33	121
Percentage of population with access to Improved sanitation facilities	87.00	67	5.2 Economy and Environment	60.33	89
Motor vehicles per 1,000 people	73.70	84	Land resource utilization efficiency	0.07	83
Renewable internal freshwater resources per capita	0.60	115	Sulfur dioxide emissions per unit of GDP	90.56	86
SO_2 emissions per capita	74.00	119	Carbon dioxide emissions per unit of GDP	74.64	100
			Energy consumption per unit of GDP	76.04	88

Table 107.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Rvesource Environment Competitiveness	14	1	3	0	1	9
Ecological Environment Competitiveness	11	2	0	3	4	2
Environment Carrying Competitiveness	15	2	1	4	2	6
Environment Management Competitiveness	10	0	1	0	5	3
Environment Harmony Competitiveness	10	0	0	0	6	4
Total	60	5	5	7	18	24

Chapter 108
Report on Global Environment Competitiveness of Pakistan

Pakistan is located in the South Asia, it is bordered by India to the east, Afghanistan to the west and north, Iran to the west and China in the far northeast. The coastline of Pakistan is 1,046 km. It covers 770.9 thousand of square kilometers and has a population of 176.75 million. Its GDP reaches $210.22 billion in 2011. Through the index system and evaluation model, the environment competitiveness index of Pakistan ranks at 112 in 133 countries.

Score: 45.21
Rank: 112

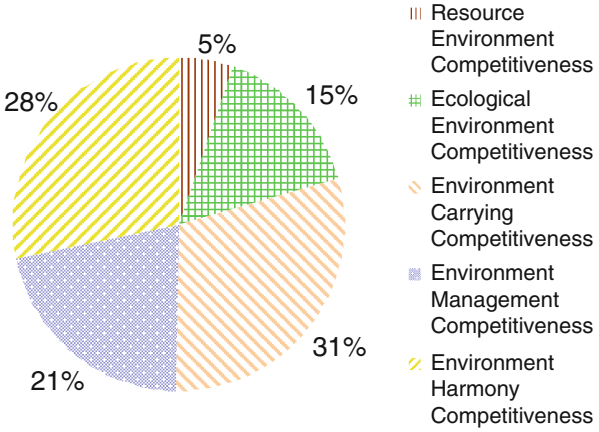

Fig. 108.1 Contribution of sub-index to GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_108,

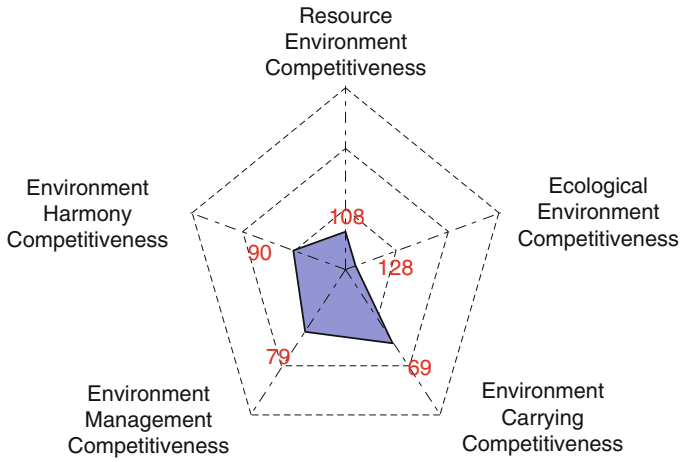

Fig. 108.2 Rank of sub-index of GEC

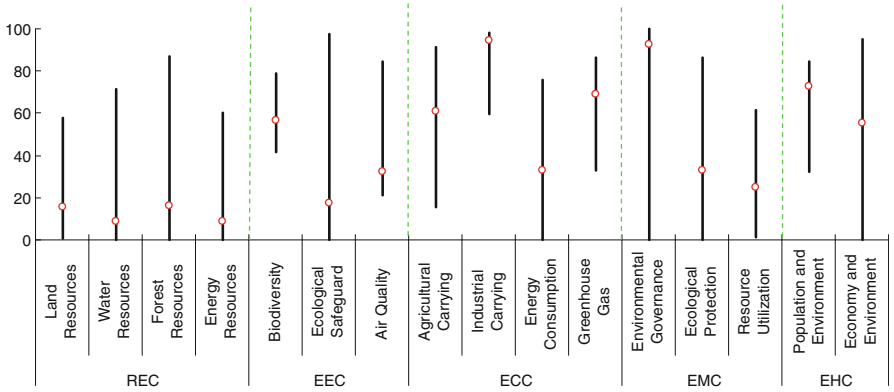

Fig. 108.3 Score and rank of the pillars of GEC

Table 108.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	11.69	108	Groundwater	10.24	67
1.1 Land Resources	15.61	48	Total internal renewable water resources	3.60	102
Land area per capita	0.76	115	1.3 Forest Resources	16.16	115
Percentage of arable land to total land area	45.53	26	Growing stock in forest and other wooded land	50.48	86
Arable land per capita	5.48	91	Proportion of land area covered by forest	2.50	117
1.2 Water Resources	8.88	98	Forest area per capita	0.06	127
Surface water	4.38	61	1.4 Energy Resources	8.92	48
Annual precipitation	17.30	100			

(continued)

Table 108.1 (continued)

Indicators	Score	Rank
Fossil energy	0.16	51
Energy production	0.37	97
Proportion of combustible renewable and waste to total energy consumption	36.51	28
Net energy imports of the energy consumption	9.60	62
2 Ecological Environment Competitiveness	34.85	128
2.1 Biodiversity	56.23	95
Threatened fish species	83.96	79
Threatened mammal species	87.50	102
Threatened plant species	99.88	30
GEF benefits index for biodiversity	4.90	49
2.2 Ecological Safeguard	17.21	78
Terrestrial protected areas	27.17	69
Marine protected areas	2.26	60
2.3 Air Quality	32.06	127
Inhalable particles (PM10)	33.58	124
Particulate matter (PM2.5)	36.59	131
Index of indoor air pollution	9.20	94
Nitrogen oxides emission	63.27	111
Sulfur dioxide emission	38.48	108
3 Environment Carrying Competitiveness	66.90	69
3.1 Agricultural Carrying	60.94	112
Cereal yield per unit of arable land	25.05	78
Fertilizer consumption per unit of arable land	82.43	107
Annual freshwater withdrawals for agriculture per unit of arable land	87.29	115
3.2 Industrial Carrying	94.19	27
Net exports of goods as a percentage of GDP	92.37	12
Electric power consumption per unit of value added of industry	87.88	92
SO_2 emissions per unit of value added of industry	99.51	102
Annual freshwater withdrawals for industry per value added of industry	97.02	71
3.3 Energy Consumption	32.75	70
Energy consumption per unit of land area	99.77	67
Ratio of clean energy consumption	6.33	64
Elasticity of energy consumption	14.10	47
Elasticity of electric power consumption	10.83	58
3.4 Greenhouse Gas	69.04	25
Growth rate of CO_2 emissions	64.94	26
Growth rate of Methane emissions	56.80	81
CO_2 emissions per unit of land area	99.81	65
CO_2 emissions per unit of energy consumption	58.70	35
4 Environment Management Competitiveness	48.49	79
4.1 Environmental Governance	92.50	53
Agricultural chemicals regulation	N/A	N/A
Percentage of the rural population with access to an improved water source	89.00	65
Percentage of the urban population with access to an improved water source	96.00	89
4.2 Ecological Protection	33.15	69
Area of plantation and afforestation	0.44	60
Biome protect	58.90	67
Overfishing of fishing resources	51.02	54
4.3 Resource Utilization	24.92	118
Utilization rate of water resources	3.22	15
Percentage of total internal renewable water resources to total water resources	14.97	117
Percentage of agricultural land to total land area	40.30	89
Percentage of fossil fuel energy consumption to total energy consumption	41.20	40

(continued)

Table 108.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
5 Environment Harmony Competitiveness	64.13	90	CO_2 emissions per capita	98.01	32
			Energy consumption per capita	97.27	23
5.1 Population and Environment	72.77	53	5.2 Economy and Environment	55.49	100
Percentage of population with access to Improved sanitation facilities	45.00	103	Land resource utilization efficiency	0.08	75
			Sulfur dioxide emissions per unit of GDP	84.65	105
Motor vehicles per 1,000 people	98.64	14	Carbon dioxide emissions per unit of GDP	71.95	107
Renewable internal freshwater resources per capita	0.38	119	Energy consumption per unit of GDP	65.30	107
SO_2 emissions per capita	97.95	41			

Table 108.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	0	2	3	6	3
Ecological Environment Competitiveness	11	0	1	0	5	5
Environment Carrying Competitiveness	15	0	4	1	7	3
Environment Management Competitiveness	10	0	1	2	4	2
Environment Harmony Competitiveness	10	0	1	3	2	4
Total	60	0	9	9	24	17

Chapter 109
Report on Global Environment Competitiveness of Panama

Score: 54.52
Rank: 23

Panama is the southernmost country of Central America. Situated on the isthmus connecting North and South America, it is bordered by Costa Rica to the west, Colombia to the southeast, the Caribbean to the north and the Pacific Ocean to the south. It covers 74.3 thousand of square kilometers and has a population of 3.57 million. Its GDP reaches $26.78 billion in 2011. Through the index system and evaluation model, the environment competitiveness index of Panama ranks at 23 in 133 countries.

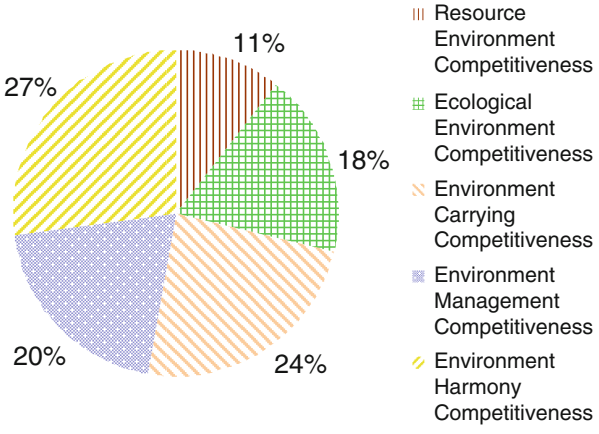

Fig. 109.1 Contribution of sub-index to GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_109,

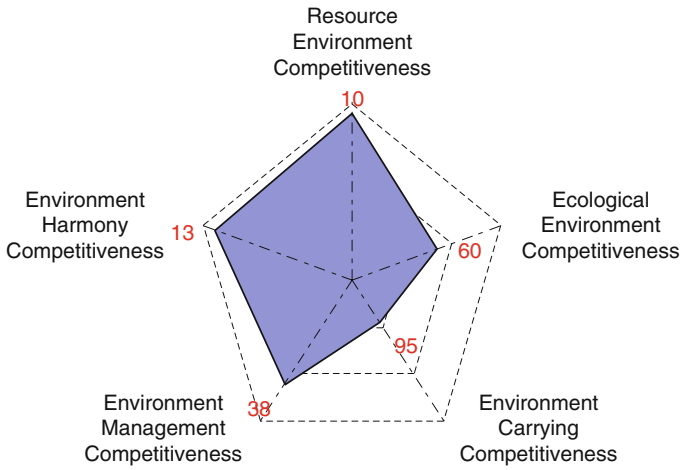

Fig. 109.2 Rank of sub-index of GEC

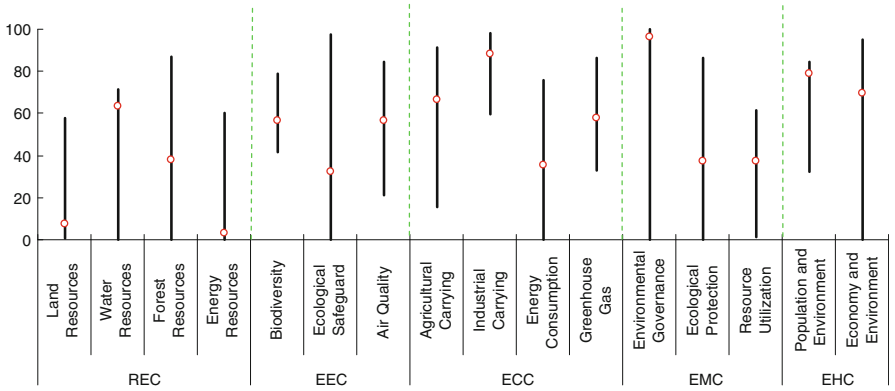

Fig. 109.3 Score and rank of the pillars of GEC

Table 109.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	29.08	10	Total internal renewable water resources	100.00	2
1.1 Land Resources	7.27	109	1.3 Forest Resources	37.91	32
Land area per capita	3.73	47	Growing stock in forest and other wooded land	52.01	50
Percentage of arable land to total land area	12.18	93	Proportion of land area covered by forest	51.03	29
Arable land per capita	7.07	74	Forest area per capita	6.33	29
1.2 Water Resources	63.57	7	1.4 Energy Resources	3.23	93
Surface water	21.01	6	Fossil energy	0.00	64
Annual precipitation	92.59	4	Energy production	0.24	110
Groundwater	40.67	15			

(continued)

Table 109.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
Proportion of combustible renewable and waste to total energy consumption	13.69	55	Ratio of clean energy consumption	18.45	37
Net energy imports of the energy consumption	2.71	110	Elasticity of energy consumption	13.12	106
2 Ecological Environment Competitiveness	49.39	60	Elasticity of electric power consumption	10.12	88
2.1 Biodiversity	56.62	91	3.4 Greenhouse Gas	57.69	102
Threatened fish species	80.66	94	Growth rate of CO_2 emissions	42.17	101
Threatened mammal species	91.85	84	Growth rate of Methane emissions	63.86	28
Threatened plant species	88.80	117	CO_2 emissions per unit of land area	99.87	54
GEF benefits index for biodiversity	10.90	28	CO_2 emissions per unit of energy consumption	40.38	69
2.2 Ecological Safeguard	32.40	39	4 Environment Management Competitiveness	54.88	38
Terrestrial protected areas	50.54	30	4.1 Environmental Governance	95.99	37
Marine protected areas	5.18	40	Agricultural chemicals regulation	95.24	20
2.3 Air Quality	56.71	74	Percentage of the rural population with access to an improved water source	N/A	N/A
Inhalable particles (PM10)	67.15	92	Percentage of the urban population with access to an improved water source	97.00	80
Particulate matter(PM2.5)	94.58	16	4.2 Ecological Protection	37.28	51
Index of indoor air pollution	26.40	70	Area of plantation and afforestation	0.10	85
Nitrogen oxides emission	68.76	25	Biome protect	90.80	24
Sulfur dioxide emission	40.90	31	Overfishing of fishing resources	33.33	85
3 Environment Carrying Competitiveness	65.13	95	4.3 Resource Utilization	37.24	66
3.1 Agricultural Carrying	66.61	65	Utilization rate of water resources	0.01	130
Cereal yield per unit of arable land	19.85	86	Percentage of total internal renewable water resources to total water resources	88.96	16
Fertilizer consumption per unit of arable land	96.22	56	Percentage of agricultural land to total land area	35.46	98
Annual freshwater withdrawals for agriculture per unit of arable land	99.35	52	Percentage of fossil fuel energy consumption to total energy consumption	24.53	66
3.2 Industrial Carrying	88.44	92	5 Environment Harmony Competitiveness	74.12	13
Net exports of goods as a percentage of GDP	69.94	102			
Electric power consumption per unit of value added of industry	84.62	105			
SO_2 emissions per unit of value added of industry	99.70	80			
Annual freshwater withdrawals for industry per value added of industry	99.52	19			
3.3 Energy Consumption	35.40	43			
Energy consumption per unit of land area	99.90	46			

(continued)

Table 109.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
5.1 Population and Environment	78.57	24	Energy consumption per capita	92.64	53
Percentage of population with access to Improved sanitation facilities	69.00	88	5.2 Economy and Environment	69.68	31
			Land resource utilization efficiency	0.10	62
Motor vehicles per 1,000 people	82.84	67	Sulfur dioxide emissions per unit of GDP	96.05	54
Renewable internal freshwater resources per capita	39.10	8	Carbon dioxide emissions per unit of GDP	90.06	53
SO_2 emissions per capita	95.98	64	Energy consumption per unit of GDP	92.49	28
CO_2 emissions per capita	93.63	60			

Table 109.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	3	2	4	3	2
Ecological Environment Competitiveness	11	0	3	1	6	1
Environment Carrying Competitiveness	15	0	1	5	4	5
Environment Management Competitiveness	10	0	3	2	3	1
Environment Harmony Competitiveness	10	1	1	4	4	0
Total	60	4	10	16	20	9

Chapter 110
Report on Global Environment Competitiveness of Paraguay

Score: 49.20
Rank: 76

Paraguay is a landlocked country in South America. It is bordered by Argentina to the south and southwest, Brazil to the east and northeast, and Bolivia to the northwest. Paraguay lies on both banks of the Paraguay River, which runs through the centre of the country from north to south. It covers 397.3 thousand of square kilometers and has a population of 6.57 million. Its GDP reaches $23.84 billion in 2011. Through the index system and evaluation model, the environment competitiveness index of Paraguay ranks at 76 in 133 countries.

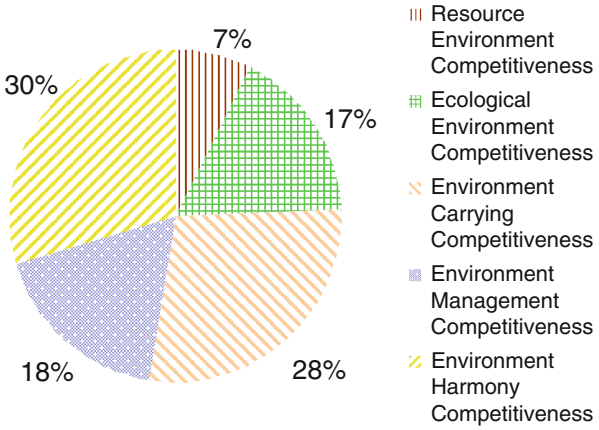

Fig. 110.1 Contribution of sub-index to GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_110,

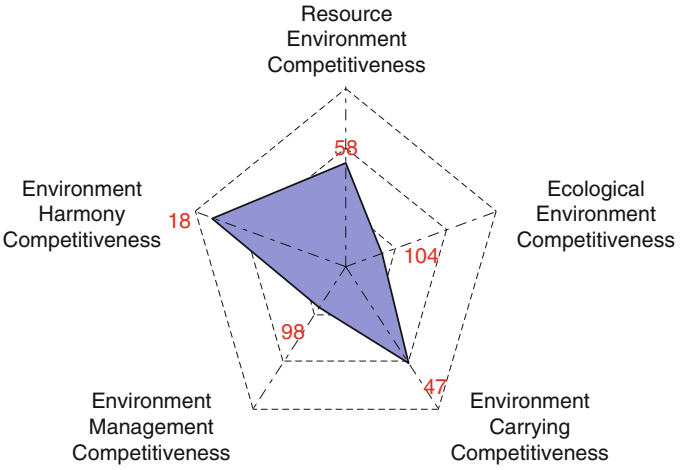

Fig. 110.2 Rank of sub-index of GEC

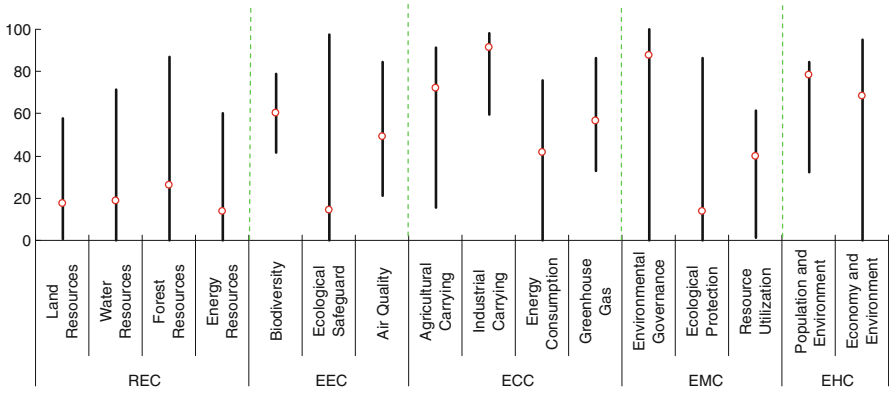

Fig. 110.3 Score and rank of the pillars of GEC

Table 110.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	18.43	58	Groundwater	14.83	49
1.1 Land Resources	17.65	38	Total internal renewable water resources	11.93	75
Land area per capita	10.88	23	1.3 Forest Resources	26.07	78
Percentage of arable land to total land area	16.52	81	Growing stock in forest and other wooded land	0.00	121
Arable land per capita	27.80	9	Proportion of land area covered by forest	51.30	26
1.2 Water Resources	18.78	56	Forest area per capita	18.48	14
Surface water	9.13	37	1.4 Energy Resources	13.53	34
Annual precipitation	39.22	50			

(continued)

Table 110.1 (continued)

Indicators	Score	Rank
Fossil energy	0.00	64
Energy production	1.11	58
Proportion of combustible renewable and waste to total energy consumption	51.53	24
Net energy imports of the energy consumption	18.88	30
2 Ecological Environment Competitiveness	41.95	104
2.1 Biodiversity	60.15	16
Threatened fish species	100.00	1
Threatened mammal species	95.65	46
Threatened plant species	99.47	60
GEF benefits index for biodiversity	2.80	66
2.2 Ecological Safeguard	14.40	86
Terrestrial protected areas	14.40	95
Marine protected areas	N/A	N/A
2.3 Air Quality	48.95	101
Inhalable particles (PM10)	53.28	114
Particulate matter(PM2.5)	94.55	17
Index of indoor air pollution	10.60	90
Nitrogen oxides emission	67.07	84
Sulfur dioxide emission	40.96	12
3 Environment Carrying Competitiveness	68.70	47
3.1 Agricultural Carrying	72.28	33
Cereal yield per unit of arable land	34.82	53
Fertilizer consumption per unit of arable land	94.64	67
Annual freshwater withdrawals for agriculture per unit of arable land	99.87	24
3.2 Industrial Carrying	91.56	67
Net exports of goods as a percentage of GDP	84.77	47
Electric power consumption per unit of value added of industry	82.78	108
SO_2 emissions per unit of value added of industry	99.89	43
Annual freshwater withdrawals for industry per value added of industry	98.81	46
3.3 Energy Consumption	41.47	22
Energy consumption per unit of land area	99.98	12
Ratio of clean energy consumption	N/A	N/A
Elasticity of energy consumption	13.84	71
Elasticity of electric power consumption	10.59	75
3.4 Greenhouse Gas	56.30	109
Growth rate of CO_2 emissions	28.92	122
Growth rate of Methane emissions	47.30	121
CO_2 emissions per unit of land area	99.99	18
CO_2 emissions per unit of energy consumption	76.36	18
4 Environment Management Competitiveness	43.65	98
4.1 Environmental Governance	87.60	74
Agricultural chemicals regulation	95.24	20
Percentage of the rural population with access to an improved water source	66.00	95
Percentage of the urban population with access to an improved water source	99.00	51
4.2 Ecological Protection	13.71	118
Area of plantation and afforestation	0.06	94
Biome protect	31.90	94
Overfishing of fishing resources	N/A	N/A
4.3 Resource Utilization	39.63	55
Utilization rate of water resources	0.00	131
Percentage of total internal renewable water resources to total water resources	24.93	109
Percentage of agricultural land to total land area	62.18	47
Percentage of fossil fuel energy consumption to total energy consumption	71.40	18

(continued)

Table 110.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
5 Environment Harmony Competitiveness	73.28	18	CO_2 emissions per capita	98.14	30
5.1 Population and Environment	78.29	25	Energy consumption per capita	95.26	41
Percentage of population with access to Improved sanitation facilities	70.00	87	5.2 Economy and Environment	68.28	42
Motor vehicles per 1,000 people	89.01	52	Land resource utilization efficiency	0.02	110
Renewable internal freshwater resources per capita	17.32	25	Sulfur dioxide emissions per unit of GDP	97.90	28
SO_2 emissions per capita	99.19	21	Carbon dioxide emissions per unit of GDP	92.38	37
			Energy consumption per unit of GDP	82.83	71

Table 110.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	0	3	7	3	1
Ecological Environment Competitiveness	11	1	2	2	4	2
Environment Carrying Competitiveness	15	0	3	4	3	4
Environment Management Competitiveness	10	0	1	2	4	3
Environment Harmony Competitiveness	10	0	5	3	1	1
Total	60	1	14	18	15	11

Chapter 111
Report on Global Environment Competitiveness of Peru

Peru is a country in western South America. It is bordered on the north by Ecuador and Colombia, on the east by Brazil, on the southeast by Bolivia, on the south by Chile, and on the west by the Pacific Ocean. It covers 1,280.0 thousand of square kilometers and has a population of 29.40 million. Its GDP reaches $176.93 billion in 2011. Through the index system and evaluation model, the environment competitiveness index of Peru ranks at 34 in 133 countries.

Score: 52.94
Rank: 34

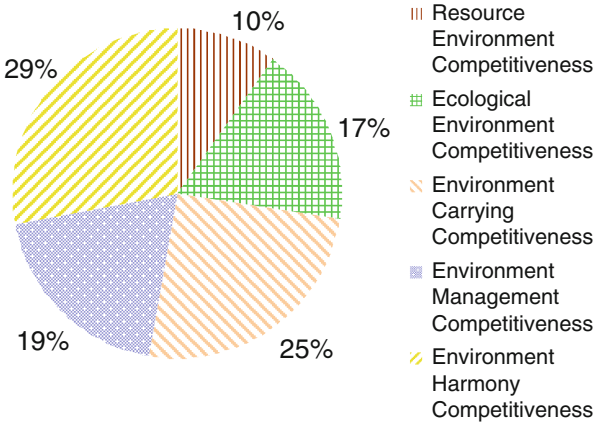

Fig. 111.1 Contribution of sub-index to GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_111,

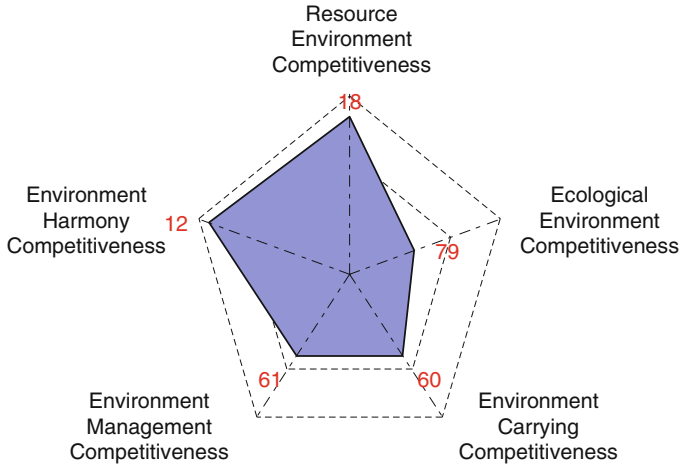

Fig. 111.2 Rank of sub-index of GEC

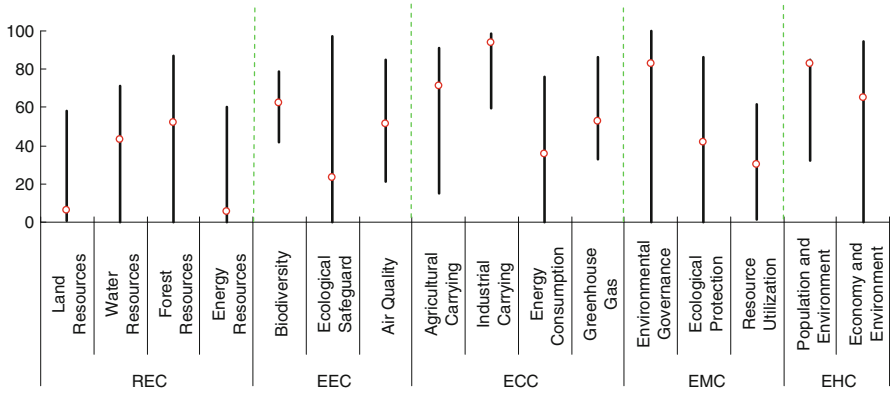

Fig. 111.3 Score and rank of the pillars of GEC

Table 111.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	26.35	18	Groundwater	34.07	19
1.1 Land Resources	6.27	114	Total internal renewable water resources	63.67	10
Land area per capita	7.82	28	1.3 Forest Resources	52.08	11
Percentage of arable land to total land area	4.67	114	Growing stock in forest and other wooded land	74.72	7
Arable land per capita	5.81	86	Proportion of land area covered by forest	62.08	13
1.2 Water Resources	43.26	16	Forest area per capita	16.09	16
Surface water	16.13	14	1.4 Energy Resources	5.66	65
Annual precipitation	59.18	23			

(continued)

Table 111.1 (continued)

Indicators	Score	Rank
Fossil energy	0.13	56
Energy production	0.67	73
Proportion of combustible renewable and waste to total energy consumption	17.42	47
Net energy imports of the energy consumption	12.68	43
2 Ecological Environment Competitiveness	46.25	79
2.1 Biodiversity	62.48	9
Threatened fish species	90.57	53
Threatened mammal species	70.65	123
Threatened plant species	84.36	123
GEF benefits index for biodiversity	33.40	11
2.2 Ecological Safeguard	23.45	62
Terrestrial protected areas	36.68	53
Marine protected areas	3.59	51
2.3 Air Quality	51.18	90
Inhalable particles (PM10)	69.34	89
Particulate matter (PM2.5)	86.26	60
Index of indoor air pollution	14.40	85
Nitrogen oxides emission	67.40	80
Sulfur dioxide emission	37.51	111
3 Environment Carrying Competitiveness	67.28	60
3.1 Agricultural Carrying	71.32	40
Cereal yield per unit of arable land	39.80	42
Fertilizer consumption per unit of arable land	91.55	80
Annual freshwater withdrawals for agriculture per unit of arable land	93.13	104
3.2 Industrial Carrying	93.91	32
Net exports of goods as a percentage of GDP	84.01	52
Electric power consumption per unit of value added of industry	95.63	29
SO_2 emissions per unit of value added of industry	99.35	108
Annual freshwater withdrawals for industry per value added of industry	96.65	75
3.3 Energy Consumption	35.58	41
Energy consumption per unit of land area	99.97	16
Ratio of clean energy consumption	18.96	36
Elasticity of energy consumption	12.80	113
Elasticity of electric power consumption	10.61	74
3.4 Greenhouse Gas	52.99	122
Growth rate of CO_2 emissions	38.31	113
Growth rate of Methane emissions	46.12	123
CO_2 emissions per unit of land area	99.96	31
CO_2 emissions per unit of energy consumption	42.23	66
4 Environment Management Competitiveness	50.60	61
4.1 Environmental Governance	82.99	82
Agricultural chemicals regulation	90.48	37
Percentage of the rural population with access to an improved water source	65.00	96
Percentage of the urban population with access to an improved water source	91.00	106
4.2 Ecological Protection	41.75	36
Area of plantation and afforestation	1.29	33
Biome protect	78.90	46
Overfishing of fishing resources	58.54	39
4.3 Resource Utilization	30.03	101
Utilization rate of water resources	0.04	114
Percentage of total internal renewable water resources to total water resources	72.92	54
Percentage of agricultural land to total land area	19.80	118
Percentage of fossil fuel energy consumption to total energy consumption	27.36	61

(continued)

Table 111.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
5 Environment Harmony Competitiveness	74.21	12	CO_2 emissions per capita	96.20	46
5.1 Population and Environment	83.19	5	Energy consumption per capita	95.85	31
Percentage of population with access to Improved sanitation facilities	68.00	90	5.2 Economy and Environment	65.22	67
Motor vehicles per 1,000 people	91.85	44	Land resource utilization efficiency	0.04	93
Renewable internal freshwater resources per capita	66.51	5	Sulfur dioxide emissions per unit of GDP	75.47	119
SO_2 emissions per capita	82.94	108	Carbon dioxide emissions per unit of GDP	91.69	44
			Energy consumption per unit of GDP	93.67	24

Table 111.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	1	7	2	2	2
Ecological Environment Competitiveness	11	1	0	3	5	2
Environment Carrying Competitiveness	15	0	2	7	1	5
Environment Management Competitiveness	10	0	0	5	2	3
Environment Harmony Competitiveness	10	2	0	3	3	2
Total	60	4	9	20	13	14

Chapter 112
Report on Global Environment Competitiveness of Philippines

Philippines is one of the Southeast Asian countries, located in the western Pacific. In the north of Philippines is Luzon Strait, across which is Pingtung in Taiwan, in its south is Celebes Sea, across which is Indonesia, in its west is the South China Sea, across which is Vietnam, and in its east is Philippine Sea. It covers 298.2 thousand of square kilometers and has a population of 94.85 million. Its GDP reaches $224.75 billion in 2011. Through the index system and evaluation model, the environment competitiveness index of Philippine ranks at 29 in 133 countries.

Score: 53.16
Rank: 29

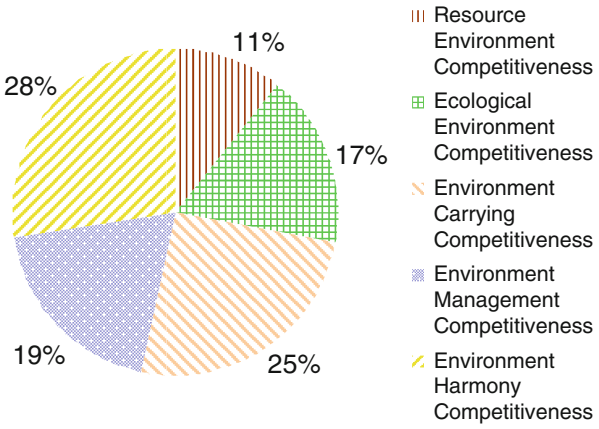

Fig. 112.1 Contribution of sub-index to GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_112,

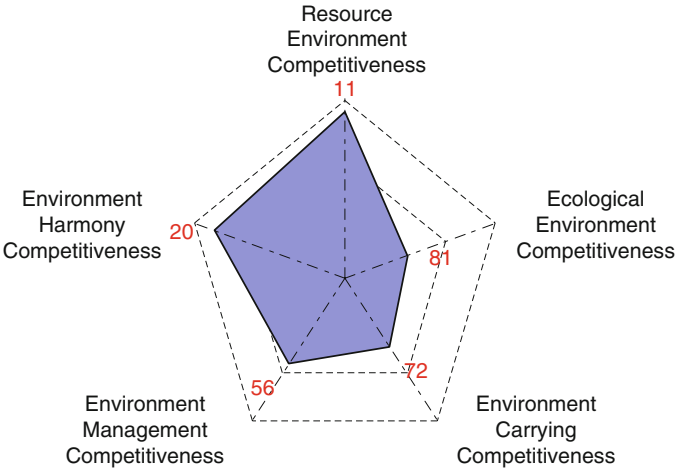

Fig. 112.2 Rank of sub-index of GEC

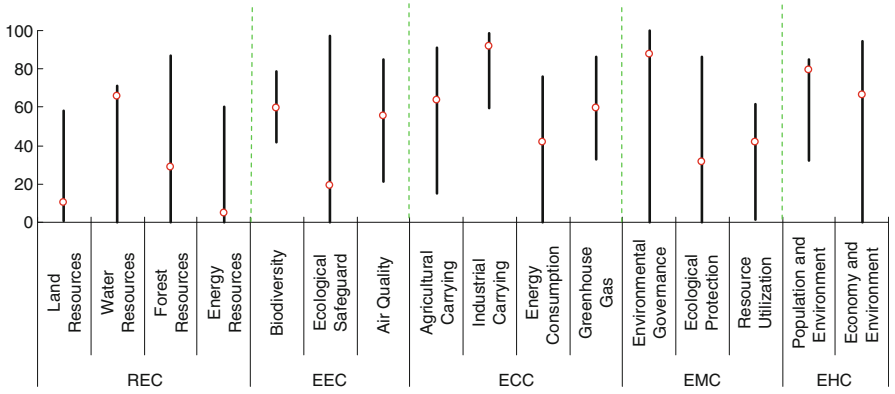

Fig. 112.3 Score and rank of the pillars of GEC

Table 112.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	28.99	11	Groundwater	86.95	4
1.1 Land Resources	10.20	82	Total internal renewable water resources	81.02	5
Land area per capita	0.54	121	1.3 Forest Resources	28.46	72
Percentage of arable land to total land area	30.63	45	Growing stock in forest and other wooded land	53.87	37
Arable land per capita	2.66	116	Proportion of land area covered by forest	30.32	68
1.2 Water Resources	66.04	3	Forest area per capita	0.57	102
Surface water	16.07	15	1.4 Energy Resources	4.83	74
Annual precipitation	80.10	7			

(continued)

Table 112.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
Fossil energy	0.00	64	3.3 Energy Consumption	41.56	21
Energy production	0.25	109	Energy consumption per unit of land area	99.71	79
Proportion of combustible renewable and waste to total energy consumption	18.26	46	Ratio of clean energy consumption	42.71	13
Net energy imports of the energy consumption	7.27	78	Elasticity of energy consumption	13.75	78
2 Ecological Environment Competitiveness	45.63	81	Elasticity of electric power consumption	10.05	92
2.1 Biodiversity	59.64	20	3.4 Greenhouse Gas	59.26	88
Threatened fish species	66.51	119	Growth rate of CO_2 emissions	42.23	100
Threatened mammal species	79.35	117	Growth rate of Methane emissions	61.98	38
Threatened plant species	87.75	120	CO_2 emissions per unit of land area	99.72	78
GEF benefits index for biodiversity	32.30	12	CO_2 emissions per unit of energy consumption	50.13	47
2.2 Ecological Safeguard	18.88	73	4 Environment Management Competitiveness	51.63	56
Terrestrial protected areas	29.35	64	4.1 Environmental Governance	87.88	71
Marine protected areas	3.19	54	Agricultural chemicals regulation	80.95	53
2.3 Air Quality	55.17	79	Percentage of the rural population with access to an improved water source	92.00	53
Inhalable particles (PM10)	87.59	28	Percentage of the urban population with access to an improved water source	93.00	98
Particulate matter (PM2.5)	92.86	22	4.2 Ecological Protection	31.76	75
Index of indoor air pollution	10.90	89	Area of plantation and afforestation	0.46	59
Nitrogen oxides emission	66.24	92	Biome protect	64.00	61
Sulfur dioxide emission	39.15	104	Overfishing of fishing resources	41.25	71
3 Environment Carrying Competitiveness	66.76	72	4.3 Resource Utilization	41.88	41
3.1 Agricultural Carrying	63.81	96	Utilization rate of water resources	0.69	47
Cereal yield per unit of arable land	32.28	58	Percentage of total internal renewable water resources to total water resources	76.76	45
Fertilizer consumption per unit of arable land	88.64	91	Percentage of agricultural land to total land area	47.37	77
Annual freshwater withdrawals for agriculture per unit of arable land	81.03	122			
3.2 Industrial Carrying	91.53	69			
Net exports of goods as a percentage of GDP	86.50	36			
Electric power consumption per unit of value added of industry	93.59	47			
SO_2 emissions per unit of value added of industry	99.74	78			
Annual freshwater withdrawals for industry per value added of industry	86.28	120			

(continued)

Table 112.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
Percentage of fossil fuel energy consumption to total energy consumption	42.69	37	SO_2 emissions per capita	97.20	52
			CO_2 emissions per capita	97.89	33
			Energy consumption per capita	97.69	16
5 Environment Harmony Competitiveness	72.77	20	5.2 Economy and Environment	66.27	56
5.1 Population and Environment	79.27	19	Land resource utilization efficiency	0.22	46
Percentage of population with access to Improved sanitation facilities	76.00	82	Sulfur dioxide emissions per unit of GDP	90.07	87
Motor vehicles per 1,000 people	96.17	30	Carbon dioxide emissions per unit of GDP	87.26	71
Renewable internal freshwater resources per capita	6.11	51	Energy consumption per unit of GDP	87.52	54

Table 112.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	3	1	3	5	2
Ecological Environment Competitiveness	11	0	3	0	5	3
Environment Carrying Competitiveness	15	0	2	4	9	0
Environment Management Competitiveness	10	0	0	6	4	0
Environment Harmony Competitiveness	10	0	2	5	3	0
Total	60	3	8	18	26	5

Chapter 113
Report on Global Environment Competitiveness of Poland

Poland is a country in Central Europe, bordered by the Baltic Sea to the north and Germany to the west, by the Czech Republic and Slovakia to the south, by Ukraine and Belarus to the east, by Lithuania and Russia to the northeast. It covers 304.2 thousand of square kilometers and has a population of 38.53 million. Its GDP reaches $514.50 billion in 2011. Through the index system and evaluation model, the environment competitiveness index of Poland ranks at 38 in 133 countries.

Score: 52.78
Rank: 38

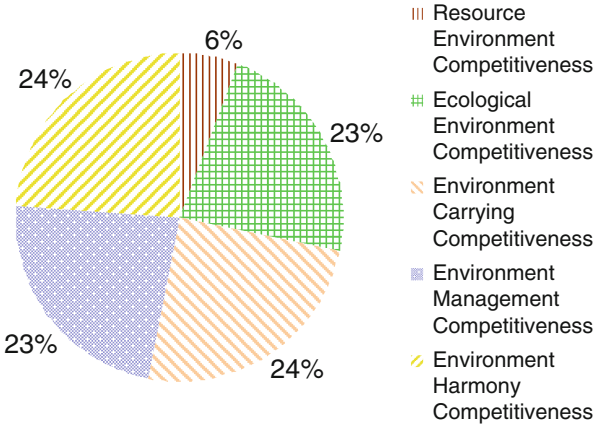

Fig. 113.1 Contribution of sub-index to GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_113,

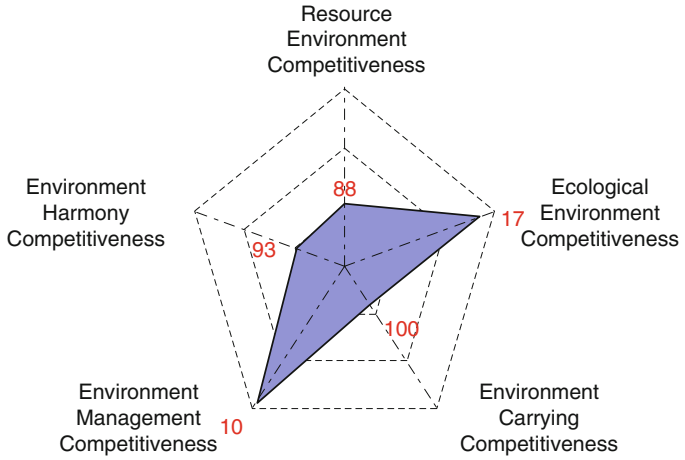

Fig. 113.2 Rank of sub-index of GEC

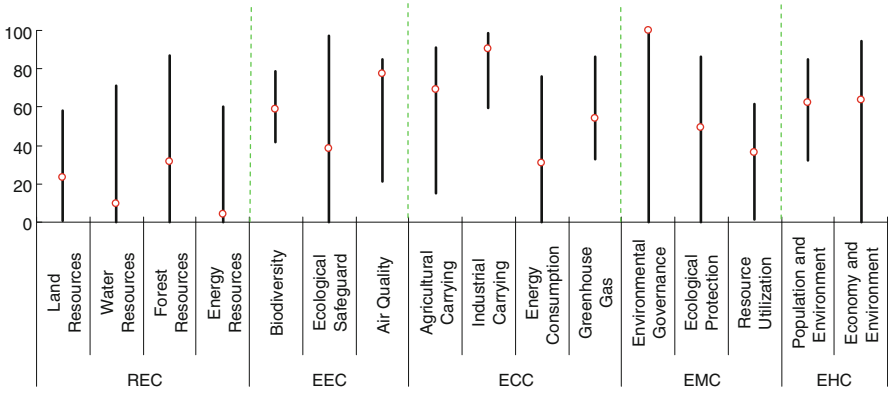

Fig. 113.3 Score and rank of the pillars of GEC

Table 113.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	15.06	88	Groundwater	5.88	82
1.1 Land Resources	23.17	23	Total internal renewable water resources	8.89	83
Land area per capita	1.40	100	1.3 Forest Resources	31.80	57
Percentage of arable land to total land area	61.89	13	Growing stock in forest and other wooded land	56.21	29
Arable land per capita	13.48	35	Proportion of land area covered by forest	36.06	60
1.2 Water Resources	9.46	95	Forest area per capita	1.69	69
Surface water	2.17	89	1.4 Energy Resources	4.10	80
Annual precipitation	20.91	90			

(continued)

Table 113.1 (continued)

Indicators	Score	Rank
Fossil energy	2.05	26
Energy production	1.78	40
Proportion of combustible renewable and waste to total energy consumption	8.02	66
Net energy imports of the energy consumption	8.37	72
2 Ecological Environment Competitiveness	60.07	17
2.1 Biodiversity	58.90	36
Threatened fish species	96.70	20
Threatened mammal species	97.28	22
Threatened plant species	99.53	56
GEF benefits index for biodiversity	0.50	99
2.2 Ecological Safeguard	38.48	25
Terrestrial protected areas	60.60	21
Marine protected areas	5.31	39
2.3 Air Quality	77.13	37
Inhalable particles (PM10)	75.91	75
Particulate matter (PM2.5)	84.86	66
Index of indoor air pollution	100.00	1
Nitrogen oxides emission	62.55	114
Sulfur dioxide emission	37.32	113
3 Environment Carrying Competitiveness	64.88	100
3.1 Agricultural Carrying	69.30	50
Cereal yield per unit of arable land	32.14	60
Fertilizer consumption per unit of arable land	88.31	92
Annual freshwater withdrawals for agriculture per unit of arable land	99.85	26
3.2 Industrial Carrying	90.53	79
Net exports of goods as a percentage of GDP	76.84	85
Electric power consumption per unit of value added of industry	91.68	66
SO_2 emissions per unit of value added of industry	99.72	79
Annual freshwater withdrawals for industry per value added of industry	93.88	96
3.3 Energy Consumption	30.66	115
Energy consumption per unit of land area	99.29	105
Ratio of clean energy consumption	0.57	104
Elasticity of energy consumption	13.15	104
Elasticity of electric power consumption	9.62	100
3.4 Greenhouse Gas	54.00	118
Growth rate of CO_2 emissions	46.13	85
Growth rate of Methane emissions	61.03	47
CO_2 emissions per unit of land area	98.88	114
CO_2 emissions per unit of energy consumption	17.81	119
4 Environment Management Competitiveness	60.75	10
4.1 Environmental Governance	100.00	1
Agricultural chemicals regulation	100.00	1
Percentage of the rural population with access to an improved water source	N/A	N/A
Percentage of the urban population with access to an improved water source	100.00	1
4.2 Ecological Protection	49.61	15
Area of plantation and afforestation	11.52	6
Biome protect	100.00	1
Overfishing of fishing resources	50.00	55
4.3 Resource Utilization	36.37	70
Utilization rate of water resources	0.78	43

(continued)

Table 113.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
Percentage of total internal renewable water resources to total water resources	72.83	56	Renewable internal freshwater resources per capita	1.68	87
Percentage of agricultural land to total land area	62.63	45	SO_2 emissions per capita	86.33	105
			CO_2 emissions per capita	78.44	104
Percentage of fossil fuel energy consumption to total energy consumption	9.24	100	Energy consumption per capita	80.13	85
			5.2 Economy and Environment	63.77	76
5 Environment Harmony Competitiveness	63.13	93	Land resource utilization efficiency	0.49	28
5.1 Population and Environment	62.49	112	Sulfur dioxide emissions per unit of GDP	91.62	82
Percentage of population with access to Improved sanitation facilities	90.00	62	Carbon dioxide emissions per unit of GDP	76.52	98
Motor vehicles per 1,000 people	37.53	108	Energy consumption per unit of GDP	86.46	58

Table 113.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	0	4	3	7	0
Ecological Environment Competitiveness	11	1	4	3	2	1
Environment Carrying Competitiveness	15	0	0	3	6	6
Environment Management Competitiveness	10	4	1	3	1	0
Environment Harmony Competitiveness	10	0	1	0	5	4
Total	60	5	10	12	21	11

Chapter 114
Report on Global Environment Competitiveness of Portugal

Portugal is situated on the Iberian Peninsula of southwestern Europe. And it is bordered by the Atlantic Ocean to the West and South and by Spain to the North and East. It covers 91.5 thousand of square kilometers and has a population of 10.56 million. Its GDP reaches $237.37 billion in 2011. Through the index system and evaluation model, the environment competitiveness index of Portugal ranks at 43 in 133 countries.

Score: 52.14
Rank: 43

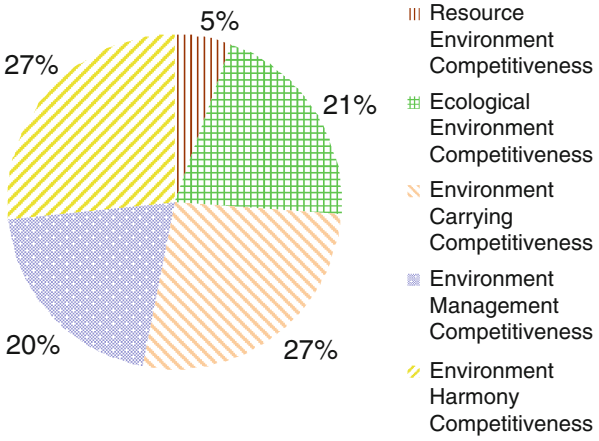

Fig. 114.1 Contribution of sub-index to GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_114,

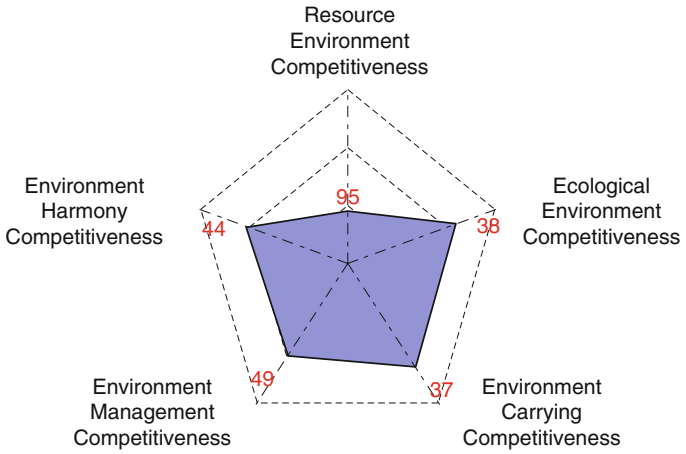

Fig. 114.2 Rank of sub-index of GEC

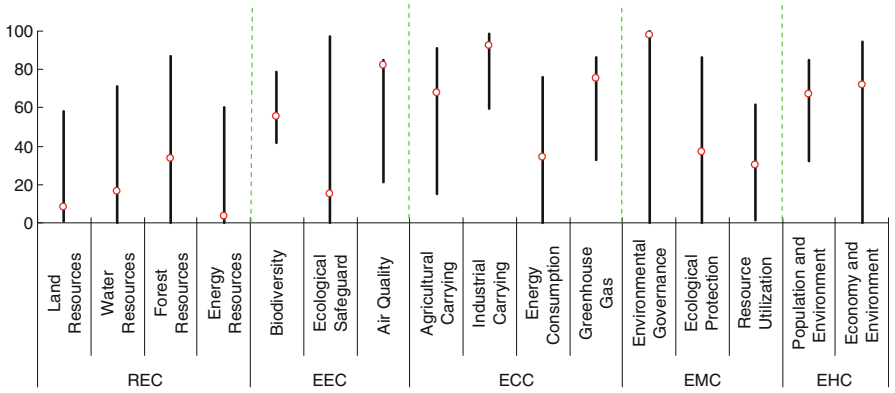

Fig 114.3 Score and rank of the pillars of GEC

Table 114.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	14.30	95	Groundwater	6.26	80
1.1 Land Resources	8.12	97	Total internal renewable water resources	20.95	51
Land area per capita	1.54	96	1.3 Forest Resources	33.58	51
Percentage of arable land to total land area	20.17	68	Growing stock in forest and other wooded land	50.56	81
Arable land per capita	4.85	96	Proportion of land area covered by forest	44.30	40
1.2 Water Resources	16.37	62	Forest area per capita	2.29	61
Surface water	9.13	36	1.4 Energy Resources	3.51	87
Annual precipitation	29.15	65			

(continued)

Table 114.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
Fossil energy	0.00	64	Annual freshwater withdrawals for industry per value added of industry	95.49	90
Energy production	0.53	80			
Proportion of combustible renewable and waste to total energy consumption	14.46	53	3.3 Energy Consumption	34.43	54
			Energy consumption per unit of land area	99.45	100
Net energy imports of the energy consumption	2.89	108	Ratio of clean energy consumption	11.29	50
2 Ecological Environment Competitiveness	53.88	38	Elasticity of energy consumption	13.29	100
2.1 Biodiversity	55.21	108	Elasticity of electric power consumption	13.70	18
Threatened fish species	75.00	107			
Threatened mammal species	94.02	64	3.4 Greenhouse Gas	75.33	9
			Growth rate of CO_2 emissions	82.92	3
Threatened plant species	96.03	100			
GEF benefits index for biodiversity	5.50	43	Growth rate of Methane emissions	65.81	21
2.2 Ecological Safeguard	14.96	84	CO_2 emissions per unit of land area	99.41	98
Terrestrial protected areas	22.28	76			
Marine protected areas	3.98	49	CO_2 emissions per unit of energy consumption	45.59	57
2.3 Air Quality	82.07	14			
Inhalable particles (PM10)	86.86	30	4 Environment Management Competitiveness	53.17	49
Particulate matter (PM2.5)	92.40	26			
Index of indoor air pollution	100.00	1	4.1 Environmental Governance	97.80	32
Nitrogen oxides emission	67.74	68	Agricultural chemicals regulation	95.24	20
Sulfur dioxide emission	40.36	80			
3 Environment Carrying Competitiveness	70.00	37	Percentage of the rural population with access to an improved water source	100.00	1
3.1 Agricultural Carrying	67.51	60			
Cereal yield per unit of arable land	34.89	52	Percentage of the urban population with access to an improved water source	99.00	51
Fertilizer consumption per unit of arable land	87.13	94			
Annual freshwater withdrawals for agriculture per unit of arable land	91.38	107	4.2 Ecological Protection	36.73	55
			Area of plantation and afforestation	1.10	38
3.2 Industrial Carrying	92.65	51			
Net exports of goods as a percentage of GDP	84.32	48	Biome protect	49.00	75
			Overfishing of fishing resources	71.98	16
Electric power consumption per unit of value added of industry	90.93	70	4.3 Resource Utilization	30.46	95
			Utilization rate of water resources	0.50	58
SO_2 emissions per unit of value added of industry	99.86	54			

(continued)

Table 114.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
Percentage of total internal renewable water resources to total water resources	46.68	91	Renewable internal freshwater resources per capita	4.36	58
Percentage of agricultural land to total land area	47.61	74	SO_2 emissions per capita	91.43	89
Percentage of fossil fuel energy consumption to total energy consumption	27.07	63	CO_2 emissions per capita	87.83	82
5 Environment Harmony Competitiveness	69.37	44	Energy consumption per capita	83.64	79
5.1 Population and Environment	66.88	87	5.2 Economy and Environment	71.86	19
Percentage of population with access to Improved sanitation facilities	100.00	1	Land resource utilization efficiency	0.76	24
Motor vehicles per 1,000 people	33.95	113	Sulfur dioxide emissions per unit of GDP	97.03	37
			Carbon dioxide emissions per unit of GDP	94.15	26
			Energy consumption per unit of GDP	95.49	14

Table 114.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	0	0	4	10	0
Ecological Environment Competitiveness	11	1	3	0	5	2
Environment Carrying Competitiveness	15	2	1	7	5	0
Environment Management Competitiveness	10	1	1	4	4	0
Environment Harmony Competitiveness	10	1	3	2	3	1
Total	60	5	8	17	27	3

Chapter 115
Report on Global Environment Competitiveness of Qatar

Qatar is located in Western Asia, and it's a peninsula which is located in the edge of the Arabian peninsula. Its sole land is bordered by Saudi Arabia to the south, and the rest of its territory surrounded by the Persian Gulf. It covers 11.6 thousand of square kilometers and has a population of 1.87 million. Its GDP reaches $172.98 billion in 2011. Through the index system and evaluation model, the environment competitiveness index of Qatar ranks at 118 in 133 countries.

Score: 44.30
Rank: 118

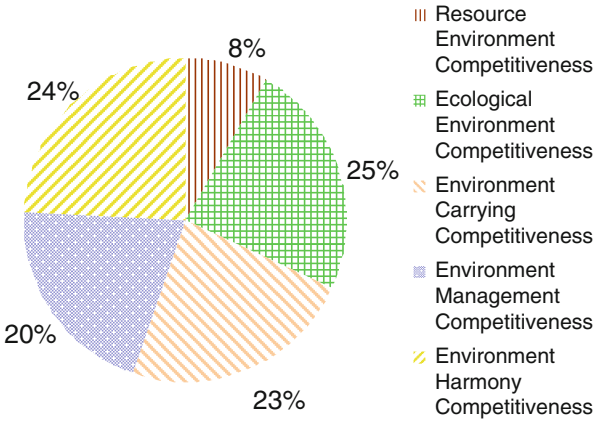

Fig. 115.1 Contribution of sub-index to GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_115,

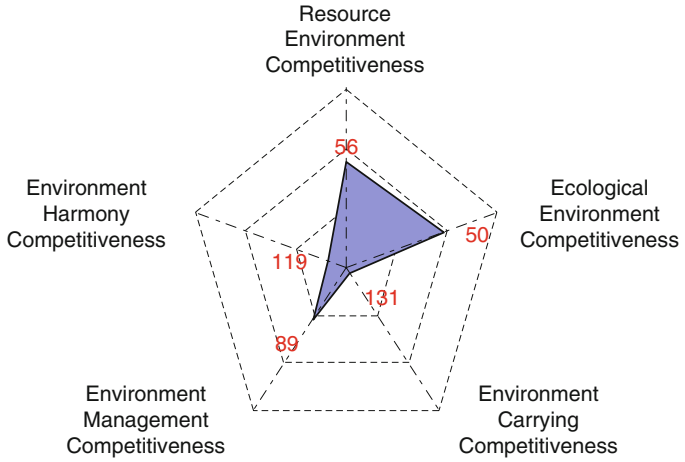

Fig. 115.2 Rank of sub-index of GEC

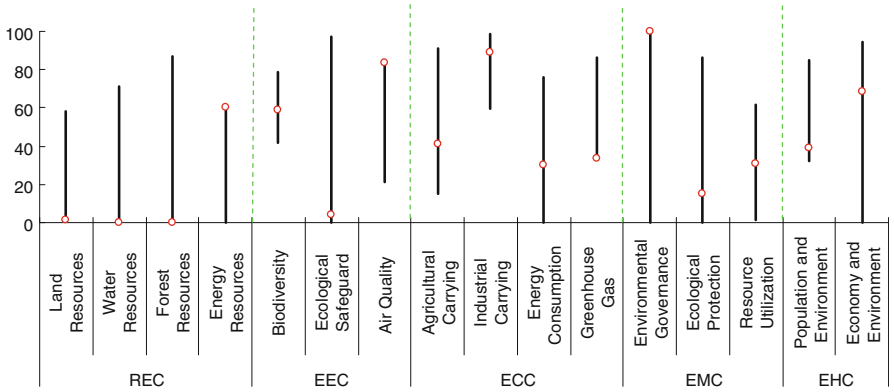

Fig. 115.3 Score and rank of the pillars of GEC

Table 115.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	18.45	56	Groundwater	0.68	111
1.1 Land Resources	1.10	130	Total internal renewable water resources	0.24	121
Land area per capita	1.09	108	1.3 Forest Resources	0.00	133
Percentage of arable land to total land area	1.88	124	Growing stock in forest and other wooded land	N/A	N/A
Arable land per capita	0.34	130	Proportion of land area covered by forest	0.00	131
1.2 Water Resources	0.23	133	Forest area per capita	0.00	132
Surface water	0.00	127	1.4 Energy Resources	60.55	1
Annual precipitation	0.00	131			

(continued)

Table 115.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
Fossil energy	35.59	3	Annual freshwater withdrawals for industry per value added of industry	100.00	1
Energy production	100.00	1	3.3 Energy Consumption	30.29	118
Proportion of combustible renewable and waste to total energy consumption	0.00	120	Energy consumption per unit of land area	95.86	122
Net energy imports of the energy consumption	99.15	2	Ratio of clean energy consumption	0.00	116
2 Ecological Environment Competitiveness	52.22	50	Elasticity of energy consumption	14.34	33
2.1 Biodiversity	58.68	42	Elasticity of electric power consumption	10.97	52
Threatened fish species	94.81	28	3.4 Greenhouse Gas	33.32	131
Threatened mammal species	98.37	11	Growth rate of CO_2 emissions	25.73	128
Threatened plant species	100.00	1	Growth rate of Methane emissions	0.00	126
GEF benefits index for biodiversity	0.10	122	CO_2 emissions per unit of land area	93.77	130
2.2 Ecological Safeguard	4.02	114	CO_2 emissions per unit of energy consumption	21.39	113
Terrestrial protected areas	6.52	109	4 Environment Management Competitiveness	45.32	89
Marine protected areas	0.27	83	4.1 Environmental Governance	100.00	1
2.3 Air Quality	83.54	6	Agricultural chemicals regulation	N/A	N/A
Inhalable particles (PM10)	85.40	39	Percentage of the rural population with access to an improved water source	100.00	1
Particulate matter (PM2.5)	100.00	1	Percentage of the urban population with access to an improved water source	100.00	1
Index of indoor air pollution	100.00	1	4.2 Ecological Protection	15.28	115
Nitrogen oxides emission	68.97	4	Area of plantation and afforestation	N/A	N/A
Sulfur dioxide emission	40.74	58	Biome protect	13.90	112
3 Environment Carrying Competitiveness	51.89	131	Overfishing of fishing resources	16.67	98
3.1 Agricultural Carrying	41.38	130	4.3 Resource Utilization	30.69	92
Cereal yield per unit of arable land	49.92	28	Utilization rate of water resources	18.46	5
Fertilizer consumption per unit of arable land	0.00	131			
Annual freshwater withdrawals for agriculture per unit of arable land	71.36	126			
3.2 Industrial Carrying	89.16	87			
Net exports of goods as a percentage of GDP	58.20	120			
Electric power consumption per unit of value added of industry	98.47	7			
SO_2 emissions per unit of value added of industry	99.98	15			

(continued)

Table 115.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
Percentage of total internal renewable water resources to total water resources	96.55	4	Renewable internal freshwater resources per capita	0.04	130
Percentage of agricultural land to total land area	6.63	130	SO_2 emissions per capita	78.73	115
Percentage of fossil fuel energy consumption to total energy consumption	1.12	123	CO_2 emissions per capita	0.00	132
			Energy consumption per capita	0.00	126
5 Environment Harmony Competitiveness	53.61	119	5.2 Economy and Environment	68.49	40
5.1 Population and Environment	38.73	132	Land resource utilization efficiency	4.36	7
Percentage of population with access to Improved sanitation facilities	100.00	1	Sulfur dioxide emissions per unit of GDP	97.85	29
			Carbon dioxide emissions per unit of GDP	82.15	86
Motor vehicles per 1,000 people	34.57	112	Energy consumption per unit of GDP	89.61	46

Table 115.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	3	0	0	0	10
Ecological Environment Competitiveness	11	5	2	2	0	2
Environment Carrying Competitiveness	15	1	2	1	1	10
Environment Management Competitiveness	10	4	0	0	1	3
Environment Harmony Competitiveness	10	2	1	1	1	5
Total	60	15	5	4	3	30

Chapter 116
Report on Global Environment Competitiveness of Romania

Score: 49.50
Rank: 68

Romania is a country located at the intersection of Central and Southeastern Europe, on the Lower Danube, within and outside the Carpathian arch, bordering on the Black Sea. Romania shares a border with Hungary and Serbia to the west, Ukraine and Moldova to the northeast and east, and Bulgaria to the south. It covers 230.1 thousand of square kilometers and has a population of 21.38 million. Its GDP reaches $179.79 billion in 2011. Through the index system and evaluation model, the environment competitiveness index of Romania ranks at 68 in 133 countries.

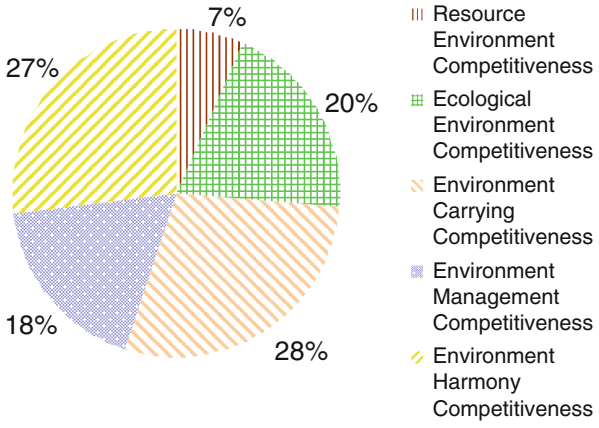

Fig. 116.1 Contribution of sub-index to GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_116,

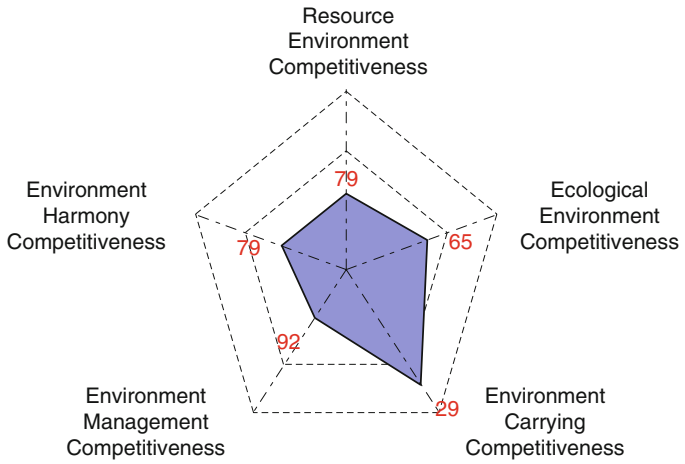

Fig. 116.2 Rank of sub-index of GEC

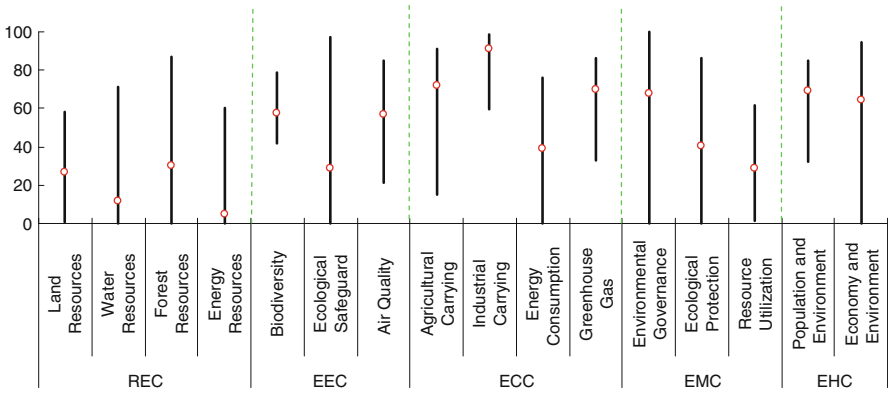

Fig. 116.3 Score and rank of the pillars of GEC

Table 116.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	16.26	79	Groundwater	5.21	85
1.1 Land Resources	26.56	14	Total internal renewable water resources	9.27	81
Land area per capita	1.92	82	1.3 Forest Resources	30.36	63
Percentage of arable land to total land area	66.30	10	Growing stock in forest and other wooded land	54.21	35
Arable land per capita	19.69	22	Proportion of land area covered by forest	33.63	64
1.2 Water Resources	11.70	81	Forest area per capita	2.16	62
Surface water	9.92	35	1.4 Energy Resources	4.55	75
Annual precipitation	22.39	85			

(continued)

Table 116.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
Fossil energy	0.28	46	3.3 Energy Consumption	39.31	26
Energy production	1.29	53	Energy consumption per unit of land area	99.68	83
Proportion of combustible renewable and waste to total energy consumption	12.65	56	Ratio of clean energy consumption	21.93	30
Net energy imports of the energy consumption	9.91	58	Elasticity of energy consumption	14.54	29
2 Ecological Environment Competitiveness	48.86	65	Elasticity of electric power consumption	21.10	8
2.1 Biodiversity	57.68	72	3.4 Greenhouse Gas	69.55	21
Threatened fish species	91.04	47	Growth rate of CO_2 emissions	70.54	15
Threatened mammal species	96.20	37	Growth rate of Methane emissions	64.75	24
Threatened plant species	99.77	43	CO_2 emissions per unit of land area	99.64	87
GEF benefits index for biodiversity	0.70	92	CO_2 emissions per unit of energy consumption	42.30	65
2.2 Ecological Safeguard	29.05	48	4 Environment Management Competitiveness	45.18	92
Terrestrial protected areas	19.02	80	4.1 Environmental Governance	67.80	110
Marine protected areas	44.09	4	Agricultural chemicals regulation	95.24	20
2.3 Air Quality	57.11	70	Percentage of the rural population with access to an improved water source	0.00	122
Inhalable particles (PM10)	91.97	7	Percentage of the urban population with access to an improved water source	99.00	51
Particulate matter (PM2.5)	82.53	79	4.2 Ecological Protection	40.37	45
Index of indoor air pollution	21.30	77	Area of plantation and afforestation	1.87	30
Nitrogen oxides emission	66.54	89	Biome protect	40.20	84
Sulfur dioxide emission	38.91	105	Overfishing of fishing resources	91.88	2
3 Environment Carrying Competitiveness	70.69	29	4.3 Resource Utilization	28.99	103
3.1 Agricultural Carrying	72.12	34	Utilization rate of water resources	0.13	86
Cereal yield per unit of arable land	33.39	55	Percentage of total internal renewable water resources to total water resources	19.24	116
Fertilizer consumption per unit of arable land	96.08	58	Percentage of agricultural land to total land area	69.48	33
Annual freshwater withdrawals for agriculture per unit of arable land	99.81	32			
3.2 Industrial Carrying	90.92	74			
Net exports of goods as a percentage of GDP	79.10	77			
Electric power consumption per unit of value added of industry	93.14	52			
SO_2 emissions per unit of value added of industry	99.63	90			
Annual freshwater withdrawals for industry per value added of industry	91.83	109			

(continued)

Table 116.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
Percentage of fossil fuel energy consumption to total energy consumption	27.10	62	SO_2 emissions per capita	86.16	106
			CO_2 emissions per capita	90.55	69
5 Environment Harmony Competitiveness	66.51	79	Energy consumption per capita	88.23	69
5.1 Population and Environment	68.87	75	5.2 Economy and Environment	64.15	73
Percentage of population with access to Improved sanitation facilities	72.00	85	Land resource utilization efficiency	0.23	44
			Sulfur dioxide emissions per unit of GDP	86.08	101
Motor vehicles per 1,000 people	71.85	85	Carbon dioxide emissions per unit of GDP	83.85	80
Renewable internal freshwater resources per capita	2.39	81	Energy consumption per unit of GDP	86.42	59

Table 116.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	1	1	5	7	0
Ecological Environment Competitiveness	11	1	0	4	6	0
Environment Carrying Competitiveness	15	0	6	4	5	0
Environment Management Competitiveness	10	0	2	2	2	4
Environment Harmony Competitiveness	10	0	0	1	7	2
Total	60	2	9	16	27	6

Chapter 117
Report on Global Environment Competitiveness of Russia

Russia is the largest country in the world, its total area is 1,6376.9 thousand square kilometers. From northwest to southeast, Russia shares borders with 14 countries. The enormous size of Russia and the remoteness of many areas from the sea result in the dominance of the humid continental climate and Russia possesses rich natural resources. It covers 1,6376.9 thousand of square kilometers and has a population of 142.96 million. Its GDP reaches $1,857.77 billion in 2011. Through the index system and evaluation model, the environment competitiveness index of Russia ranks at 81 in 133 countries.

Score: 48.46
Rank: 81

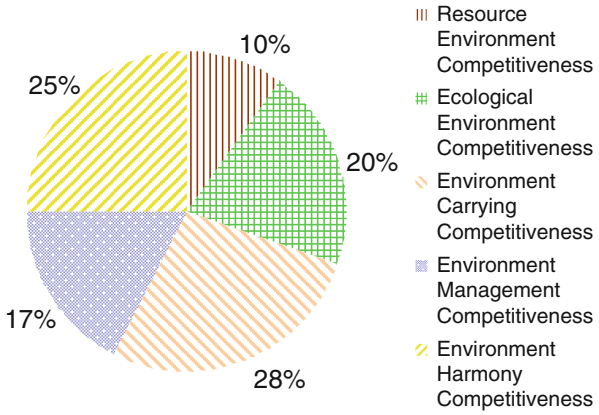

Fig. 117.1 Contribution of sub-index to GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_117,

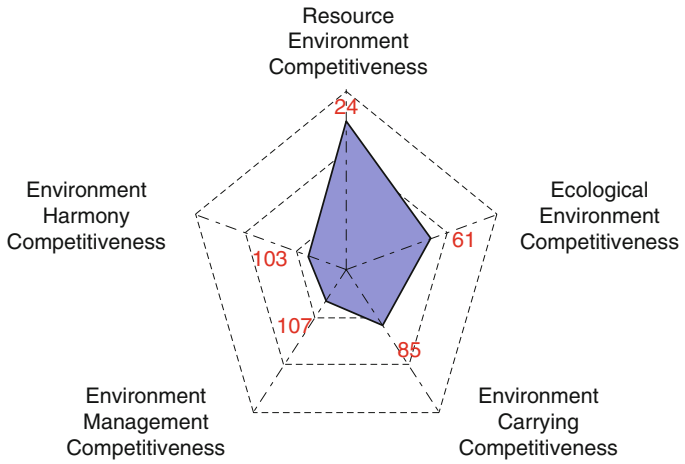

Fig. 117.2 Rank of sub-index of GEC

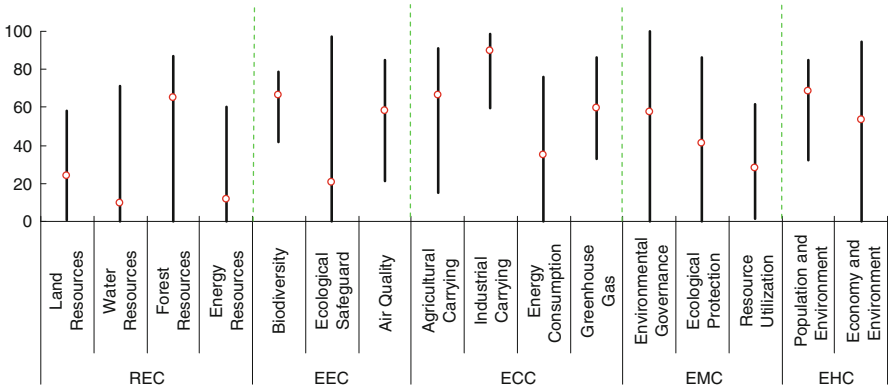

Fig. 117.3 Score and rank of the pillars of GEC

Table 117.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	24.32	24	Total internal renewable water resources	13.28	68
1.1 Land Resources	23.92	20	1.3 Forest Resources	64.99	2
Land area per capita	20.63	10	Growing stock in forest and other wooded land	100.00	1
Percentage of arable land to total land area	12.44	91	Proportion of land area covered by forest	57.87	19
Arable land per capita	39.79	6	Forest area per capita	39.47	4
1.2 Water Resources	9.81	94	1.4 Energy Resources	11.97	38
Surface water	2.79	77	Fossil energy	16.75	10
Annual precipitation	16.28	103	Energy production	9.17	14
Groundwater	6.89	76			

(continued)

Table 117.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
Proportion of combustible renewable and waste to total energy consumption	1.06	106	Energy consumption per unit of land area	99.91	41
Net energy imports of the energy consumption	23.51	24	Ratio of clean energy consumption	15.39	40
2 Ecological Environment Competitiveness	49.38	61	Elasticity of energy consumption	13.67	83
2.1 Biodiversity	66.77	4	Elasticity of electric power consumption	10.70	64
Threatened fish species	83.49	82	3.4 Greenhouse Gas	59.45	86
Threatened mammal species	82.61	110	Growth rate of CO_2 emissions	51.51	70
Threatened plant species	99.53	56	Growth rate of Methane emissions	54.74	88
GEF benefits index for biodiversity	34.10	10	CO_2 emissions per unit of land area	99.89	51
2.2 Ecological Safeguard	20.36	68	CO_2 emissions per unit of energy consumption	39.56	73
Terrestrial protected areas	24.46	73	4 Environment Management Competitiveness	42.10	107
Marine protected areas	14.21	21	4.1 Environmental Governance	57.30	123
2.3 Air Quality	58.10	66	Agricultural chemicals regulation	0.00	86
Inhalable particles (PM10)	89.05	16	Percentage of the rural population with access to an improved water source	92.00	53
Particulate matter (PM2.5)	86.94	55	Percentage of the urban population with access to an improved water source	99.00	51
Index of indoor air pollution	38.30	56	4.2 Ecological Protection	41.21	39
Nitrogen oxides emission	52.72	127	Area of plantation and afforestation	22.02	3
Sulfur dioxide emission	23.36	128	Biome protect	53.40	70
3 Environment Carrying Competitiveness	65.69	85	Overfishing of fishing resources	54.60	48
3.1 Agricultural Carrying	66.22	68	4.3 Resource Utilization	28.09	104
Cereal yield per unit of arable land	16.61	92	Utilization rate of water resources	0.06	106
Fertilizer consumption per unit of arable land	98.74	34	Percentage of total internal renewable water resources to total water resources	85.92	25
Annual freshwater withdrawals for agriculture per unit of arable land	99.84	28	Percentage of agricultural land to total land area	15.56	120
3.2 Industrial Carrying	89.86	84	Percentage of fossil fuel energy consumption to total energy consumption	10.83	97
Net exports of goods as a percentage of GDP	82.40	59			
Electric power consumption per unit of value added of industry	85.38	104			
SO_2 emissions per unit of value added of industry	99.64	88			
Annual freshwater withdrawals for industry per value added of industry	92.00	108			
3.3 Energy Consumption	34.92	47			

(continued)

Table 117.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
5 Environment Harmony Competitiveness	60.83	103	CO_2 emissions per capita	69.84	117
5.1 Population and Environment	68.40	79	Energy consumption per capita	62.20	110
Percentage of population with access to Improved sanitation facilities	87.00	67	5.2 Economy and Environment	53.26	107
Motor vehicles per 1,000 people	66.79	88	Land resource utilization efficiency	0.03	95
Renewable internal freshwater resources per capita	36.50	10	Sulfur dioxide emissions per unit of GDP	87.25	99
SO_2 emissions per capita	82.41	109	Carbon dioxide emissions per unit of GDP	59.85	118
			Energy consumption per unit of GDP	65.92	106

Table 117.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	4	3	1	4	2
Ecological Environment Competitiveness	11	1	1	3	4	2
Environment Carrying Competitiveness	15	0	0	6	8	1
Environment Management Competitiveness	10	1	1	2	2	4
Environment Harmony Competitiveness	10	1	0	0	5	4
Total	60	7	5	12	23	13

Chapter 118
Report on Global Environment Competitiveness of Saudi Arabia

Score: 51.33
Rank: 54

Saudi Arabia is the largest state in Western Asia by land area, Its total area is 2,149.7 thousand square kilometers, it is bordered by Jordan and Iraq to the north and northeast, Kuwait, Qatar, Bahrain and the United Arab Emirates to the east, Oman to the southeast, and Yemen to the south. The Red Sea lies to its west, and the Persian Gulf lies to the east. Saudi Arabia has a desert climate with extremely high daytime temperatures and a sharp temperature drop at night. It covers 2,149.7 thousand of square kilometers and has a population of 28.08 million. Its GDP reaches $576.82 billion in 2011. Through the index system and evaluation model, the environment competitiveness index of Saudi Arabia ranks at 54 in 133 countries.

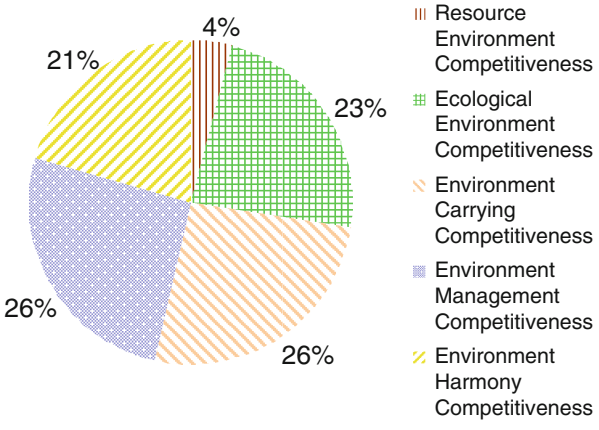

Fig. 118.1 Contribution of sub-index to GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_118,

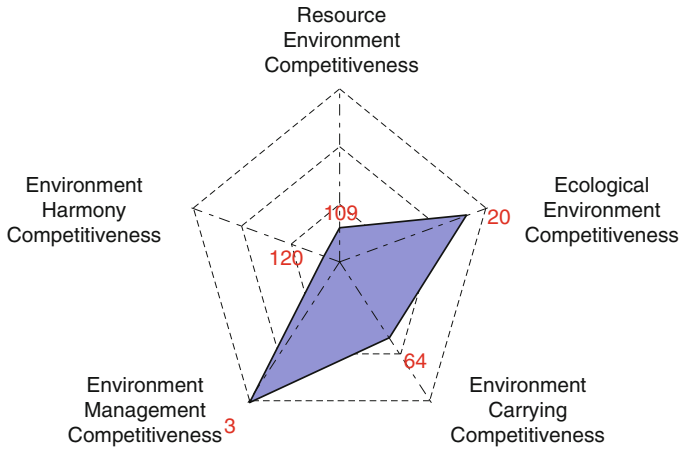

Fig. 118.2 Rank of sub-index of GEC

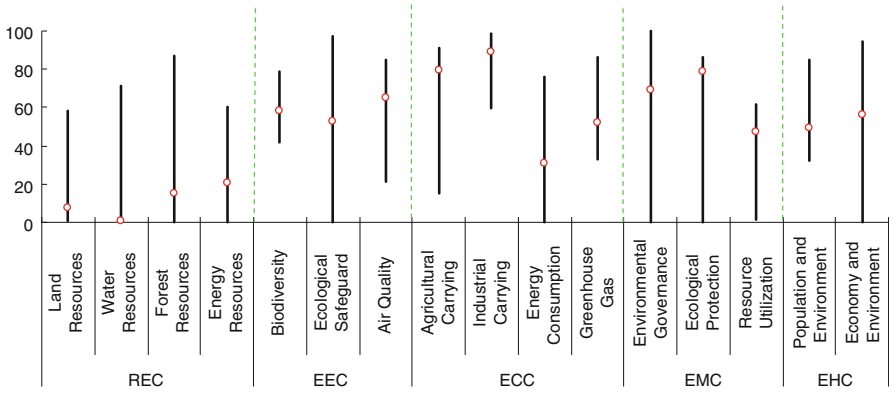

Fig. 118.3 Score and rank of the pillars of GEC

Table 118.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	11.02	109	Total internal renewable water resources	0.06	130
1.1 Land Resources	7.75	102	1.3 Forest Resources	15.29	121
Land area per capita	13.78	17	Growing stock in forest and other wooded land	50.02	109
Percentage of arable land to total land area	2.28	122	Proportion of land area covered by forest	0.53	125
Arable land per capita	5.18	93	Forest area per capita	0.24	114
1.2 Water Resources	0.54	131	1.4 Energy Resources	20.83	12
Surface water	0.01	125	Fossil energy	25.99	7
Annual precipitation	2.00	128	Energy production	19.80	7
Groundwater	0.11	124			

(continued)

Table 118.1 (continued)

Indicators	Score	Rank
Proportion of combustible renewable and waste to total energy consumption	0.00	118
Net energy imports of the energy consumption	40.65	12
2 Ecological Environment Competitiveness	59.37	20
2.1 Biodiversity	58.10	65
Threatened fish species	89.15	62
Threatened mammal species	95.11	49
Threatened plant species	99.82	40
GEF benefits index for biodiversity	3.20	61
2.2 Ecological Safeguard	52.62	12
Terrestrial protected areas	84.78	5
Marine protected areas	4.38	44
2.3 Air Quality	65.38	54
Inhalable particles (PM10)	29.93	127
Particulate matter (PM2.5)	69.03	108
Index of indoor air pollution	100.00	1
Nitrogen oxides emission	67.62	73
Sulfur dioxide emission	36.31	117
3 Environment Carrying Competitiveness	67.14	64
3.1 Agricultural Carrying	79.57	12
Cereal yield per unit of arable land	59.24	17
Fertilizer consumption per unit of arable land	96.46	53
Annual freshwater withdrawals for agriculture per unit of arable land	89.77	111
3.2 Industrial Carrying	89.11	88
Net exports of goods as a percentage of GDP	61.29	114
Electric power consumption per unit of value added of industry	95.46	30
SO_2 emissions per unit of value added of industry	99.87	49
Annual freshwater withdrawals for industry per value added of industry	99.83	11
3.3 Energy Consumption	30.95	108
Energy consumption per unit of land area	99.84	54
Ratio of clean energy consumption	0.00	116
Elasticity of energy consumption	13.71	81
Elasticity of electric power consumption	10.27	83
3.4 Greenhouse Gas	51.72	125
Growth rate of CO_2 emissions	41.23	103
Growth rate of Methane emissions	47.79	119
CO_2 emissions per unit of land area	99.77	69
CO_2 emissions per unit of energy consumption	28.59	105
4 Environment Management Competitiveness	66.31	3
4.1 Environmental Governance	69.10	107
Agricultural chemicals regulation	100.00	1
Percentage of the rural population with access to an improved water source	0.00	122
Percentage of the urban population with access to an improved water source	97.00	80
4.2 Ecological Protection	78.46	2
Area of plantation and afforestation	N/A	N/A
Biome protect	100.00	1
Overfishing of fishing resources	56.93	43
4.3 Resource Utilization	47.32	21
Utilization rate of water resources	38.27	3
Percentage of total internal renewable water resources to total water resources	54.55	82
Percentage of agricultural land to total land area	95.36	4

(continued)

Table 118.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
Percentage of fossil fuel energy consumption to total energy consumption	1.12	121	SO_2 emissions per capita	75.71	117
			CO_2 emissions per capita	56.03	126
			Energy consumption per capita	52.39	116
5 Environment Harmony Competitiveness	52.79	120	5.2 Economy and Environment	56.34	97
5.1 Population and Environment	49.24	127	Land resource utilization efficiency	0.08	77
Percentage of population with access to Improved sanitation facilities	N/A	N/A	Sulfur dioxide emissions per unit of GDP	88.82	92
			Carbon dioxide emissions per unit of GDP	62.82	116
Motor vehicles per 1,000 people	58.77	95	Energy consumption per unit of GDP	73.64	95
Renewable internal freshwater resources per capita	0.10	128			

Table 118.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	2	2	0	0	10
Ecological Environment Competitiveness	11	2	1	3	3	2
Environment Carrying Competitiveness	15	0	3	3	3	6
Environment Management Competitiveness	10	5	1	0	1	2
Environment Harmony Competitiveness	10	0	0	0	4	5
Total	60	9	7	6	11	25

Chapter 119
Report on Global Environment Competitiveness of Senegal

Senegal is a country in western Africa, bounded by the Atlantic Ocean to the west, Mauritania to the north, Mali to the east, and Guinea and Guinea-Bissau to the south. Its total area is thousand square kilometers. The local climate is tropical with well-defined dry and humid seasons. It covers 192.5 thousand of square kilometers and has a population of 12.77 million. Its GDP reaches $14.29 billion in 2011. Through the index system and evaluation model, the environment competitiveness index of Senegal ranks at 62 in 133 countries.

Score: 50.50
Rank: 62

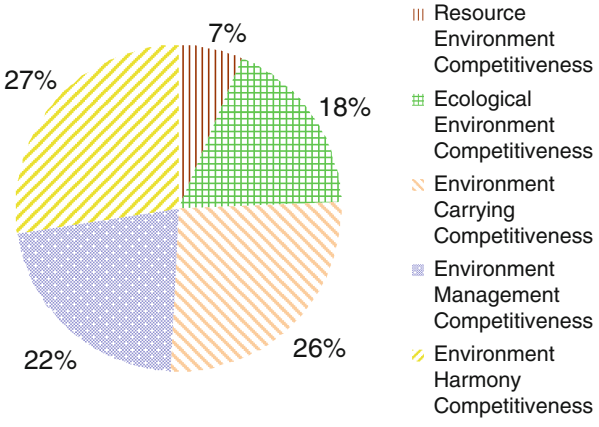

Fig. 119.1 Contribution of sub-index to GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_119,

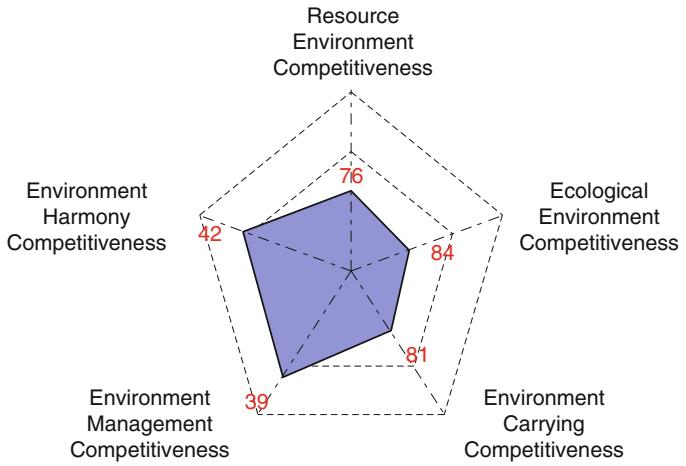

Fig. 119.2 Rank of sub-index of GEC

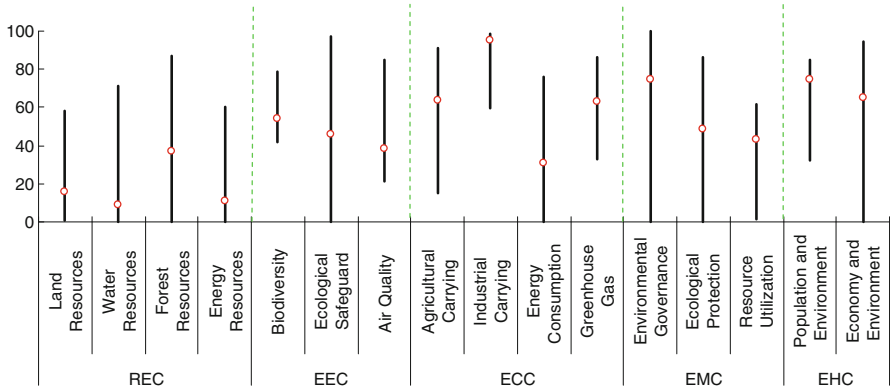

Fig. 119.3 Score and rank of the pillars of GEC

Table 119.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	16.43	76	Groundwater	2.58	99
1.1 Land Resources	15.46	49	Total internal renewable water resources	6.76	87
Land area per capita	2.69	57	1.3 Forest Resources	37.19	33
Percentage of arable land to total land area	33.84	39	Growing stock in forest and other wooded land	50.96	74
Arable land per capita	14.11	33	Proportion of land area covered by forest	51.30	28
1.2 Water Resources	8.79	100	Forest area per capita	4.61	37
Surface water	2.06	90	1.4 Energy Resources	10.87	41
Annual precipitation	23.76	75			

(continued)

Table 119.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
Fossil energy	0.00	64	Energy consumption per unit of land area	99.97	21
Energy production	0.13	119	Ratio of clean energy consumption	1.21	96
Proportion of combustible renewable and waste to total energy consumption	49.64	25	Elasticity of energy consumption	8.59	123
Net energy imports of the energy consumption	5.98	94	Elasticity of electric power consumption	12.95	27
2 Ecological Environment Competitiveness	45.36	84	3.4 Greenhouse Gas	62.89	60
2.1 Biodiversity	54.31	113	Growth rate of CO_2 emissions	52.41	64
Threatened fish species	78.77	100	Growth rate of Methane emissions	51.77	105
Threatened mammal species	91.30	90	CO_2 emissions per unit of land area	99.97	29
Threatened plant species	99.47	60	CO_2 emissions per unit of energy consumption	57.91	37
GEF benefits index for biodiversity	1.00	83	4 Environment Management Competitiveness	54.73	39
2.2 Ecological Safeguard	45.66	21	4.1 Environmental Governance	74.50	92
Terrestrial protected areas	65.22	16	Agricultural chemicals regulation	N/A	N/A
Marine protected areas	16.33	19	Percentage of the rural population with access to an improved water source	56.00	100
2.3 Air Quality	38.42	126	Percentage of the urban population with access to an improved water source	93.00	98
Inhalable particles (PM10)	43.80	120	4.2 Ecological Protection	48.48	18
Particulate matter (PM2.5)	51.95	127	Area of plantation and afforestation	0.60	51
Index of indoor air pollution	9.70	93	Biome protect	99.50	17
Nitrogen oxides emission	68.14	53	Overfishing of fishing resources	61.29	34
Sulfur dioxide emission	40.90	32	4.3 Resource Utilization	43.30	35
3 Environment Carrying Competitiveness	66.21	81	Utilization rate of water resources	0.23	71
3.1 Agricultural Carrying	63.36	99	Percentage of total internal renewable water resources to total water resources	64.02	67
Cereal yield per unit of arable land	9.30	113	Percentage of agricultural land to total land area	58.35	52
Fertilizer consumption per unit of arable land	99.60	16	Percentage of fossil fuel energy consumption to total energy consumption	50.58	35
Annual freshwater withdrawals for agriculture per unit of arable land	99.19	57			
3.2 Industrial Carrying	94.97	19			
Net exports of goods as a percentage of GDP	88.90	28			
Electric power consumption per unit of value added of industry	93.69	44			
SO_2 emissions per unit of value added of industry	99.65	85			
Annual freshwater withdrawals for industry per value added of industry	97.63	64			
3.3 Energy Consumption	30.68	113			

(continued)

Table 119.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
5 Environment Harmony Competitiveness	69.75	42	CO_2 emissions per capita	98.92	24
5.1 Population and Environment	74.58	45	Energy consumption per capita	98.97	4
Percentage of population with access to Improved sanitation facilities	51.00	98	5.2 Economy and Environment	64.92	70
Motor vehicles per 1,000 people	97.53	24	Land resource utilization efficiency	0.02	103
Renewable internal freshwater resources per capita	2.45	80	Sulfur dioxide emissions per unit of GDP	91.45	83
SO_2 emissions per capita	98.84	25	Carbon dioxide emissions per unit of GDP	85.53	75
			Energy consumption per unit of GDP	82.68	72

Table 119.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	0	2	5	6	1
Ecological Environment Competitiveness	11	0	2	2	3	4
Environment Carrying Competitiveness	15	0	5	2	4	4
Environment Management Competitiveness	10	0	2	3	4	0
Environment Harmony Competitiveness	10	0	3	1	5	1
Total	60	0	14	13	22	10

Chapter 120
Report on Global Environment Competitiveness of Serbia

Serbia is a landlocked country located at the crossroads of Central and Southeast Europe, Serbia borders Hungary to the north, Romania and Bulgaria to the east, the Republic of Macedonia to the south, Croatia, Bosnia and Herzegovina, and Montenegro to the west. It covers 87.5 thousand of square kilometers and has a population of 7.26 million. Its GDP reaches $45.82billion in 2011. Through the index system and evaluation model, the environment competitiveness index of Serbia ranks at 108 in 133 countries.

Score: 46.07
Rank: 108

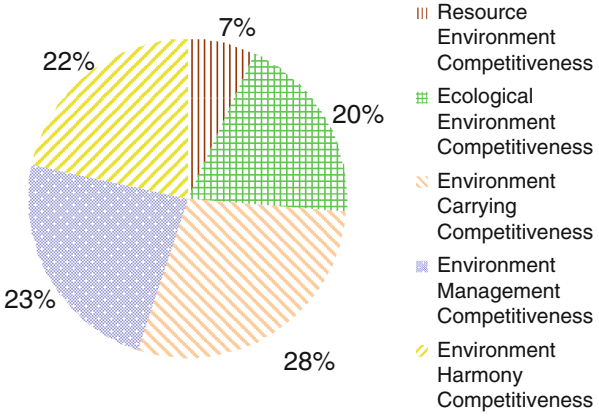

Fig. 120.1 Contribution of sub-index to GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_120,

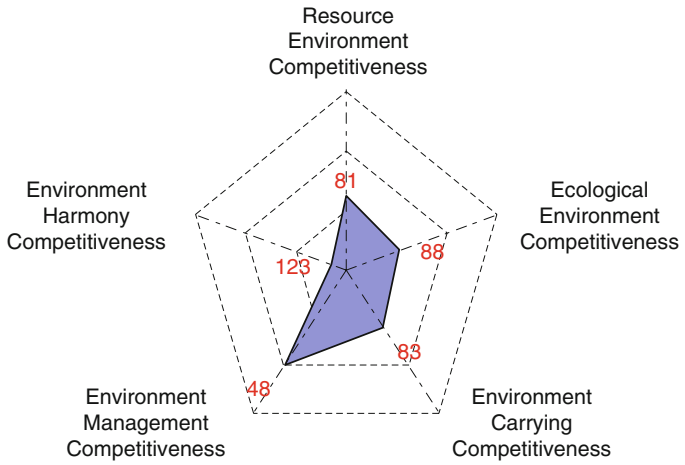

Fig. 120.2 Rank of sub-index of GEC

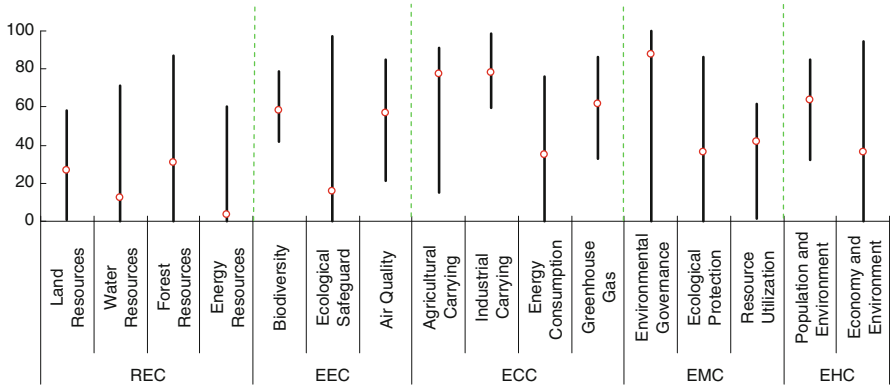

Fig. 120.3 Score and rank of the pillars of GEC

Table 120.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	16.07	81	Groundwater	N/A	N/A
1.1 Land Resources	26.40	15	Total internal renewable water resources	4.85	95
Land area per capita	2.15	76	1.3 Forest Resources	30.96	61
Percentage of arable land to total land area	63.88	12	Growing stock in forest and other wooded land	51.26	68
Arable land per capita	21.24	17	Proportion of land area covered by forest	36.97	55
1.2 Water Resources	12.11	76	Forest area per capita	2.65	58
Surface water	N/A	N/A	1.4 Energy Resources	3.22	94
Annual precipitation	19.38	97			

(continued)

Table 120.1 (continued)

Indicators	Score	Rank
Fossil energy	0.00	64
Energy production	1.47	49
Proportion of combustible renewable and waste to total energy consumption	7.10	69
Net energy imports of the energy consumption	8.56	71
2 Ecological Environment Competitiveness	44.97	88
2.1 Biodiversity	58.37	56
Threatened fish species	94.81	28
Threatened mammal species	96.74	30
Threatened plant species	99.88	30
GEF benefits index for biodiversity	0.20	109
2.2 Ecological Safeguard	16.03	81
Terrestrial protected areas	16.03	90
Marine protected areas	N/A	N/A
2.3 Air Quality	56.63	75
Inhalable particles (PM10)	100.00	1
Particulate matter (PM2.5)	80.15	86
Index of indoor air pollution	15.60	82
Nitrogen oxides emission	68.03	59
Sulfur dioxide emission	38.10	110
3 Environment Carrying Competitiveness	65.92	83
3.1 Agricultural Carrying	77.46	16
Cereal yield per unit of arable land	51.78	24
Fertilizer consumption per unit of arable land	89.18	89
Annual freshwater withdrawals for agriculture per unit of arable land	99.97	11
3.2 Industrial Carrying	78.08	124
Net exports of goods as a percentage of GDP	81.85	63
Electric power consumption per unit of value added of industry	73.55	115
SO_2 emissions per unit of value added of industry	96.94	127
Annual freshwater withdrawals for industry per value added of industry	59.99	130
3.3 Energy Consumption	34.71	49
Energy consumption per unit of land area	99.62	88
Ratio of clean energy consumption	10.95	51
Elasticity of energy consumption	14.75	24
Elasticity of electric power consumption	13.50	19
3.4 Greenhouse Gas	61.60	66
Growth rate of CO_2 emissions	62.52	31
Growth rate of Methane emissions	64.06	26
CO_2 emissions per unit of land area	99.41	99
CO_2 emissions per unit of energy consumption	19.47	115
4 Environment Management Competitiveness	53.34	48
4.1 Environmental Governance	87.67	73
Agricultural chemicals regulation	71.43	63
Percentage of the rural population with access to an improved water source	98.00	40
Percentage of the urban population with access to an improved water source	99.00	51
4.2 Ecological Protection	36.35	57
Area of plantation and afforestation	0.23	71
Biome protect	84.50	36
Overfishing of fishing resources	N/A	N/A
4.3 Resource Utilization	41.68	44
Utilization rate of water resources	N/A	N/A
Percentage of total internal renewable water resources to total water resources	N/A	N/A
Percentage of agricultural land to total land area	68.32	35
Percentage of fossil fuel energy consumption to total energy consumption	15.04	82

(continued)

Table 120.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
5 Environment Harmony Competitiveness	50.02	123	CO_2 emissions per capita	82.98	92
5.1 Population and Environment	64.03	105	Energy consumption per capita	84.21	78
Percentage of population with access to Improved sanitation facilities	92.00	57	5.2 Economy and Environment	36.00	123
Motor vehicles per 1,000 people	69.14	86	Land resource utilization efficiency	0.15	53
Renewable internal freshwater resources per capita	1.40	97	Sulfur dioxide emissions per unit of GDP	18.30	128
SO_2 emissions per capita	43.46	127	Carbon dioxide emissions per unit of GDP	54.39	122
			Energy consumption per unit of GDP	71.17	98

Table 120.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	0	2	2	8	0
Ecological Environment Competitiveness	11	1	3	2	5	0
Environment Carrying Competitiveness	15	0	4	3	5	3
Environment Management Competitiveness	10	0	0	5	3	0
Environment Harmony Competitiveness	10	0	0	2	3	5
Total	60	1	9	14	24	8

Chapter 121
Report on Global Environment Competitiveness of Singapore

Score: 48.13
Rank: 86

Singapore is a Southeast Asian city-state off the southern tip of the Malay Peninsula, it is separated from Malaysia by the Straits of Johor to its north and from Indonesia's Riau Islands by the Singapore Strait to its south.Singapore has a tropical rainforest climate. It covers 0.1 thousand of square kilometers and has a population of 5.18 million. Its GDP reaches $239.70 billion in 2011. Through the index system and evaluation model, the environment competitiveness index of Singapore ranks at 86 in 133 countries.

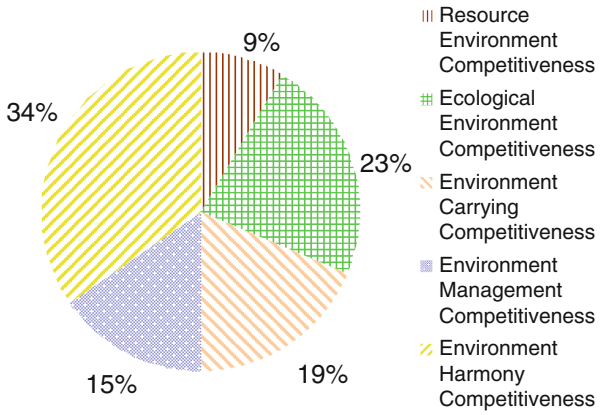

Fig. 121.1 Contribution of sub-index to GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_121,

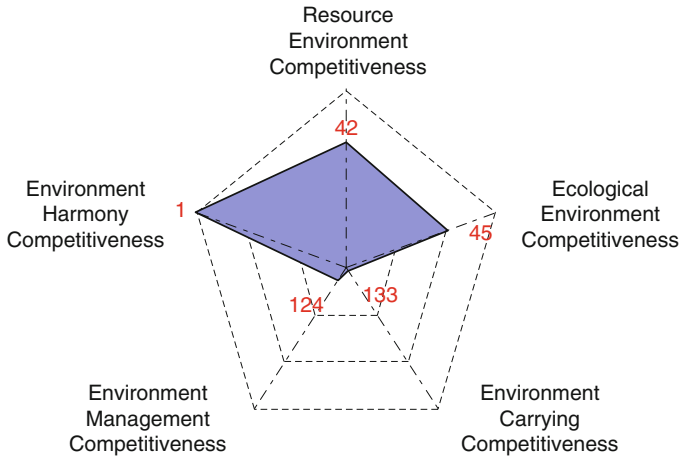

Fig. 121.2 Rank of sub-index of GEC

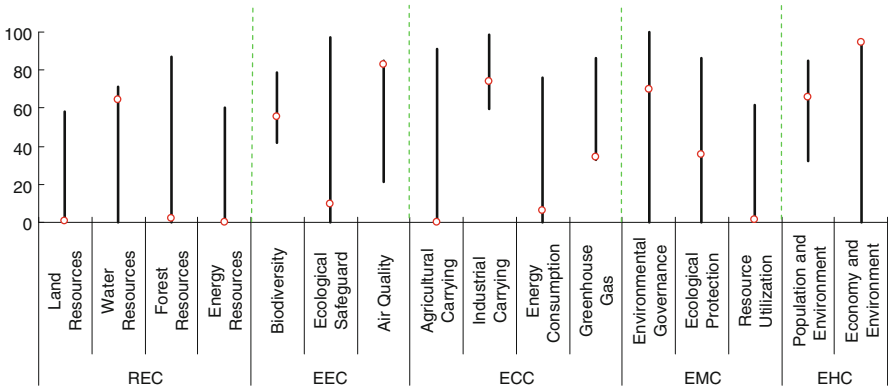

Fig. 121.3 Score and rank of the pillars of GEC

Table 121.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	19.98	42	Groundwater	N/A	N/A
1.1 Land Resources	0.41	133	Total internal renewable water resources	43.23	25
Land area per capita	0.00	133	1.3 Forest Resources	2.20	128
Percentage of arable land to total land area	1.35	127	Growing stock in forest and other wooded land	N/A	N/A
Arable land per capita	0.00	133	Proportion of land area covered by forest	3.85	114
1.2 Water Resources	64.56	5	Forest area per capita	0.00	131
Surface water	N/A	N/A	1.4 Energy Resources	0.29	123
Annual precipitation	85.88	6			

(continued)

Table 121.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
Fossil energy	0.00	64	Energy consumption per unit of land area	0.00	126
Energy production	0.08	122	Ratio of clean energy consumption	0.00	116
Proportion of combustible renewable and waste to total energy consumption	1.32	104	Elasticity of energy consumption	13.00	108
Net energy imports of the energy consumption	0.00	126	Elasticity of electric power consumption	10.44	77
2 Ecological Environment Competitiveness	52.75	45	3.4 Greenhouse Gas	34.25	130
2.1 Biodiversity	55.82	102	Growth rate of CO_2 emissions	30.42	120
Threatened fish species	88.21	69	Growth rate of Methane emissions	61.19	45
Threatened mammal species	94.02	64	CO_2 emissions per unit of land area	0.00	132
Threatened plant species	96.67	97	CO_2 emissions per unit of energy consumption	49.21	49
GEF benefits index for biodiversity	0.10	122	4 Environment Management Competitiveness	35.50	124
2.2 Ecological Safeguard	9.33	102	4.1 Environmental Governance	70.00	106
Terrestrial protected areas	14.40	95	Agricultural chemicals regulation	100.00	1
Marine protected areas	1.73	66	Percentage of the rural population with access to an improved water source	0.00	122
2.3 Air Quality	83.01	9	Percentage of the urban population with access to an improved water source	100.00	1
Inhalable particles (PM10)	83.21	50	4.2 Ecological Protection	35.34	62
Particulate matter (PM2.5)	100.00	1	Area of plantation and afforestation	N/A	N/A
Index of indoor air pollution	100.00	1	Biome protect	28.50	101
Nitrogen oxides emission	68.79	20	Overfishing of fishing resources	42.17	67
Sulfur dioxide emission	40.34	82	4.3 Resource Utilization	1.23	133
3 Environment Carrying Competitiveness	43.08	133	Utilization rate of water resources	1.28	28
3.1 Agricultural Carrying	N/A	N/A	Percentage of total internal renewable water resources to total water resources	N/A	N/A
Cereal yield per unit of arable land	N/A	N/A	Percentage of agricultural land to total land area	0.00	133
Fertilizer consumption per unit of arable land	N/A	N/A	Percentage of fossil fuel energy consumption to total energy consumption	2.41	115
Annual freshwater withdrawals for agriculture per unit of arable land	N/A	N/A			
3.2 Industrial Carrying	73.79	130			
Net exports of goods as a percentage of GDP	0.00	133			
Electric power consumption per unit of value added of industry	95.41	31			
SO_2 emissions per unit of value added of industry	99.90	39			
Annual freshwater withdrawals for industry per value added of industry	99.83	10			
3.3 Energy Consumption	5.86	126			

(continued)

Table 121.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
5 Environment Harmony Competitiveness	80.34	1	CO_2 emissions per capita	66.48	121
5.1 Population and Environment	65.93	91	Energy consumption per capita	50.12	117
Percentage of population with access to Improved sanitation facilities	100.00	1	5.2 Economy and Environment	94.75	1
Motor vehicles per 1,000 people	80.99	74	Land resource utilization efficiency	100.00	1
Renewable internal freshwater resources per capita	0.14	123	Sulfur dioxide emissions per unit of GDP	96.73	44
SO_2 emissions per capita	81.48	111	Carbon dioxide emissions per unit of GDP	90.80	48
			Energy consumption per unit of GDP	91.46	36

Table 121.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	2	0	0	1	8
Ecological Environment Competitiveness	11	3	1	1	4	2
Environment Carrying Competitiveness	15	0	0	3	0	9
Environment Management Competitiveness	10	1	1	0	1	5
Environment Harmony Competitiveness	10	3	0	2	2	3
Total	60	9	2	6	8	27

Chapter 122
Report on Global Environment Competitiveness of Slovak

Score: 55.73
Rank: 13

Slovak Republic is a landlocked state in Central Europe and is bordered by the Czech Republic and Austria to the west, Poland to the north, Ukraine to the east and Hungary to the south. There are four somewhat different climates in Slovakia. It covers 48.1 thousand of square kilometers and has a population of 5.40 million. Its GDP reaches $95.99 billion in 2011. Through the index system and evaluation model, the environment competitiveness index of Slovak ranks at 13 in 133 countries.

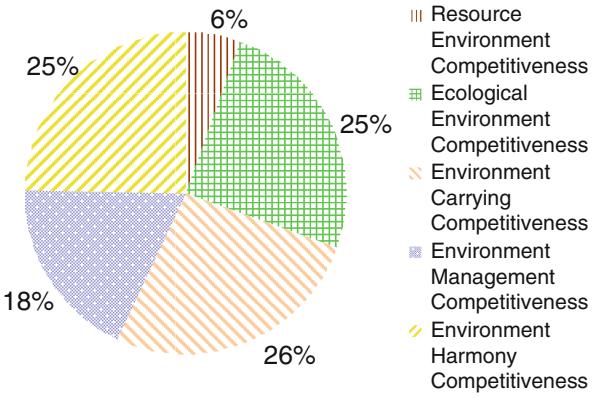

Fig. 122.1 Contribution of sub-index to GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_122,

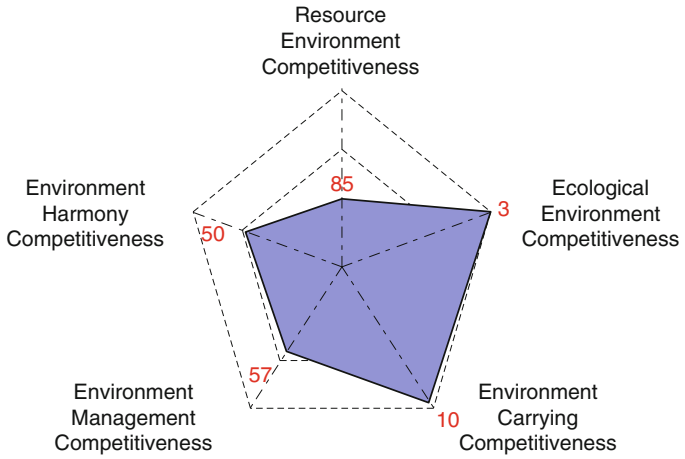

Fig. 122.2 Rank of sub-index of GEC

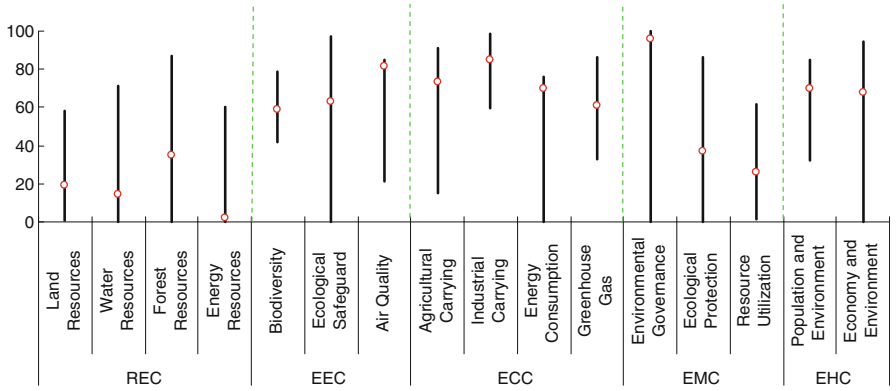

Fig. 122.3 Score and rank of the pillars of GEC

Table 122.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	15.82	85	Groundwater	5.14	86
1.1 Land Resources	18.96	34	Total internal renewable water resources	13.21	69
Land area per capita	1.58	93	1.3 Forest Resources	35.05	42
Percentage of arable land to total land area	49.03	23	Growing stock in forest and other wooded land	51.56	60
Arable land per capita	12.06	46	Proportion of land area covered by forest	47.08	34
1.2 Water Resources	14.52	67	Forest area per capita	2.50	59
Surface water	11.24	29	1.4 Energy Resources	2.20	105
Annual precipitation	28.49	68			

(continued)

Table 122.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
Fossil energy	0.00	64	Energy consumption per unit of land area	99.21	107
Energy production	1.15	56	Ratio of clean energy consumption	41.92	16
Proportion of combustible renewable and waste to total energy consumption	5.77	74	Elasticity of energy consumption	51.43	2
Net energy imports of the energy consumption	4.31	101	Elasticity of electric power consumption	87.42	2
2 Ecological Environment Competitiveness	69.07	3	3.4 Greenhouse Gas	61.05	72
2.1 Biodiversity	59.18	30	Growth rate of CO_2 emissions	47.97	79
Threatened fish species	97.64	14	Growth rate of Methane emissions	62.21	36
Threatened mammal species	98.37	11	CO_2 emissions per unit of land area	99.19	108
Threatened plant species	99.71	47	CO_2 emissions per unit of energy consumption	47.91	52
GEF benefits index for biodiversity	0.10	122	4 Environment Management Competitiveness	51.46	57
2.2 Ecological Safeguard	62.77	9	4.1 Environmental Governance	96.19	36
Terrestrial protected areas	62.77	18	Agricultural chemicals regulation	90.48	37
Marine protected areas	N/A	N/A	Percentage of the rural population with access to an improved water source	100.00	1
2.3 Air Quality	81.21	18	Percentage of the urban population with access to an improved water source	100.00	1
Inhalable particles (PM10)	90.51	12	4.2 Ecological Protection	36.92	52
Particulate matter (PM2.5)	83.76	73	Area of plantation and afforestation	1.24	36
Index of indoor air pollution	100.00	1	Biome protect	84.50	36
Nitrogen oxides emission	68.30	48	Overfishing of fishing resources	N/A	N/A
Sulfur dioxide emission	40.74	57	4.3 Resource Utilization	26.10	114
3 Environment Carrying Competitiveness	73.62	10	Utilization rate of water resources	0.05	109
3.1 Agricultural Carrying	72.95	30	Percentage of total internal renewable water resources to total water resources	24.31	111
Cereal yield per unit of arable land	38.17	47	Percentage of agricultural land to total land area	47.44	76
Fertilizer consumption per unit of arable land	92.28	76	Percentage of fossil fuel energy consumption to total energy consumption	32.60	49
Annual freshwater withdrawals for agriculture per unit of arable land	99.98	8			
3.2 Industrial Carrying	85.09	111			
Net exports of goods as a percentage of GDP	48.16	129			
Electric power consumption per unit of value added of industry	93.46	49			
SO_2 emissions per unit of value added of industry	99.92	32			
Annual freshwater withdrawals for industry per value added of industry	98.82	45			
3.3 Energy Consumption	70.00	2			

(continued)

Table 122.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
5 Environment Harmony Competitiveness	68.69	50	CO_2 emissions per capita	82.62	94
5.1 Population and Environment	69.55	72	Energy consumption per capita	75.20	97
Percentage of population with access to Improved sanitation facilities	100.00	1	5.2 Economy and Environment	67.84	47
Motor vehicles per 1,000 people	57.28	97	Land resource utilization efficiency	0.58	27
Renewable internal freshwater resources per capita	2.82	74	Sulfur dioxide emissions per unit of GDP	96.91	42
SO_2 emissions per capita	93.31	83	Carbon dioxide emissions per unit of GDP	86.49	72
			Energy consumption per unit of GDP	87.38	55

Table 122.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	0	2	5	6	1
Ecological Environment Competitiveness	11	2	6	2	1	0
Environment Carrying Competitiveness	15	2	2	4	3	4
Environment Management Competitiveness	10	1	0	5	1	3
Environment Harmony Competitiveness	10	1	1	2	6	0
Total	60	6	11	18	17	8

Chapter 123
Report on Global Environment Competitiveness of Slovenia

Slovenia is located in South-Central Europe borders Italy to the west, Austria to the north, Croatia to the south and southeast and Hungary to the northeast. Slovenia is located in temperate latitudes. It covers 20.1 thousand of square kilometers and has a population of 2.05 million. Its GDP reaches $49.54 billion in 2011. Through the index system and evaluation model, the environment competitiveness index of Slovenia ranks at 27 in 133 countries.

Score: 53.82
Rank: 27

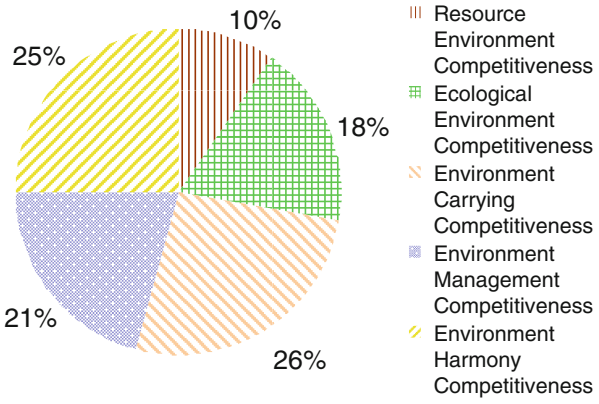

Fig. 123.1 Contribution of sub-index to GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_123,

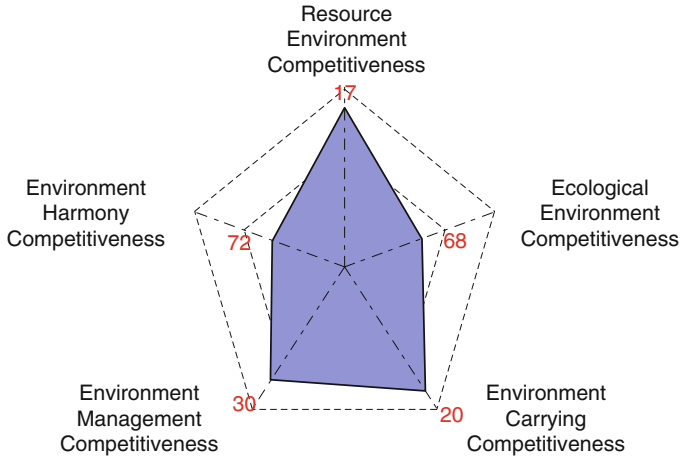

Fig. 123.2 Rank of sub-index of GEC

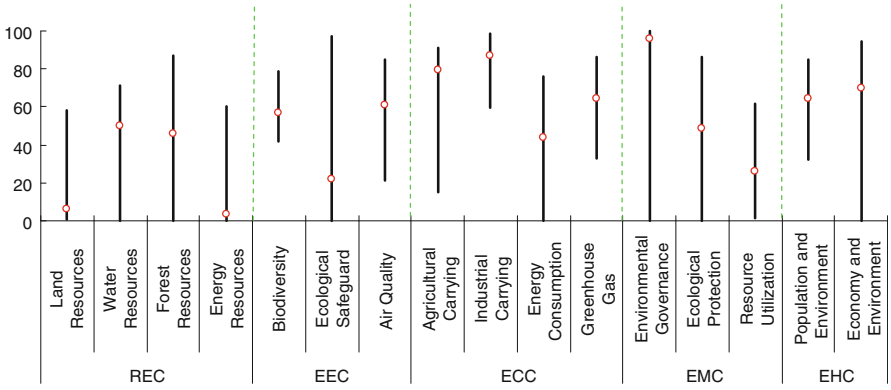

Fig. 123.3 Score and rank of the pillars of GEC

Table 123.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	26.46	17	Groundwater	96.55	3
1.1 Land Resources	6.07	118	Total internal renewable water resources	46.75	21
Land area per capita	1.74	85	1.3 Forest Resources	45.85	16
Percentage of arable land to total land area	14.05	90	Growing stock in forest and other wooded land	51.26	67
Arable land per capita	3.84	104	Proportion of land area covered by forest	72.98	8
1.2 Water Resources	49.99	13	Forest area per capita	4.26	42
Surface water	17.00	13	1.4 Energy Resources	3.60	85
Annual precipitation	39.65	47			

(continued)

Table 123.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
Fossil energy	0.00	64	Energy consumption per unit of land area	99.24	106
Energy production	1.83	39	Ratio of clean energy consumption	46.55	11
Proportion of combustible renewable and waste to total energy consumption	9.97	62	Elasticity of energy consumption	14.57	25
Net energy imports of the energy consumption	6.44	86	Elasticity of electric power consumption	15.89	16
2 Ecological Environment Competitiveness	47.95	68	3.4 Greenhouse Gas	64.21	45
2.1 Biodiversity	56.83	85	Growth rate of CO_2 emissions	58.45	41
Threatened fish species	86.32	74	Growth rate of Methane emissions	61.68	41
Threatened mammal species	97.83	17	CO_2 emissions per unit of land area	99.15	110
Threatened plant species	99.59	54	CO_2 emissions per unit of energy consumption	43.30	63
GEF benefits index for biodiversity	0.20	109	4 Environment Management Competitiveness	56.11	30
2.2 Ecological Safeguard	21.68	64	4.1 Environmental Governance	95.89	38
Terrestrial protected areas	35.60	55	Agricultural chemicals regulation	90.48	37
Marine protected areas	0.80	75	Percentage of the rural population with access to an improved water source	99.00	30
2.3 Air Quality	61.00	61	Percentage of the urban population with access to an improved water source	100.00	1
Inhalable particles (PM10)	81.02	56	4.2 Ecological Protection	48.75	17
Particulate matter (PM2.5)	88.38	45	Area of plantation and afforestation	0.04	99
Index of indoor air pollution	35.60	59	Biome protect	76.90	49
Nitrogen oxides emission	68.77	21	Overfishing of fishing resources	85.56	5
Sulfur dioxide emission	40.87	44	4.3 Resource Utilization	26.13	113
3 Environment Carrying Competitiveness	71.61	20	Utilization rate of water resources	0.12	87
3.1 Agricultural Carrying	79.41	13	Percentage of total internal renewable water resources to total water resources	41.29	97
Cereal yield per unit of arable land	63.22	14	Percentage of agricultural land to total land area	27.47	108
Fertilizer consumption per unit of arable land	80.43	112	Percentage of fossil fuel energy consumption to total energy consumption	35.67	45
Annual freshwater withdrawals for agriculture per unit of arable land	99.99	5			
3.2 Industrial Carrying	87.10	102			
Net exports of goods as a percentage of GDP	63.47	113			
Electric power consumption per unit of value added of industry	92.03	65			
SO_2 emissions per unit of value added of industry	99.90	41			
Annual freshwater withdrawals for industry per value added of industry	92.99	103			
3.3 Energy Consumption	44.06	14			

(continued)

Table 123.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
5 Environment Harmony Competitiveness	66.99	72	CO_2 emissions per capita	79.82	102
5.1 Population and Environment	64.31	102	Energy consumption per capita	73.31	100
Percentage of population with access to Improved sanitation facilities	100.00	1	5.2 Economy and Environment	69.68	30
Motor vehicles per 1,000 people	30.37	120	Land resource utilization efficiency	0.72	25
Renewable internal freshwater resources per capita	11.00	34	Sulfur dioxide emissions per unit of GDP	97.01	39
SO_2 emissions per capita	90.74	94	Carbon dioxide emissions per unit of GDP	89.53	58
			Energy consumption per unit of GDP	91.46	35

Table 123.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	2	3	2	6	1
Ecological Environment Competitiveness	11	0	2	5	4	0
Environment Carrying Competitiveness	15	0	5	4	1	5
Environment Management Competitiveness	10	0	2	3	3	2
Environment Harmony Competitiveness	10	1	2	3	1	3
Total	60	3	14	17	15	11

Chapter 124
Report on Global Environment Competitiveness of South Africa

South Africa is a country located at the southern tip of Africa and borders territories of Namibia, Botswana and Zimbabwe to the north, Mozambique and Swaziland to the east South Africa has a generally temperate climate. It covers 1,214.5 thousand of square kilometers and has a population of 50.59 million. Its GDP reaches $408.24 billion in 2011. Through the index system and evaluation model, the environment competitiveness index of South Africa ranks at 97 in 133 countries.

Score: 47.21
Rank: 97

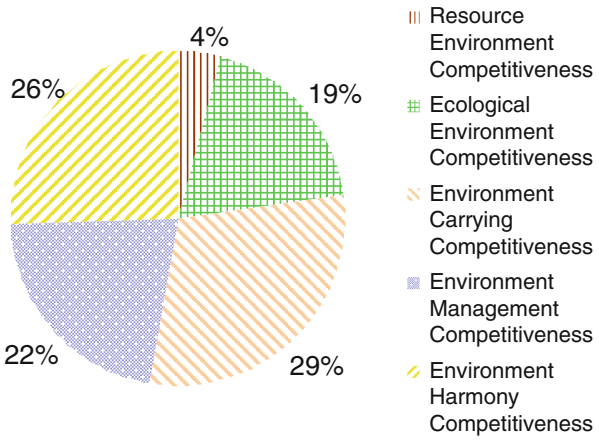

Fig. 124.1 Contribution of sub-index to GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_124,

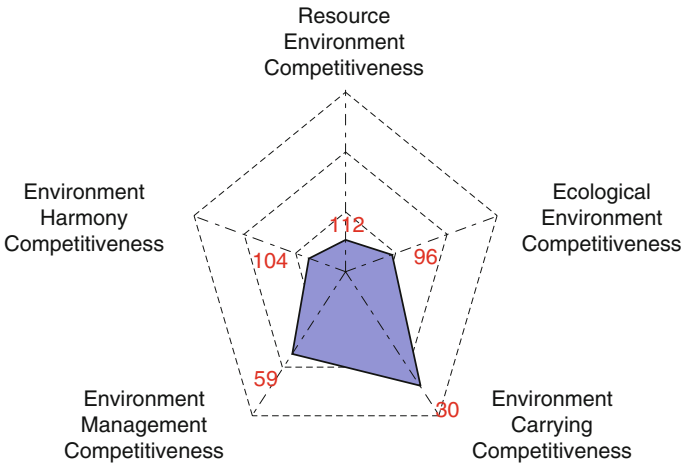

Fig. 124.2 Rank of sub-index of GEC

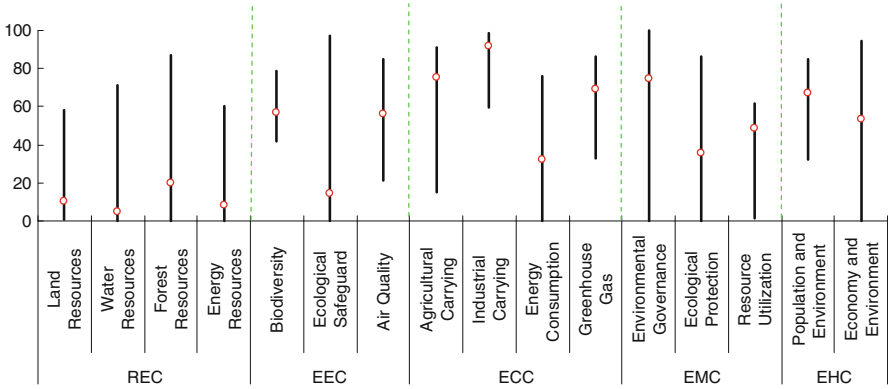

Fig. 124.3 Score and rank of the pillars of GEC

Table 124.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	9.84	112	Groundwater	0.53	114
1.1 Land Resources	10.07	84	Total internal renewable water resources	1.86	109
Land area per capita	4.30	41	1.3 Forest Resources	19.56	102
Percentage of arable land to total land area	16.70	80	Growing stock in forest and other wooded land	52.03	49
Arable land per capita	11.13	50	Proportion of land area covered by forest	8.92	104
1.2 Water Resources	4.92	107	Forest area per capita	1.27	77
Surface water	0.44	113	1.4 Energy Resources	8.13	49
Annual precipitation	16.85	102			

(continued)

Table 124.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
Fossil energy	8.25	14	Energy consumption per unit of land area	99.76	69
Energy production	3.28	29	Ratio of clean energy consumption	4.18	72
Proportion of combustible renewable and waste to total energy consumption	11.24	59	Elasticity of energy consumption	14.42	31
Net energy imports of the energy consumption	15.08	37	Elasticity of electric power consumption	11.05	49
2 Ecological Environment Competitiveness	43.88	96	3.4 Greenhouse Gas	69.20	24
2.1 Biodiversity	56.71	88	Growth rate of CO_2 emissions	74.84	10
Threatened fish species	58.96	124	Growth rate of Methane emissions	65.13	23
Threatened mammal species	86.96	104	CO_2 emissions per unit of land area	99.68	81
Threatened plant species	96.21	99	CO_2 emissions per unit of energy consumption	31.48	99
GEF benefits index for biodiversity	20.70	17	4 Environment Management Competitiveness	51.24	59
2.2 Ecological Safeguard	14.49	85	4.1 Environmental Governance	74.35	93
Terrestrial protected areas	18.48	84	Agricultural chemicals regulation	52.38	78
Marine protected areas	8.50	30	Percentage of the rural population with access to an improved water source	79.00	79
2.3 Air Quality	56.29	76	Percentage of the urban population with access to an improved water source	99.00	51
Inhalable particles (PM10)	86.86	30	4.2 Ecological Protection	35.79	59
Particulate matter (PM2.5)	83.43	74	Area of plantation and afforestation	2.28	26
Index of indoor air pollution	25.60	74	Biome protect	38.20	87
Nitrogen oxides emission	63.87	106	Overfishing of fishing resources	78.04	8
Sulfur dioxide emission	33.18	123	4.3 Resource Utilization	48.73	16
3 Environment Carrying Competitiveness	70.58	30	Utilization rate of water resources	1.01	35
3.1 Agricultural Carrying	75.62	24	Percentage of total internal renewable water resources to total water resources	82.35	31
Cereal yield per unit of arable land	42.78	36	Percentage of agricultural land to total land area	96.58	3
Fertilizer consumption per unit of arable land	96.02	59	Percentage of fossil fuel energy consumption to total energy consumption	15.00	83
Annual freshwater withdrawals for agriculture per unit of arable land	99.01	62			
3.2 Industrial Carrying	91.94	59			
Net exports of goods as a percentage of GDP	85.61	40			
Electric power consumption per unit of value added of industry	83.59	107			
SO_2 emissions per unit of value added of industry	99.32	109			
Annual freshwater withdrawals for industry per value added of industry	99.24	31			
3.3 Energy Consumption	32.35	73			

(continued)

Table 124.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
5 Environment Harmony Competitiveness	60.53	104	CO_2 emissions per capita	81.29	99
5.1 Population and Environment	67.39	83	Energy consumption per capita	79.49	87
Percentage of population with access to Improved sanitation facilities	77.00	81	5.2 Economy and Environment	53.67	106
Motor vehicles per 1,000 people	80.25	75	Land resource utilization efficiency	0.10	67
Renewable internal freshwater resources per capita	1.07	105	Sulfur dioxide emissions per unit of GDP	76.79	118
SO_2 emissions per capita	77.78	116	Carbon dioxide emissions per unit of GDP	64.24	112
			Energy consumption per unit of GDP	73.56	96

Table 124.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	0	2	4	2	6
Ecological Environment Competitiveness	11	0	1	0	7	3
Environment Carrying Competitiveness	15	1	3	5	4	2
Environment Management Competitiveness	10	1	2	3	4	0
Environment Harmony Competitiveness	10	0	0	0	5	5
Total	60	2	8	12	22	16

Chapter 125
Report on Global Environment Competitiveness of Spain

Spain is located in southwestern Europe on the Iberian Peninsula and borders France and Andorra and the Bay of Biscay to the north and north east, Atlantic Ocean and Portugal to the northwest and west, it belongs to Mediterranean – type climate. It covers 498.8 thousand of square kilometers and has a population of 46.17 million. Its GDP reaches $1,476.88 billion in 2011. Through the index system and evaluation model, the environment competitiveness index of Spain ranks at 67 in 133 countries.

Score: 49.72
Rank: 67

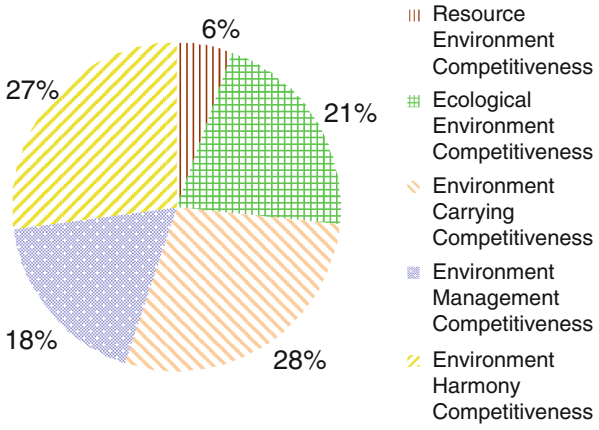

Fig. 125.1 Contribution of sub-index to GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_125,

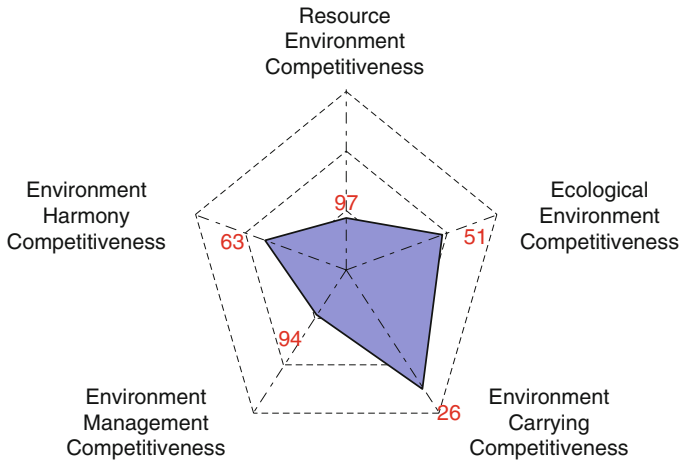

Fig. 125.2 Rank of sub-index of GEC

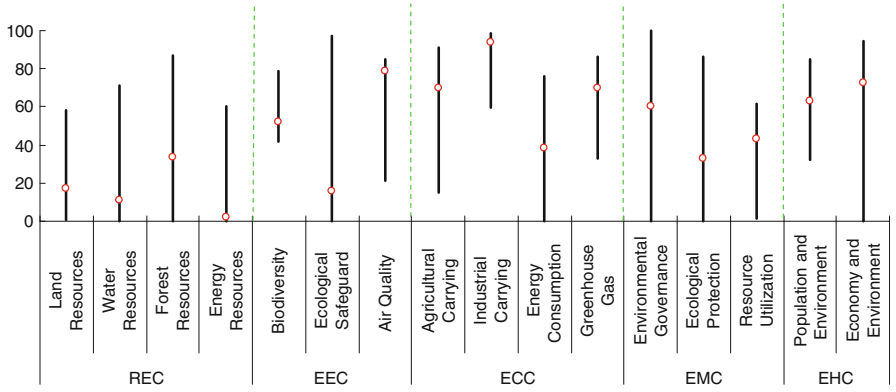

Fig. 125.3 Score and rank of the pillars of GEC

Table 125.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	14.13	97	Groundwater	8.60	72
1.1 Land Resources	17.32	39	Total internal renewable water resources	11.24	76
Land area per capita	1.92	81	1.3 Forest Resources	33.89	48
Percentage of arable land to total land area	42.49	29	Growing stock in forest and other wooded land	52.76	44
Arable land per capita	12.68	43	Proportion of land area covered by forest	43.09	43
1.2 Water Resources	11.02	87	Forest area per capita	2.77	56
Surface water	2.38	86	1.4 Energy Resources	1.95	108
Annual precipitation	21.86	86			

(continued)

Table 125.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
Fossil energy	0.16	53	Energy consumption per unit of land area	99.46	99
Energy production	0.75	71	Ratio of clean energy consumption	26.91	26
Proportion of combustible renewable and waste to total energy consumption	5.72	76	Elasticity of energy consumption	14.22	42
Net energy imports of the energy consumption	3.28	106	Elasticity of electric power consumption	12.82	28
2 Ecological Environment Competitiveness	51.84	51	3.4 Greenhouse Gas	69.69	20
2.1 Biodiversity	51.89	126	Growth rate of CO_2 emissions	72.62	14
Threatened fish species	66.51	119	Growth rate of Methane emissions	59.79	58
Threatened mammal species	91.30	90	CO_2 emissions per unit of land area	99.40	100
Threatened plant species	88.04	118	CO_2 emissions per unit of energy consumption	44.00	61
GEF benefits index for biodiversity	6.80	40	4 Environment Management Competitiveness	44.12	94
2.2 Ecological Safeguard	15.66	82	4.1 Environmental Governance	60.00	121
Terrestrial protected areas	23.10	75	Agricultural chemicals regulation	0.00	86
Marine protected areas	4.52	43	Percentage of the rural population with access to an improved water source	100.00	1
2.3 Air Quality	78.93	30	Percentage of the urban population with access to an improved water source	100.00	1
Inhalable particles (PM10)	82.48	53	4.2 Ecological Protection	32.94	71
Particulate matter (PM2.5)	86.92	56	Area of plantation and afforestation	3.47	17
Index of indoor air pollution	100.00	1	Biome protect	50.40	72
Nitrogen oxides emission	63.33	109	Overfishing of fishing resources	54.76	47
Sulfur dioxide emission	37.02	115	4.3 Resource Utilization	43.15	37
3 Environment Carrying Competitiveness	70.78	26	Utilization rate of water resources	1.17	29
3.1 Agricultural Carrying	69.84	48	Percentage of total internal renewable water resources to total water resources	79.60	41
Cereal yield per unit of arable land	32.27	59	Percentage of agricultural land to total land area	65.59	40
Fertilizer consumption per unit of arable land	92.16	78	Percentage of fossil fuel energy consumption to total energy consumption	26.24	64
Annual freshwater withdrawals for agriculture per unit of arable land	97.61	75			
3.2 Industrial Carrying	94.06	30			
Net exports of goods as a percentage of GDP	87.26	34			
Electric power consumption per unit of value added of industry	92.09	63			
SO_2 emissions per unit of value added of industry	99.86	56			
Annual freshwater withdrawals for industry per value added of industry	97.02	70			
3.3 Energy Consumption	38.35	30			

(continued)

Table 125.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
5 Environment Harmony Competitiveness	67.71	63	CO_2 emissions per capita	84.31	91
5.1 Population and Environment	63.16	109	Energy consumption per capita	79.21	88
Percentage of population with access to Improved sanitation facilities	100.00	1	5.2 Economy and Environment	72.27	17
Motor vehicles per 1,000 people	25.19	125	Land resource utilization efficiency	0.86	21
Renewable internal freshwater resources per capita	2.91	72	Sulfur dioxide emissions per unit of GDP	96.97	41
SO_2 emissions per capita	87.72	102	Carbon dioxide emissions per unit of GDP	94.86	16
			Energy consumption per unit of GDP	96.38	10

Table 125.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	0	1	5	7	1
Ecological Environment Competitiveness	11	1	1	2	3	4
Environment Carrying Competitiveness	15	0	5	6	4	0
Environment Management Competitiveness	10	1	2	3	3	1
Environment Harmony Competitiveness	10	1	3	1	2	3
Total	60	3	12	17	19	9

Chapter 126
Report on Global Environment Competitiveness of Sri Lanka

Sri Lanka is a country off the southern coast of the Indian subcontinent in South Asia. The northern part of Sri Lanka is a tropical grassland climate and the southern tropical rainforest climate. It covers 62.7 thousand of square kilometers and has a population of 20.87 million. Its GDP reaches $59.17 billion in 2011. Through the index system and evaluation model, the environment competitiveness index of Sri Lanka ranks at 39 in 133 countries.

Score: 52.58
Rank: 39

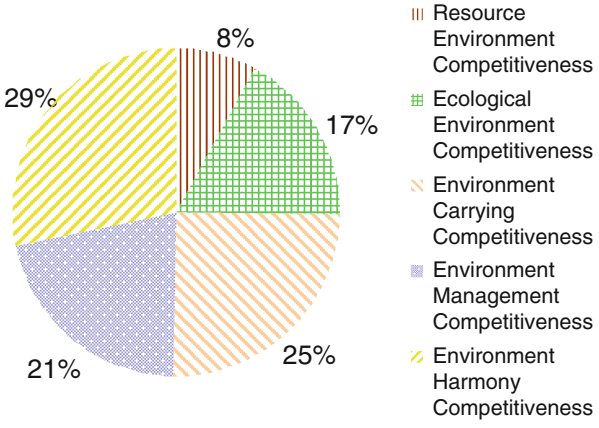

Fig. 126.1 Contribution of sub-index to GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_126,

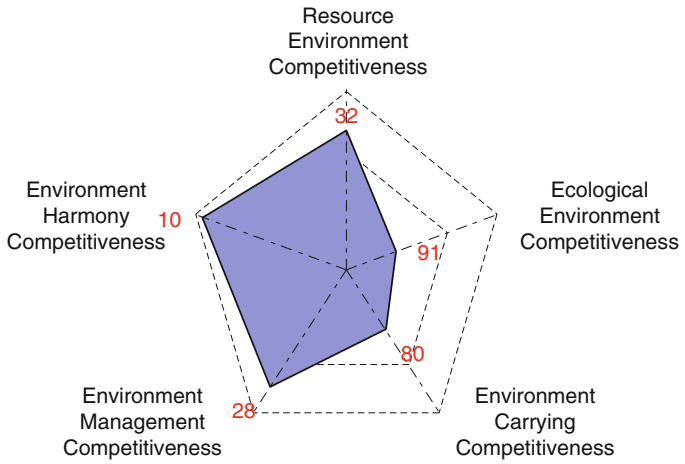

Fig. 126.2 Rank of sub-index of GEC

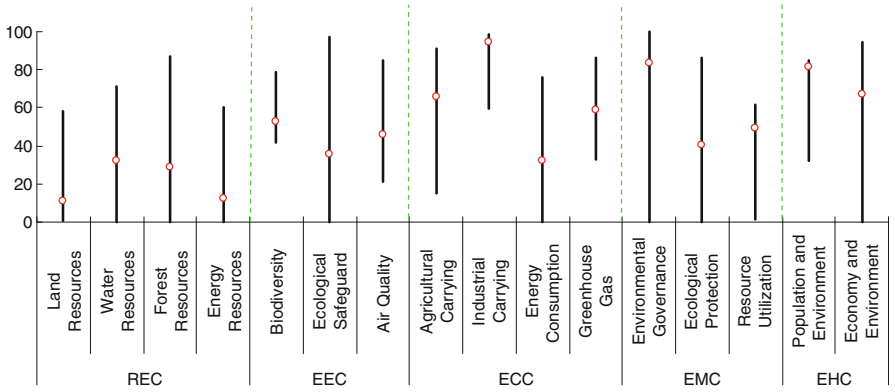

Fig. 126.3 Score and rank of the pillars of GEC

Table 126.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	21.33	32	Groundwater	17.88	44
1.1 Land Resources	10.72	78	Total internal renewable water resources	42.46	27
Land area per capita	0.52	122	1.3 Forest Resources	29.01	69
Percentage of arable land to total land area	32.37	42	Growing stock in forest and other wooded land	50.12	100
Arable land per capita	2.69	115	Proportion of land area covered by forest	34.47	62
1.2 Water Resources	32.50	31	Forest area per capita	0.62	99
Surface water	8.95	39	1.4 Energy Resources	12.12	37
Annual precipitation	60.72	20			

(continued)

Table 126.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
Fossil energy	0.00	64	Energy consumption per unit of land area	99.67	85
Energy production	0.27	106	Ratio of clean energy consumption	6.20	66
Proportion of combustible renewable and waste to total energy consumption	54.85	23	Elasticity of energy consumption	13.57	91
Net energy imports of the energy consumption	7.05	80	Elasticity of electric power consumption	9.91	97
2 Ecological Environment Competitiveness	44.85	91	3.4 Greenhouse Gas	58.88	91
2.1 Biodiversity	52.57	121	Growth rate of CO_2 emissions	35.67	116
Threatened fish species	79.25	97	Growth rate of Methane emissions	57.66	73
Threatened mammal species	84.24	108	CO_2 emissions per unit of land area	99.76	72
Threatened plant species	83.55	125	CO_2 emissions per unit of energy consumption	65.62	27
GEF benefits index for biodiversity	7.90	36	4 Environment Management Competitiveness	56.14	28
2.2 Ecological Safeguard	35.42	31	4.1 Environmental Governance	83.37	81
Terrestrial protected areas	58.15	23	Agricultural chemicals regulation	66.67	65
Marine protected areas	1.33	72	Percentage of the rural population with access to an improved water source	90.00	60
2.3 Air Quality	46.13	109	Percentage of the urban population with access to an improved water source	99.00	51
Inhalable particles (PM10)	52.55	116	4.2 Ecological Protection	40.66	42
Particulate matter (PM2.5)	90.91	30	Area of plantation and afforestation	0.24	69
Index of indoor air pollution	3.60	111	Biome protect	85.20	35
Nitrogen oxides emission	68.57	36	Overfishing of fishing resources	50.00	55
Sulfur dioxide emission	40.48	76	4.3 Resource Utilization	49.56	14
3 Environment Carrying Competitiveness	66.31	80	Utilization rate of water resources	0.99	36
3.1 Agricultural Carrying	65.69	74	Percentage of total internal renewable water resources to total water resources	88.29	18
Cereal yield per unit of arable land	40.66	41	Percentage of agricultural land to total land area	49.20	71
Fertilizer consumption per unit of arable land	79.14	114	Percentage of fossil fuel energy consumption to total energy consumption	59.75	25
Annual freshwater withdrawals for agriculture per unit of arable land	85.60	116			
3.2 Industrial Carrying	94.52	24			
Net exports of goods as a percentage of GDP	89.33	25			
Electric power consumption per unit of value added of industry	95.28	32			
SO_2 emissions per unit of value added of industry	99.64	86			
Annual freshwater withdrawals for industry per value added of industry	93.83	97			
3.3 Energy Consumption	32.34	74			

(continued)

Table 126.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
5 Environment Harmony Competitiveness	74.28	10	CO_2 emissions per capita	98.38	27
5.1 Population and Environment	81.37	10	Energy consumption per capita	97.34	20
Percentage of population with access to Improved sanitation facilities	91.00	58	5.2 Economy and Environment	67.18	51
Motor vehicles per 1,000 people	94.44	38	Land resource utilization efficiency	0.27	38
Renewable internal freshwater resources per capita	3.06	71	Sulfur dioxide emissions per unit of GDP	88.80	93
SO_2 emissions per capita	96.46	61	Carbon dioxide emissions per unit of GDP	91.84	42
			Energy consumption per unit of GDP	87.82	51

Table 126.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	0	2	5	5	2
Ecological Environment Competitiveness	11	0	2	2	1	6
Environment Carrying Competitiveness	15	0	2	2	9	2
Environment Management Competitiveness	10	0	2	4	4	0
Environment Harmony Competitiveness	10	1	1	5	3	0
Total	60	1	9	18	22	10

Chapter 127
Report on Global Environment Competitiveness of Sudan

Sudan is an Arab state in North Africa It is bordered by Egypt to the north, the Red Sea to the northeast, Eritrea and Ethiopia to the east, South Sudan to the south, the Central African Republic to the southwest, Chad to the west, and Libya to the northwest. It covers 2,376.0 thousand of square kilometers and has a population of 34.32 million. Its GDP reaches $64.05 billion in 2011. Through the index system and evaluation model, the environment competitiveness index of Sudan ranks at 92 in 133 countries.

Score: 47.60
Rank: 92

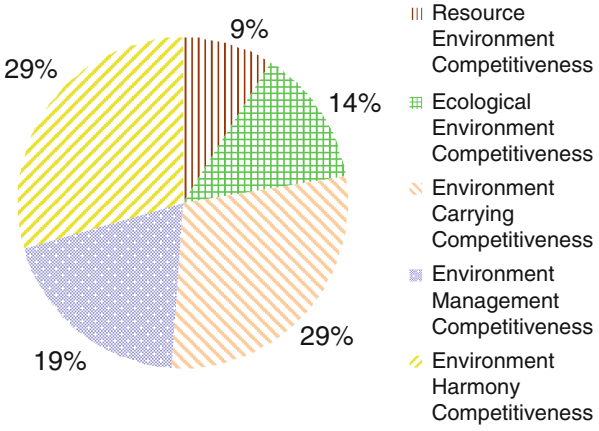

Fig. 127.1 Contribution of sub-index to GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_127,

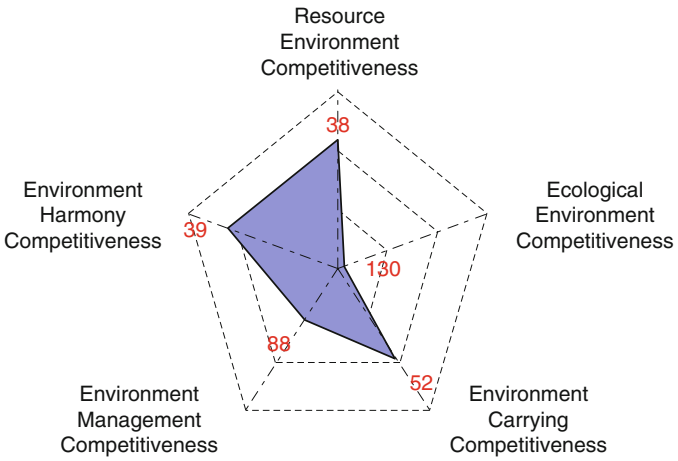

Fig. 127.2 Rank of sub-index of GEC

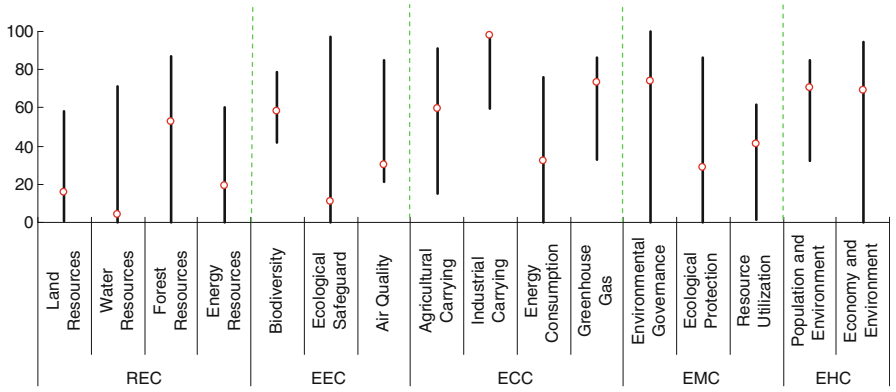

Fig. 127.3 Score and rank of the pillars of GEC

Table 127.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	20.84	38	Groundwater	0.38	117
1.1 Land Resources	15.92	46	Total internal renewable water resources	0.64	118
Land area per capita	12.46	18	1.3 Forest Resources	52.95	10
Percentage of arable land to total land area	14.26	89	Growing stock in forest and other wooded land	52.95	42
Arable land per capita	22.22	15	Proportion of land area covered by forest	N/A	N/A
1.2 Water Resources	4.17	111	Forest area per capita	N/A	N/A
Surface water	0.67	104	1.4 Energy Resources	19.38	17
Annual precipitation	14.98	107			

(continued)

Table 127.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
Fossil energy	0.52	39	Energy consumption per unit of land area	99.99	6
Energy production	1.05	60	Ratio of clean energy consumption	2.99	81
Proportion of combustible renewable and waste to total energy consumption	73.55	14	Elasticity of energy consumption	14.07	50
Net energy imports of the energy consumption	27.62	22	Elasticity of electric power consumption	10.64	71
2 Ecological Environment Competitiveness	32.92	130	3.4 Greenhouse Gas	72.98	14
2.1 Biodiversity	58.43	53	Growth rate of CO_2 emissions	57.31	45
Threatened fish species	91.04	47	Growth rate of Methane emissions	70.12	12
Threatened mammal species	91.85	84	CO_2 emissions per unit of land area	99.99	12
Threatened plant species	99.07	74	CO_2 emissions per unit of energy consumption	80.18	14
GEF benefits index for biodiversity	5.10	47	4 Environment Management Competitiveness	46.08	88
2.2 Ecological Safeguard	11.14	93	4.1 Environmental Governance	73.80	96
Terrestrial protected areas	11.14	103	Agricultural chemicals regulation	95.24	20
Marine protected areas	N/A	N/A	Percentage of the rural population with access to an improved water source	52.00	104
2.3 Air Quality	30.11	128	Percentage of the urban population with access to an improved water source	67.00	128
Inhalable particles (PM10)	0.00	133	4.2 Ecological Protection	28.96	85
Particulate matter (PM2.5)	69.01	109	Area of plantation and afforestation	7.86	8
Index of indoor air pollution	4.70	107	Biome protect	28.90	100
Nitrogen oxides emission	58.42	123	Overfishing of fishing resources	57.14	40
Sulfur dioxide emission	40.89	39	4.3 Resource Utilization	41.20	47
3 Environment Carrying Competitiveness	68.21	52	Utilization rate of water resources	2.33	19
3.1 Agricultural Carrying	59.35	121	Percentage of total internal renewable water resources to total water resources	19.48	114
Cereal yield per unit of arable land	0.89	131	Percentage of agricultural land to total land area	68.02	37
Fertilizer consumption per unit of arable land	99.37	23	Percentage of fossil fuel energy consumption to total energy consumption	74.97	14
Annual freshwater withdrawals for agriculture per unit of arable land	97.27	80			
3.2 Industrial Carrying	98.09	2			
Net exports of goods as a percentage of GDP	97.48	2			
Electric power consumption per unit of value added of industry	96.80	20			
SO_2 emissions per unit of value added of industry	99.92	36			
Annual freshwater withdrawals for industry per value added of industry	98.18	56			
3.3 Energy Consumption	31.92	88			

(continued)

Table 127.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
5 Environment Harmony Competitiveness	69.96	39	CO_2 emissions per capita	99.26	18
5.1 Population and Environment	70.89	63	Energy consumption per capita	98.19	12
Percentage of population with access to Improved sanitation facilities	34.00	107	5.2 Economy and Environment	69.04	37
Motor vehicles per 1,000 people	96.91	28	Land resource utilization efficiency	0.01	119
Renewable internal freshwater resources per capita	1.06	107	Sulfur dioxide emissions per unit of GDP	98.20	25
SO_2 emissions per capita	99.53	13	Carbon dioxide emissions per unit of GDP	94.18	24
			Energy consumption per unit of GDP	83.78	69

Table 127.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	1	3	4	1	4
Ecological Environment Competitiveness	11	0	0	2	3	6
Environment Carrying Competitiveness	15	3	5	3	2	2
Environment Management Competitiveness	10	1	2	2	3	2
Environment Harmony Competitiveness	10	0	5	1	1	3
Total	60	5	15	12	10	17

Chapter 128
Report on Global Environment Competitiveness of Sweden

Sweden is a Nordic country on the Scandinavian Peninsula in Northern Europe. Sweden borders with Norway and Finland and it is connected to Denmark by a bridge-tunnel across the Kattegatt. The country can be divided into three types of climate and most of Sweden has a temperate climate. It covers 410.3 thousand of square kilometers and has a population of 9.45 million. Its GDP reaches $539.68 billion in 2011. Through the index system and evaluation model, the environment competitiveness index of Sweden ranks at 14 in 133 countries.

Score: 55.26
Rank: 14

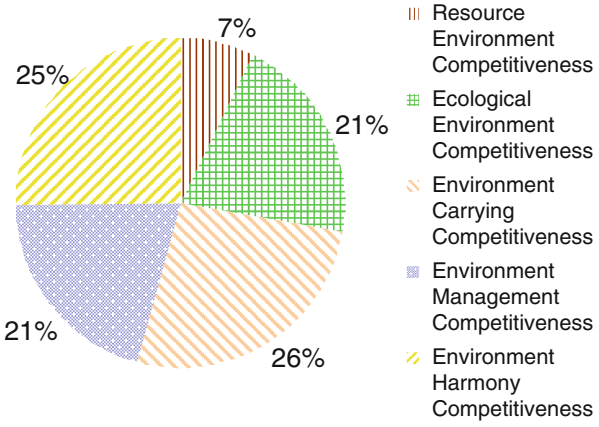

Fig. 128.1 Contribution of sub-index to GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_128,

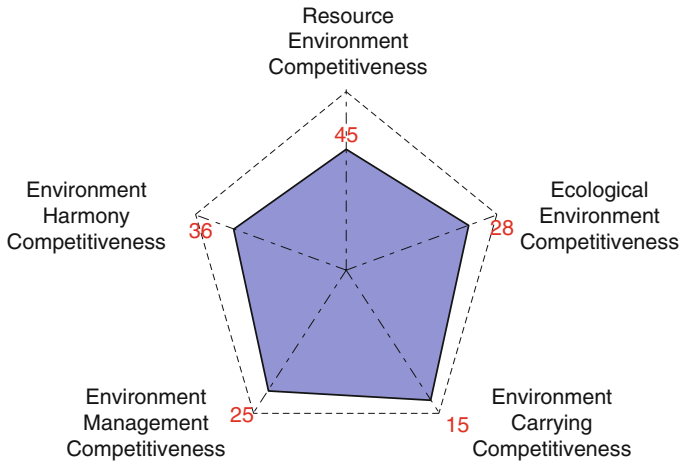

Fig. 128.2 Rank of sub-index of GEC

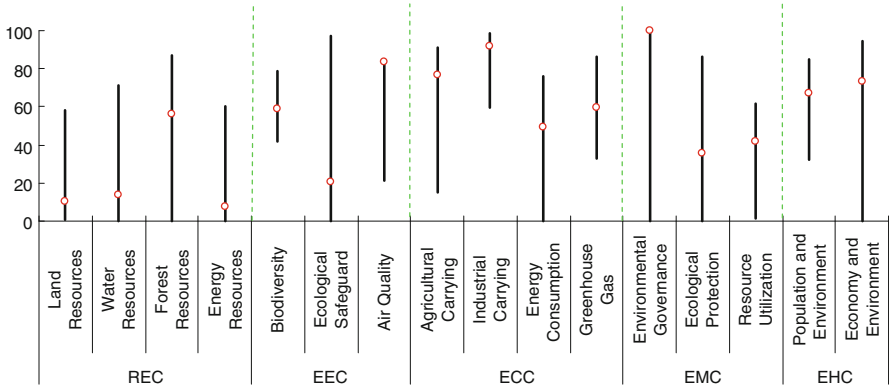

Fig. 128.3 Score and rank of the pillars of GEC

Table 128.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	19.76	45	Groundwater	6.98	75
1.1 Land Resources	10.19	83	Total internal renewable water resources	21.02	50
Land area per capita	7.80	29	1.3 Forest Resources	56.50	7
Percentage of arable land to total land area	10.64	97	Growing stock in forest and other wooded land	60.18	16
Arable land per capita	12.93	41	Proportion of land area covered by forest	80.50	3
1.2 Water Resources	13.94	68	Forest area per capita	20.82	12
Surface water	4.55	60	1.4 Energy Resources	7.47	56
Annual precipitation	23.22	77			

(continued)

Table 128.1 (continued)

Indicators	Score	Rank
Fossil energy	0.00	64
Energy production	3.61	28
Proportion of combustible renewable and waste to total energy consumption	24.86	37
Net energy imports of the energy consumption	8.23	74
2 Ecological Environment Competitiveness	57.27	28
2.1 Biodiversity	58.83	37
Threatened fish species	94.34	35
Threatened mammal species	99.46	2
Threatened plant species	99.77	43
GEF benefits index for biodiversity	0.30	105
2.2 Ecological Safeguard	20.37	67
Terrestrial protected areas	29.35	64
Marine protected areas	6.91	33
2.3 Air Quality	83.78	5
Inhalable particles (PM10)	92.70	5
Particulate matter (PM2.5)	94.70	15
Index of indoor air pollution	100.00	1
Nitrogen oxides emission	67.76	67
Sulfur dioxide emission	40.88	42
3 Environment Carrying Competitiveness	72.37	15
3.1 Agricultural Carrying	77.02	18
Cereal yield per unit of arable land	46.79	32
Fertilizer consumption per unit of arable land	94.39	68
Annual freshwater withdrawals for agriculture per unit of arable land	99.94	16
3.2 Industrial Carrying	91.84	61
Net exports of goods as a percentage of GDP	78.04	83
Electric power consumption per unit of value added of industry	90.79	73
SO_2 emissions per unit of value added of industry	99.99	9
Annual freshwater withdrawals for industry per value added of industry	98.52	49
3.3 Energy Consumption	49.05	6
Energy consumption per unit of land area	99.74	75
Ratio of clean energy consumption	73.21	3
Elasticity of energy consumption	13.06	107
Elasticity of electric power consumption	10.19	86
3.4 Greenhouse Gas	59.54	84
Growth rate of CO_2 emissions	25.99	127
Growth rate of Methane emissions	67.97	15
CO_2 emissions per unit of land area	99.87	55
CO_2 emissions per unit of energy consumption	77.87	15
4 Environment Management Competitiveness	56.76	25
4.1 Environmental Governance	100.00	1
Agricultural chemicals regulation	100.00	1
Percentage of the rural population with access to an improved water source	100.00	1
Percentage of the urban population with access to an improved water source	100.00	1
4.2 Ecological Protection	35.51	60
Area of plantation and afforestation	4.68	12
Biome protect	46.20	78
Overfishing of fishing resources	65.91	23
4.3 Resource Utilization	41.87	42
Utilization rate of water resources	0.06	104
Percentage of total internal renewable water resources to total water resources	88.60	17
Percentage of agricultural land to total land area	8.87	126
Percentage of fossil fuel energy consumption to total energy consumption	69.95	19

(continued)

Table 128.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
5 Environment Harmony Competitiveness	70.11	36	CO_2 emissions per capita	86.35	84
5.1 Population and Environment	66.81	88	Energy consumption per capita	57.92	113
Percentage of population with access to Improved sanitation facilities	100.00	1	5.2 Economy and Environment	73.41	8
Motor vehicles per 1,000 people	35.80	109	Land resource utilization efficiency	0.38	33
Renewable internal freshwater resources per capita	21.90	21	Sulfur dioxide emissions per unit of GDP	99.81	8
SO_2 emissions per capita	98.16	36	Carbon dioxide emissions per unit of GDP	98.55	4
			Energy consumption per unit of GDP	94.91	20

Table 128.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	2	3	3	6	0
Ecological Environment Competitiveness	11	4	1	3	3	0
Environment Carrying Competitiveness	15	3	2	2	6	2
Environment Management Competitiveness	10	3	2	2	1	2
Environment Harmony Competitiveness	10	4	1	2	2	1
Total	60	16	9	12	18	5

Chapter 129
Report on Global Environment Competitiveness of Switzerland

Switzerland is situated in western Europe, bordered by Germany to the north, France to the west, Italy to the south, Austria and Liechtenstein to the east. The Swiss climate is generally temperate, but can vary greatly between the localities. It covers 40.0 thousand of square kilometers and has a population of 7.91 million. Its GDP reaches $659.31 billion in 2011. Through the index system and evaluation model, the environment competitiveness index of Switzerland ranks at 1 in 133 countries.

Score: 58.68
Rank: 1

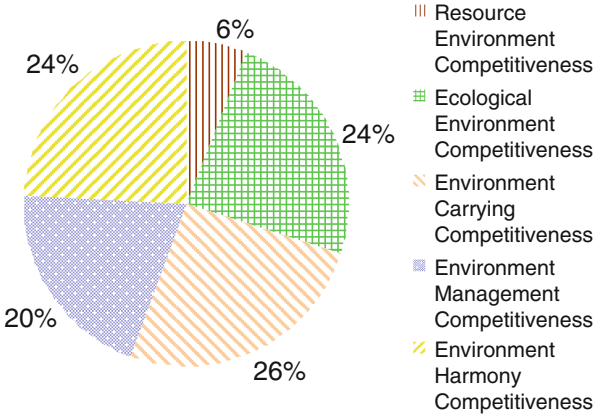

Fig. 129.1 Contribution of sub-index to GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_129,

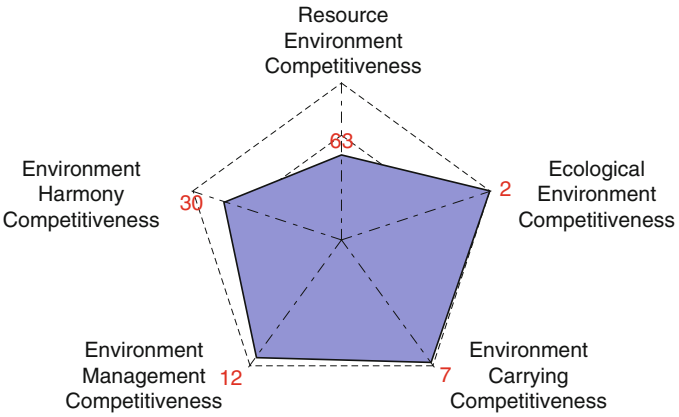

Fig. 129.2 Rank of sub-index of GEC

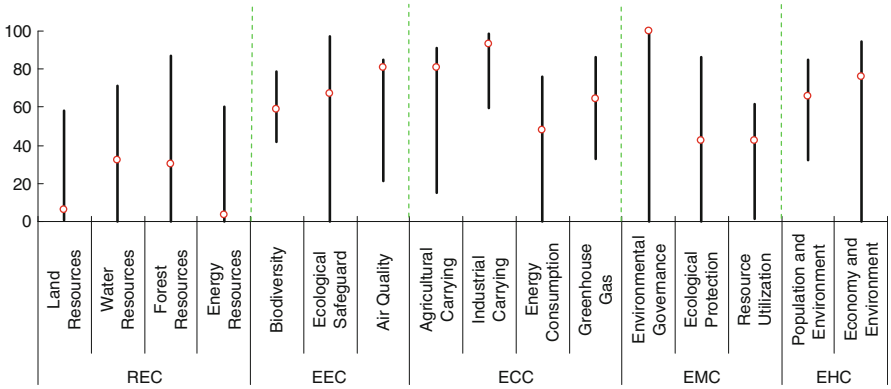

Fig. 129.3 Score and rank of the pillars of GEC

Table 129.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	17.92	63	Total internal renewable water resources	50.94	19
1.1 Land Resources	6.18	117	1.3 Forest Resources	30.30	64
Land area per capita	0.89	110	Growing stock in forest and other wooded land	51.30	66
Percentage of arable land to total land area	17.02	78	Proportion of land area covered by forest	36.44	58
Arable land per capita	2.39	118	Forest area per capita	1.10	83
1.2 Water Resources	32.03	32	1.4 Energy Resources	3.39	91
Surface water	14.44	20	Fossil energy	0.00	64
Annual precipitation	53.79	30	Energy production	1.63	45
Groundwater	8.96	70			

(continued)

Table 129.1 (continued)

Indicators	Score	Rank
Proportion of combustible renewable and waste to total energy consumption	9.57	64
Net energy imports of the energy consumption	6.03	91
2 Ecological Environment Competitiveness	70.29	2
2.1 Biodiversity	58.99	33
Threatened fish species	95.75	24
Threatened mammal species	98.91	6
Threatened plant species	99.88	30
GEF benefits index for biodiversity	0.20	109
2.2 Ecological Safeguard	67.39	7
Terrestrial protected areas	67.39	15
Marine protected areas	N/A	N/A
2.3 Air Quality	80.94	20
Inhalable particles (PM10)	85.40	39
Particulate matter (PM2.5)	87.21	53
Index of indoor air pollution	100.00	1
Nitrogen oxides emission	68.50	39
Sulfur dioxide emission	40.93	19
3 Environment Carrying Competitiveness	74.68	7
3.1 Agricultural Carrying	81.11	8
Cereal yield per unit of arable land	64.47	13
Fertilizer consumption per unit of arable land	84.60	102
Annual freshwater withdrawals for agriculture per unit of arable land	99.82	30
3.2 Industrial Carrying	93.31	44
Net exports of goods as a percentage of GDP	77.51	84
Electric power consumption per unit of value added of industry	96.88	18
SO_2 emissions per unit of value added of industry	100.00	4
Annual freshwater withdrawals for industry per value added of industry	98.87	42
3.3 Energy Consumption	47.70	7
Energy consumption per unit of land area	98.60	114
Ratio of clean energy consumption	66.94	4
Elasticity of energy consumption	14.57	27
Elasticity of electric power consumption	10.69	65
3.4 Greenhouse Gas	64.08	49
Growth rate of CO_2 emissions	52.71	61
Growth rate of Methane emissions	59.81	56
CO_2 emissions per unit of land area	98.78	115
CO_2 emissions per unit of energy consumption	56.36	39
4 Environment Management Competitiveness	59.55	12
4.1 Environmental Governance	100.00	1
Agricultural chemicals regulation	100.00	1
Percentage of the rural population with access to an improved water source	100.00	1
Percentage of the urban population with access to an improved water source	100.00	1
4.2 Ecological Protection	42.17	34
Area of plantation and afforestation	0.22	73
Biome protect	98.10	19
Overfishing of fishing resources	N/A	N/A
4.3 Resource Utilization	42.28	39
Utilization rate of water resources	0.19	76
Percentage of total internal renewable water resources to total water resources	72.14	57
Percentage of agricultural land to total land area	45.06	83

(continued)

Table 129.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
Percentage of fossil fuel energy consumption to total energy consumption	51.73	33	SO_2 emissions per capita	98.82	27
			CO_2 emissions per capita	84.84	88
			Energy consumption per capita	74.66	98
5 Environment Harmony Competitiveness	70.96	30	5.2 Economy and Environment	76.07	2
5.1 Population and Environment	65.85	92	Land resource utilization efficiency	4.81	5
Percentage of population with access to Improved sanitation facilities	100.00	1	Sulfur dioxide emissions per unit of GDP	99.96	2
			Carbon dioxide emissions per unit of GDP	99.50	2
Motor vehicles per 1,000 people	30.86	119	Energy consumption per unit of GDP	100.00	1
Renewable internal freshwater resources per capita	6.18	50			

Table 129.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	0	2	3	7	2
Ecological Environment Competitiveness	11	3	4	4	0	0
Environment Carrying Competitiveness	15	4	3	3	2	3
Environment Management Competitiveness	10	3	1	3	3	0
Environment Harmony Competitiveness	10	5	1	1	2	1
Total	60	15	11	14	14	6

Chapter 130
Report on Global Environment Competitiveness of Syria

Syria is a country in Western Asia, bordering Lebanon and the Mediterranean Sea to the West, Turkey to the north, Iraq to the east, Jordan to the south, and Israel to the southwest. The climate in Syria is dry and hot, and winters are mild. It covers 183.6 thousand of square kilometers and has a population of 20.82 million. Its GDP reaches $64.27 billion in 2011. Through the index system and evaluation model, the environment competitiveness index of Syria ranks at 113 in 133 countries.

Score: 45.01
Rank: 113

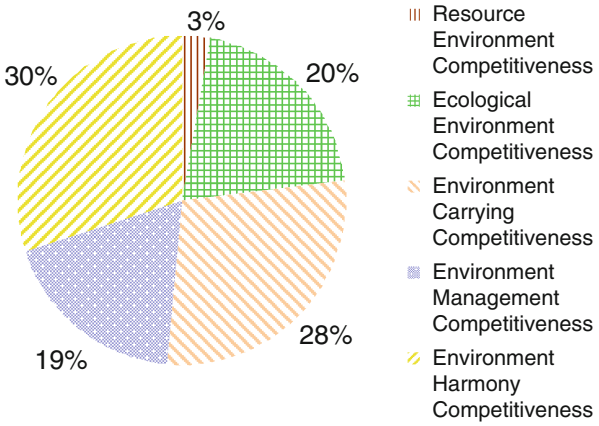

Fig. 130.1 Contribution of sub-index to GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_130,

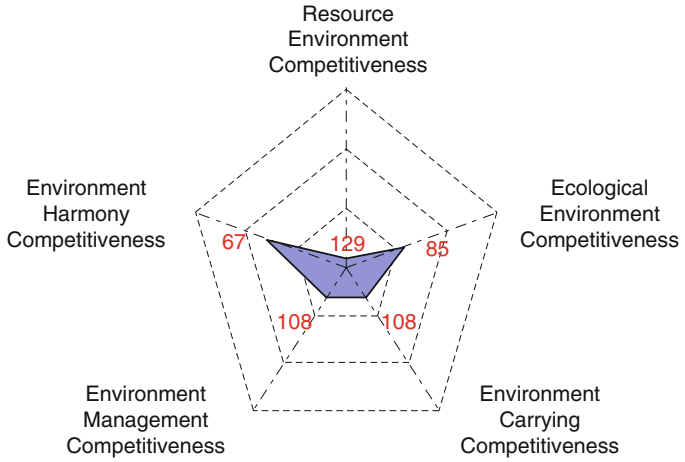

Fig. 130.2 Rank of sub-index of GEC

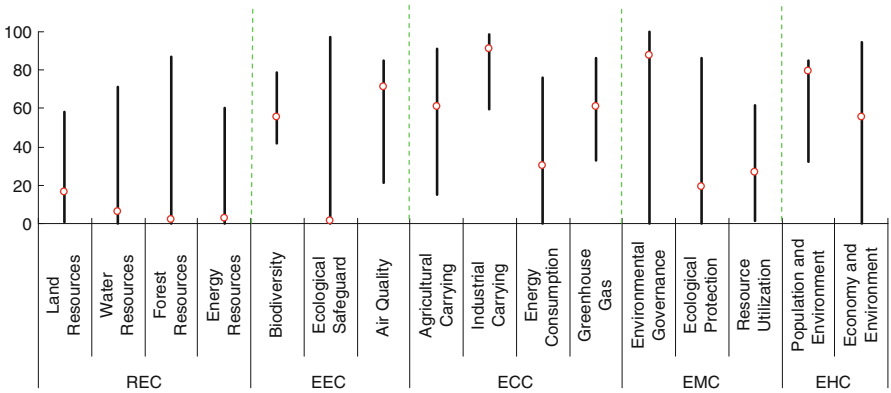

Fig. 130.3 Score and rank of the pillars of GEC

Table 130.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	6.49	129	Groundwater	12.49	58
1.1 Land Resources	16.50	41	Total internal renewable water resources	1.96	107
Land area per capita	1.57	95	1.3 Forest Resources	1.88	129
Percentage of arable land to total land area	42.53	28	Growing stock in forest and other wooded land	N/A	N/A
Arable land per capita	10.36	58	Proportion of land area covered by forest	3.17	116
1.2 Water Resources	6.38	103	Forest area per capita	0.17	119
Surface water	2.46	85	1.4 Energy Resources	3.00	99
Annual precipitation	8.62	112			

(continued)

Table 130.1 (continued)

Indicators	Score	Rank
Fossil energy	0.29	45
Energy production	1.37	52
Proportion of combustible renewable and waste to total energy consumption	0.03	117
Net energy imports of the energy consumption	16.19	31
2 Ecological Environment Competitiveness	45.30	85
2.1 Biodiversity	55.39	106
Threatened fish species	83.96	79
Threatened mammal species	91.30	90
Threatened plant species	99.88	30
GEF benefits index for biodiversity	0.90	84
2.2 Ecological Safeguard	1.08	126
Terrestrial protected areas	1.36	122
Marine protected areas	0.66	77
2.3 Air Quality	70.90	45
Inhalable particles (PM10)	60.58	102
Particulate matter (PM2.5)	62.97	118
Index of indoor air pollution	100.00	1
Nitrogen oxides emission	67.83	64
Sulfur dioxide emission	40.08	87
3 Environment Carrying Competitiveness	63.76	108
3.1 Agricultural Carrying	60.84	113
Cereal yield per unit of arable land	9.70	112
Fertilizer consumption per unit of arable land	94.71	66
Annual freshwater withdrawals for agriculture per unit of arable land	95.14	91
3.2 Industrial Carrying	90.80	77
Net exports of goods as a percentage of GDP	81.01	67
Electric power consumption per unit of value added of industry	85.98	100
SO_2 emissions per unit of value added of industry	99.58	96
Annual freshwater withdrawals for industry per value added of industry	96.62	76
3.3 Energy Consumption	30.14	119
Energy consumption per unit of land area	99.75	72
Ratio of clean energy consumption	1.22	95
Elasticity of energy consumption	13.89	69
Elasticity of electric power consumption	5.69	119
3.4 Greenhouse Gas	61.22	69
Growth rate of CO_2 emissions	58.84	40
Growth rate of Methane emissions	60.83	51
CO_2 emissions per unit of land area	99.65	84
CO_2 emissions per unit of energy consumption	27.92	106
4 Environment Management Competitiveness	42.07	108
4.1 Environmental Governance	87.99	68
Agricultural chemicals regulation	85.71	46
Percentage of the rural population with access to an improved water source	86.00	71
Percentage of the urban population with access to an improved water source	93.00	98
4.2 Ecological Protection	18.94	106
Area of plantation and afforestation	0.38	62
Biome protect	3.80	123
Overfishing of fishing resources	58.82	35
4.3 Resource Utilization	27.00	111
Utilization rate of water resources	4.04	11

(continued)

Table 130.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
Percentage of total internal renewable water resources to total water resources	12.34	120	Renewable internal freshwater resources per capita	0.41	117
Percentage of agricultural land to total land area	89.52	7	SO_2 emissions per capita	93.63	80
Percentage of fossil fuel energy consumption to total energy consumption	2.08	117	CO_2 emissions per capita	92.45	65
5 Environment Harmony Competitiveness	67.41	67	Energy consumption per capita	92.72	52
5.1 Population and Environment	79.58	17	5.2 Economy and Environment	55.25	103
Percentage of population with access to Improved sanitation facilities	96.00	42	Land resource utilization efficiency	0.10	66
Motor vehicles per 1,000 people	92.47	43	Sulfur dioxide emissions per unit of GDP	83.28	106
			Carbon dioxide emissions per unit of GDP	63.34	114
			Energy consumption per unit of GDP	74.29	90

Table 130.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	0	1	4	3	5
Ecological Environment Competitiveness	11	1	1	1	3	5
Environment Carrying Competitiveness	15	0	0	2	10	3
Environment Management Competitiveness	10	1	1	1	3	4
Environment Harmony Competitiveness	10	0	1	2	3	4
Total	60	2	4	10	22	21

Chapter 131
Report on Global Environment Competitiveness of Tajikistan

Tajikistan is a mountainous landlocked country in Central Asia. It borders with Afghanistan to the south, Uzbekistan to the west, Kyrgyzstan to the north, and China to the east. It has a temperate continental climate. It covers140.0 thousand of square kilometers and has a population of 6.98 million. Its GDP reaches $6.52 billion in 2011. Through the index system and evaluation model, the environment competitiveness index of Tajikistan ranks at 116 in 133 countries.

Score: 44.73
Rank: 116

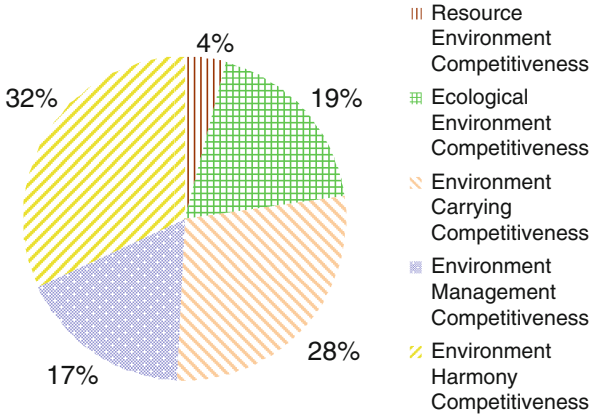

Fig. 131.1 Contribution of sub-index to GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_131,

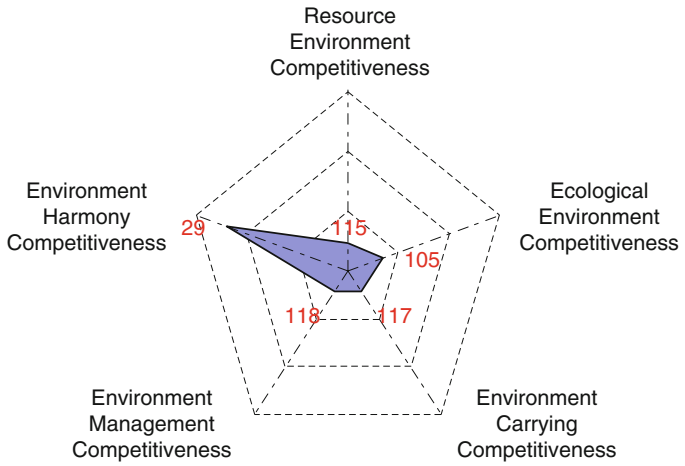

Fig. 131.2 Rank of sub-index of GEC

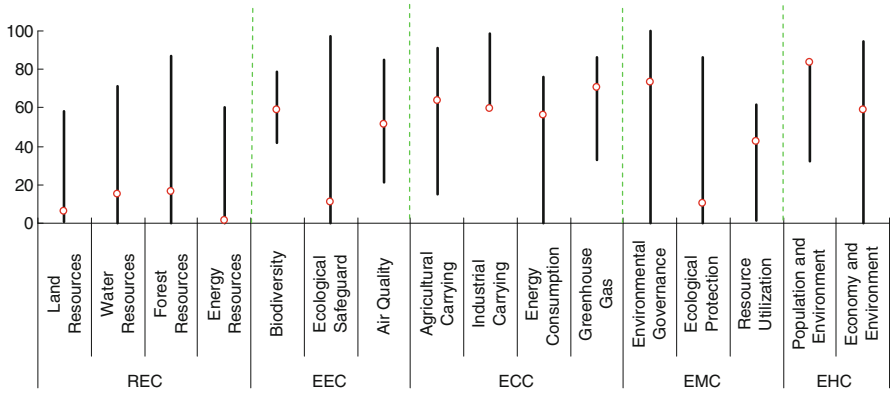

Fig. 131.3 Score and rank of the pillars of GEC

Table 131.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	9.45	115	Annual precipitation	23.86	74
1.1 Land Resources	6.19	116	Groundwater	6.14	81
Land area per capita	3.59	50	Total internal renewable water resources	22.87	46
Percentage of arable land to total land area	10.15	99	1.3 Forest Resources	16.50	113
Arable land per capita	5.70	87	Growing stock in forest and other wooded land	50.02	114
1.2 Water Resources	15.04	65	Proportion of land area covered by forest	3.43	115
Surface water	7.30	46			

(continued)

Table 131.1 (continued)

Indicators	Score	Rank
Forest area per capita	0.41	106
1.4 Energy Resources	1.31	112
Fossil energy	0.00	64
Energy production	0.22	112
Proportion of combustible renewable and waste to total energy consumption	0.00	120
Net energy imports of the energy consumption	8.24	73
2 Ecological Environment Competitiveness	41.48	105
2.1 Biodiversity	58.79	41
Threatened fish species	97.64	14
Threatened mammal species	95.65	46
Threatened plant species	99.24	67
GEF benefits index for biodiversity	0.70	92
2.2 Ecological Safeguard	10.87	96
Terrestrial protected areas	10.87	104
Marine protected areas	N/A	N/A
2.3 Air Quality	51.47	89
Inhalable particles (PM10)	78.83	68
Particulate matter (PM2.5)	62.54	120
Index of indoor air pollution	22.50	75
Nitrogen oxides emission	68.72	30
Sulfur dioxide emission	40.90	30
3 Environment Carrying Competitiveness	62.50	117
3.1 Agricultural Carrying	63.83	95
Cereal yield per unit of arable land	26.51	72
Fertilizer consumption per unit of arable land	96.18	57
Annual freshwater withdrawals for agriculture per unit of arable land	81.24	121
3.2 Industrial Carrying	59.80	133
Net exports of goods as a percentage of GDP	82.16	62
Electric power consumption per unit of value added of industry	0.00	126
SO_2 emissions per unit of value added of industry	99.12	117
Annual freshwater withdrawals for industry per value added of industry	57.94	131
3.3 Energy Consumption	56.34	3
Energy consumption per unit of land area	99.97	19
Ratio of clean energy consumption	100.00	1
Elasticity of energy consumption	14.27	36
Elasticity of electric power consumption	11.13	46
3.4 Greenhouse Gas	70.70	18
Growth rate of CO_2 emissions	67.82	23
Growth rate of Methane emissions	47.39	120
CO_2 emissions per unit of land area	99.98	24
CO_2 emissions per unit of energy consumption	70.48	22
4 Environment Management Competitiveness	38.83	118
4.1 Environmental Governance	73.00	99
Agricultural chemicals regulation	N/A	N/A
Percentage of the rural population with access to an improved water source	54.00	102
Percentage of the urban population with access to an improved water source	92.00	104
4.2 Ecological Protection	10.53	121
Area of plantation and afforestation	0.13	80
Biome protect	24.40	104
Overfishing of fishing resources	N/A	N/A
4.3 Resource Utilization	42.40	38
Utilization rate of water resources	3.03	16

(continued)

Table 131.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
Percentage of total internal renewable water resources to total water resources	63.05	68	Renewable internal freshwater resources per capita	11.01	33
Percentage of agricultural land to total land area	40.12	90	SO_2 emissions per capita	97.99	40
Percentage of fossil fuel energy consumption to total energy consumption	63.41	20	CO_2 emissions per capita	99.03	22
5 Environment Harmony Competitiveness	71.37	29	Energy consumption per capita	98.47	7
5.1 Population and Environment	83.89	3	5.2 Economy and Environment	58.86	94
Percentage of population with access to Improved sanitation facilities	94.00	52	Land resource utilization efficiency	0.01	114
Motor vehicles per 1,000 people	95.56	34	Sulfur dioxide emissions per unit of GDP	81.31	110
			Carbon dioxide emissions per unit of GDP	83.18	82
			Energy consumption per unit of GDP	70.95	100

Table 131.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	0	0	2	5	7
Ecological Environment Competitiveness	11	0	2	2	5	2
Environment Carrying Competitiveness	15	2	4	2	3	4
Environment Management Competitiveness	10	0	1	1	4	3
Environment Harmony Competitiveness	10	1	1	4	2	2
Total	60	3	8	11	19	18

Chapter 132
Report on Global Environment Competitiveness of Tanzania

Tanzania is a country in East Africa, bordered by Kenya and Uganda to the north, Rwanda, Burundi, and the Democratic Republic of the Congo to the west, Zambia, Malawi, and Mozambique to the south. It covers885.8thousand of square kilometers and has a population of 46.22 million. Its GDP reaches $23.87 billion in 2011. Through the index system and evaluation model, the environment competitiveness index of Tanzania ranks at 52 in 133 countries.

Score: 51.40
Rank: 52

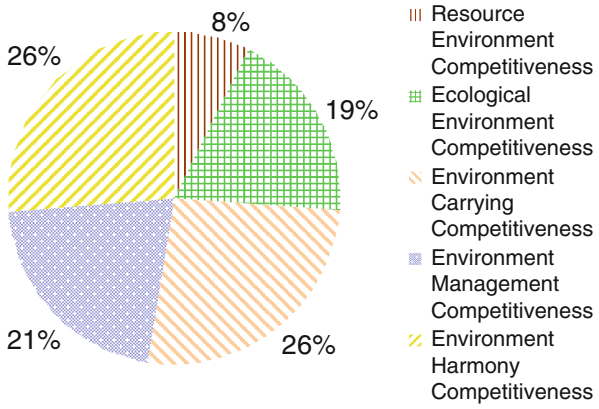

Fig. 132.1 Contribution of sub-index to GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_132,

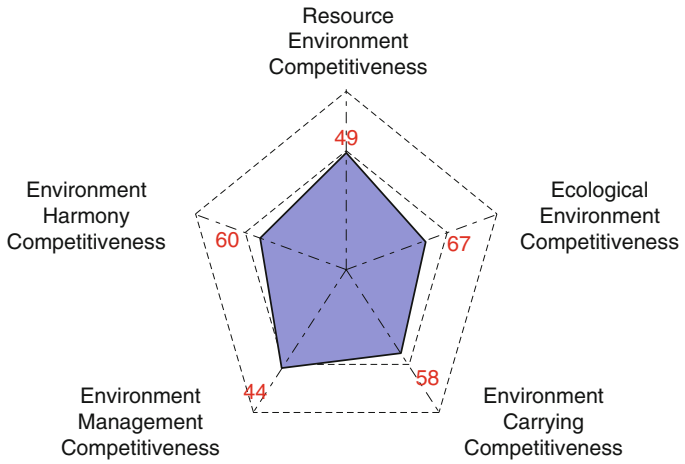

Fig. 132.2 Rank of sub-index of GEC

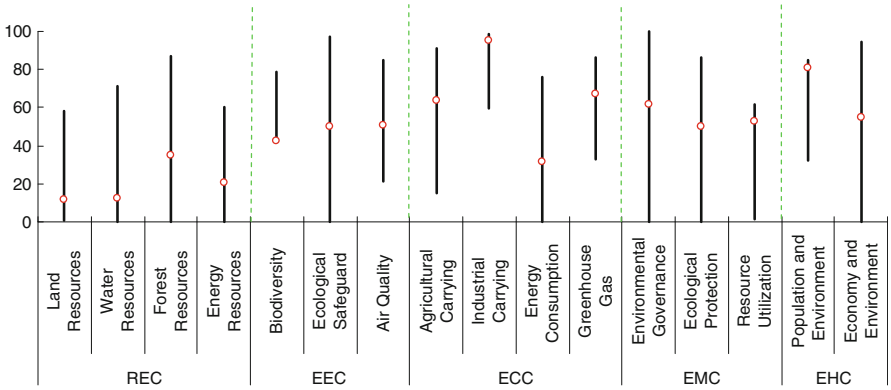

Fig. 132.3 Score and rank of the pillars of GEC

Table 132.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	19.30	49	Annual precipitation	38.85	51
			Groundwater	4.84	89
1.1 Land Resources	11.53	74	Total internal renewable water resources	4.78	96
Land area per capita	3.43	51			
Percentage of arable land to total land area	22.10	65	1.3 Forest Resources	35.09	41
			Growing stock in forest and other wooded land	53.75	38
Arable land per capita	11.75	48			
1.2 Water Resources	12.40	74	Proportion of land area covered by forest	43.67	41
Surface water	1.12	99			

(continued)

Table 132.1 (continued)

Indicators	Score	Rank
Forest area per capita	4.98	34
1.4 Energy Resources	20.86	11
Fossil energy	0.00	64
Energy production	0.42	94
Proportion of combustible renewable and waste to total energy consumption	94.74	2
Net energy imports of the energy consumption	11.79	45
2 Ecological Environment Competitiveness	47.99	67
2.1 Biodiversity	42.32	132
Threatened fish species	17.92	131
Threatened mammal species	80.98	114
Threatened plant species	83.08	126
GEF benefits index for biodiversity	14.80	22
2.2 Ecological Safeguard	49.93	16
Terrestrial protected areas	74.46	9
Marine protected areas	13.15	25
2.3 Air Quality	50.78	93
Inhalable particles (PM10)	86.13	38
Particulate matter (PM2.5)	88.20	46
Index of indoor air pollution	0.40	124
Nitrogen oxides emission	64.38	103
Sulfur dioxide emission	40.89	38
3 Environment Carrying Competitiveness	67.55	58
3.1 Agricultural Carrying	63.94	94
Cereal yield per unit of arable land	10.84	110
Fertilizer consumption per unit of arable land	99.30	26
Annual freshwater withdrawals for agriculture per unit of arable land	99.39	50
3.2 Industrial Carrying	95.45	13
Net exports of goods as a percentage of GDP	87.34	33
Electric power consumption per unit of value added of industry	N/A	N/A
SO_2 emissions per unit of value added of industry	99.75	76
Annual freshwater withdrawals for industry per value added of industry	99.27	28
3.3 Energy Consumption	31.38	98
Energy consumption per unit of land area	99.96	23
Ratio of clean energy consumption	2.08	88
Elasticity of energy consumption	13.63	87
Elasticity of electric power consumption	9.84	98
3.4 Greenhouse Gas	67.29	33
Growth rate of CO_2 emissions	45.48	90
Growth rate of Methane emissions	49.43	115
CO_2 emissions per unit of land area	99.99	13
CO_2 emissions per unit of energy consumption	96.07	4
4 Environment Management Competitiveness	54.14	44
4.1 Environmental Governance	61.50	118
Agricultural chemicals regulation	N/A	N/A
Percentage of the rural population with access to an improved water source	44.00	112
Percentage of the urban population with access to an improved water source	79.00	123
4.2 Ecological Protection	49.68	14
Area of plantation and afforestation	0.31	65
Biome protect	99.80	15
Overfishing of fishing resources	65.38	24
4.3 Resource Utilization	52.73	11
Utilization rate of water resources	0.21	74

(continued)

Table 132.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
Percentage of total internal renewable water resources to total water resources	68.70	61	Renewable internal freshwater resources per capita	2.20	84
Percentage of agricultural land to total land area	47.37	78	SO_2 emissions per capita	99.66	8
Percentage of fossil fuel energy consumption to total energy consumption	94.64	4	CO_2 emissions per capita	99.75	9
5 Environment Harmony Competitiveness	68.02	60	Energy consumption per capita	97.58	19
5.1 Population and Environment	80.94	12	5.2 Economy and Environment	55.10	104
Percentage of population with access to Improved sanitation facilities	N/A	N/A	Land resource utilization efficiency	0.01	120
Motor vehicles per 1,000 people	99.38	7	Sulfur dioxide emissions per unit of GDP	94.81	66
			Carbon dioxide emissions per unit of GDP	92.18	39
			Energy consumption per unit of GDP	33.42	120

Table 132.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	1	1	5	7	0
Ecological Environment Competitiveness	11	1	1	2	1	6
Environment Carrying Competitiveness	15	0	4	2	6	2
Environment Management Competitiveness	10	0	3	0	4	2
Environment Harmony Competitiveness	10	3	1	1	2	2
Total	60	5	10	10	20	12

Chapter 133
Report on Global Environment Competitiveness of Thailand

Thailand is a country located in the centre of the Indochina peninsula in Southeast Asia. It is bordered by Burma and Laos to the north, by Laos and Cambodia to the east, by the Gulf of Thailand and Malaysia to the south, by the Andaman Sea and the southern extremity of Burma to the west. It covers 510.9 thousand of square kilometers and has a population of 69.52 million. Its GDP reaches $345.67 billion in 2011. Through the index system and evaluation model, the environment competitiveness index of Thailand ranks at 79 in 133 countries.

Score: 48.73
Rank: 79

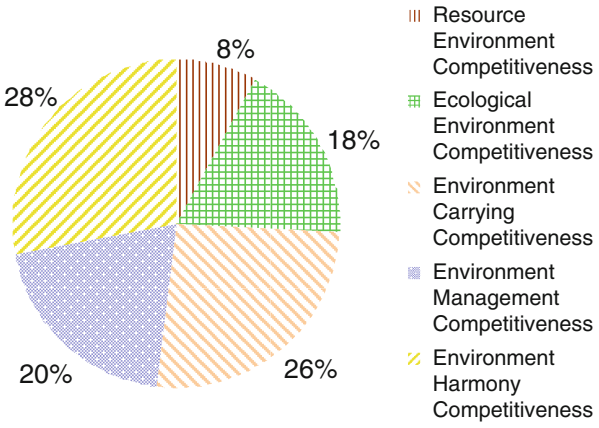

Fig. 133.1 Contribution of sub-index to GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_133,

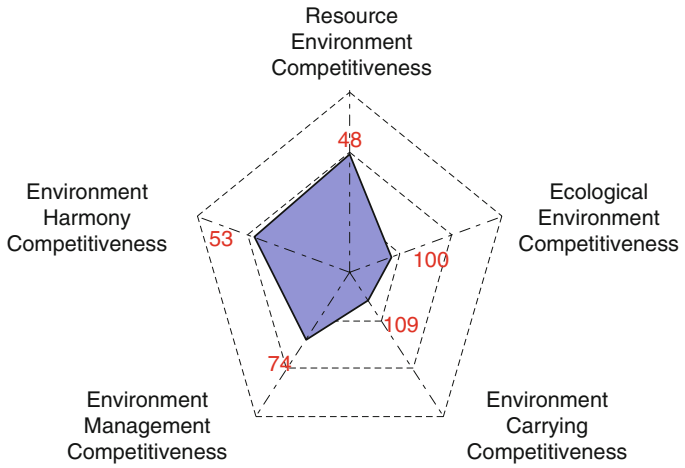

Fig. 133.2 Rank of sub-index of GEC

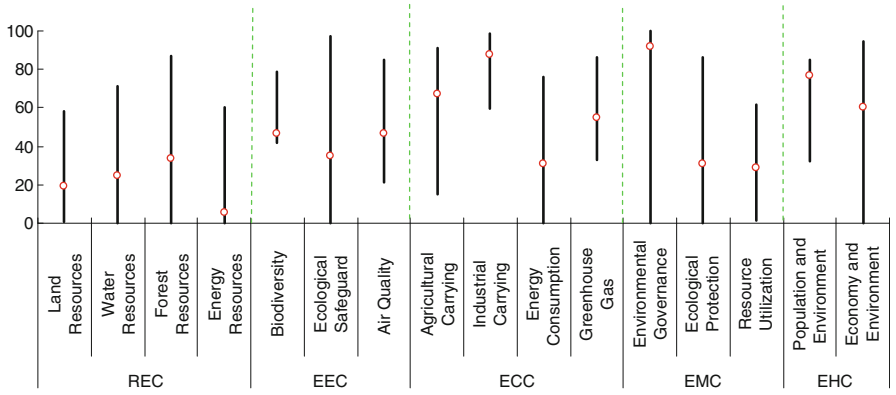

Fig. 133.3 Score and rank of the pillars of GEC

Table 133.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	19.69	48	Surface water	9.03	38
1.1 Land Resources	19.39	33	Annual precipitation	55.24	27
Land area per capita	1.30	104	Groundwater	11.78	59
Percentage of arable land to total land area	52.29	21	Total internal renewable water resources	22.16	48
Arable land per capita	10.61	54	1.3 Forest Resources	33.69	50
1.2 Water Resources	24.55	42	Growing stock in forest and other wooded land	52.37	46

(continued)

Table 133.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
Proportion of land area covered by forest	43.53	42	Annual freshwater withdrawals for industry per value added of industry	97.98	59
Forest area per capita	1.90	64	3.3 Energy Consumption	31.03	106
1.4 Energy Resources	5.70	64	Energy consumption per unit of land area	99.51	95
Fossil energy	0.27	47	Ratio of clean energy consumption	1.02	98
Energy production	1.03	61	Elasticity of energy consumption	13.60	90
Proportion of combustible renewable and waste to total energy consumption	20.62	41	Elasticity of electric power consumption	10.00	93
Net energy imports of the energy consumption	7.56	75	3.4 Greenhouse Gas	54.98	113
2 Ecological Environment Competitiveness	43.03	100	Growth rate of CO_2 emissions	40.46	108
2.1 Biodiversity	46.85	128	Growth rate of Methane emissions	50.96	109
Threatened fish species	54.25	125	CO_2 emissions per unit of land area	99.46	97
Threatened mammal species	69.02	126	CO_2 emissions per unit of energy consumption	43.56	62
Threatened plant species	94.98	104	4 Environment Management Competitiveness	48.74	74
GEF benefits index for biodiversity	8.00	35	4.1 Environmental Governance	91.89	59
2.2 Ecological Safeguard	34.89	33	Agricultural chemicals regulation	85.71	46
Terrestrial protected areas	54.35	27	Percentage of the rural population with access to an improved water source	95.00	48
Marine protected areas	5.71	36	Percentage of the urban population with access to an improved water source	97.00	80
2.3 Air Quality	46.26	108	4.2 Ecological Protection	31.14	79
Inhalable particles (PM10)	61.31	101	Area of plantation and afforestation	5.17	11
Particulate matter (PM2.5)	62.32	121	Biome protect	77.60	48
Index of indoor air pollution	20.00	78	Overfishing of fishing resources	19.30	97
Nitrogen oxides emission	64.24	104	4.3 Resource Utilization	29.06	102
Sulfur dioxide emission	39.32	100	Utilization rate of water resources	0.53	56
3 Environment Carrying Competitiveness	63.70	109	Percentage of total internal renewable water resources to total water resources	47.84	90
3.1 Agricultural Carrying	67.05	61			
Cereal yield per unit of arable land	28.97	66			
Fertilizer consumption per unit of arable land	89.88	87			
Annual freshwater withdrawals for agriculture per unit of arable land	94.98	93			
3.2 Industrial Carrying	87.94	94			
Net exports of goods as a percentage of GDP	60.77	115			
Electric power consumption per unit of value added of industry	93.11	53			
SO_2 emissions per unit of value added of industry	99.90	40			

(continued)

Table 133.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
Percentage of agricultural land to total land area	45.80	79	SO_2 emissions per capita	96.57	60
			CO_2 emissions per capita	90.36	71
Percentage of fossil fuel energy consumption to total energy consumption	22.09	72	Energy consumption per capita	87.70	70
			5.2 Economy and Environment	60.03	90
5 Environment Harmony Competitiveness	68.49	53	Land resource utilization efficiency	0.20	48
5.1 Population and Environment	76.96	31	Sulfur dioxide emissions per unit of GDP	94.40	68
Percentage of population with access to Improved sanitation facilities	96.00	42	Carbon dioxide emissions per unit of GDP	71.30	108
			Energy consumption per unit of GDP	74.23	91
Motor vehicles per 1,000 people	79.88	76			
Renewable internal freshwater resources per capita	3.91	63			

Table 133.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	0	2	9	2	1
Ecological Environment Competitiveness	11	0	1	1	1	8
Environment Carrying Competitiveness	15	0	0	2	8	5
Environment Management Competitiveness	10	0	1	5	3	1
Environment Harmony Competitiveness	10	0	0	4	5	1
Total	60	0	4	21	19	16

Chapter 134
Report on Global Environment Competitiveness of Togo

Togo is located in the East and West African countries. It locates in Benin to the east, Burkina Faso to the north, Gamer to the west and the Gulf of Guinea to the south. It covers54.4 thousand of square kilometers and has a population of 6.15 million. Its GDP reaches $3.62 billion in 2011. Through the index system and evaluation model, the environment competitiveness index of Togo ranks at 84 in 133 countries.

Score: 48.44
Rank: 84

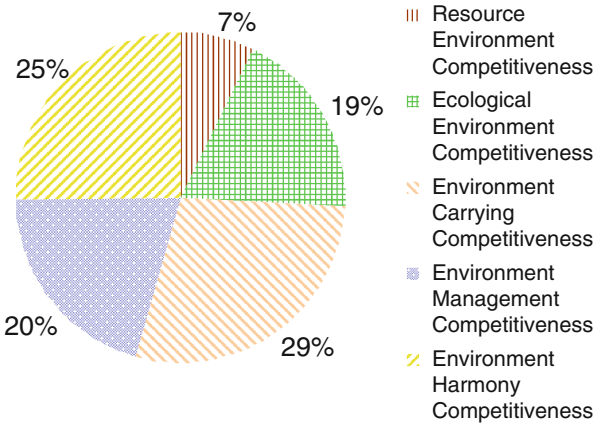

Fig. 134.1 Contribution of sub-index to GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_134,

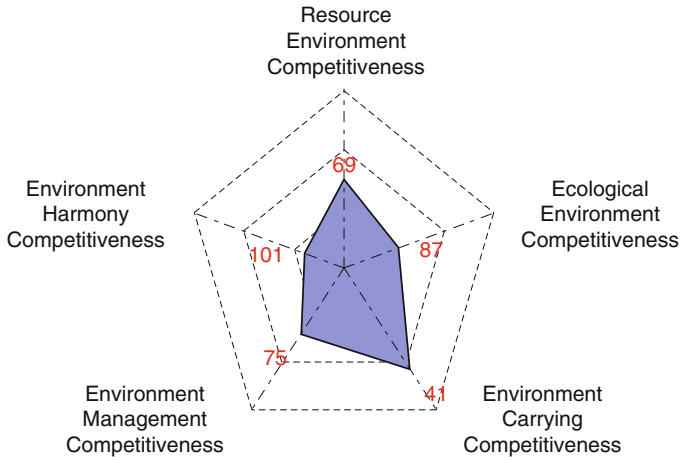

Fig. 134.2 Rank of sub-index of GEC

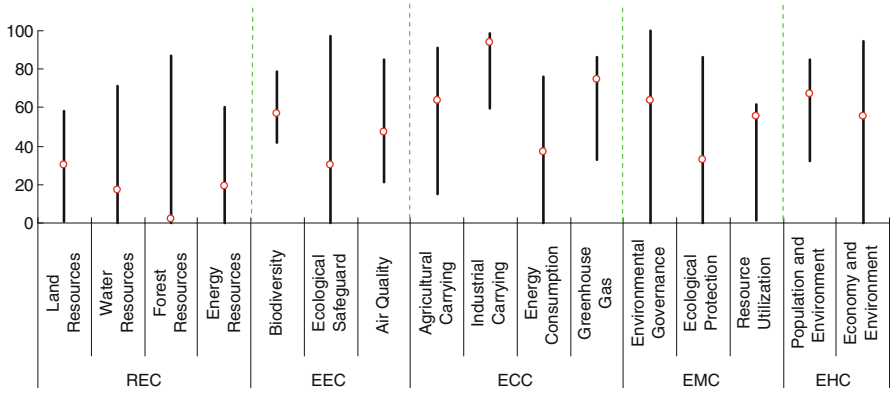

Fig. 134.3 Score and rank of the pillars of GEC

Table 134.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	17.51	69	Annual precipitation	41.35	45
1.1 Land Resources	29.85	11	Groundwater	15.06	48
Land area per capita	1.57	94	Total internal renewable water resources	10.66	78
Percentage of arable land to total land area	78.32	7	1.3 Forest Resources	2.39	127
Arable land per capita	19.09	24	Growing stock in forest and other wooded land	0.00	121
1.2 Water Resources	17.46	57	Proportion of land area covered by forest	5.75	111
Surface water	2.78	78			

(continued)

Table 134.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
Forest area per capita	0.30	111	Annual freshwater withdrawals for industry per value added of industry	99.21	33
1.4 Energy Resources	19.42	16	3.3 Energy Consumption	37.30	35
Fossil energy	0.00	64	Energy consumption per unit of land area	99.90	45
Energy production	0.37	98	Ratio of clean energy consumption	0.52	106
Proportion of combustible renewable and waste to total energy consumption	88.56	5	Elasticity of energy consumption	11.50	120
Net energy imports of the energy consumption	10.50	56	Elasticity of electric power consumption	N/A	N/A
2 Ecological Environment Competitiveness	45.01	87	3.4 Greenhouse Gas	74.97	11
2.1 Biodiversity	56.56	92	Growth rate of CO_2 emissions	53.21	60
Threatened fish species	88.68	66	Growth rate of Methane emissions	76.41	5
Threatened mammal species	94.02	64	CO_2 emissions per unit of land area	99.98	26
Threatened plant species	99.47	60	CO_2 emissions per unit of energy consumption	92.06	7
GEF benefits index for biodiversity	0.30	105	4 Environment Management Competitiveness	48.73	75
2.2 Ecological Safeguard	30.43	43	4.1 Environmental Governance	63.46	116
Terrestrial protected areas	30.43	62	Agricultural chemicals regulation	61.90	72
Marine protected areas	N/A	N/A	Percentage of the rural population with access to an improved water source	40.00	115
2.3 Air Quality	47.28	107	Percentage of the urban population with access to an improved water source	89.00	112
Inhalable particles (PM10)	80.29	58	4.2 Ecological Protection	32.59	72
Particulate matter (PM2.5)	73.43	103	Area of plantation and afforestation	0.05	97
Index of indoor air pollution	0.30	126	Biome protect	66.40	58
Nitrogen oxides emission	68.64	33	Overfishing of fishing resources	42.15	68
Sulfur dioxide emission	40.99	3	4.3 Resource Utilization	55.51	7
3 Environment Carrying Competitiveness	69.64	41	Utilization rate of water resources	0.04	113
3.1 Agricultural Carrying	63.59	98			
Cereal yield per unit of arable land	9.20	114			
Fertilizer consumption per unit of arable land	99.74	13			
Annual freshwater withdrawals for agriculture per unit of arable land	99.96	13			
3.2 Industrial Carrying	93.71	35			
Net exports of goods as a percentage of GDP	85.20	44			
Electric power consumption per unit of value added of industry	90.57	75			
SO_2 emissions per unit of value added of industry	99.84	59			

(continued)

Table 134.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
Percentage of total internal renewable water resources to total water resources	58.38	79	Renewable internal freshwater resources per capita	2.26	83
Percentage of agricultural land to total land area	73.45	28	SO_2 emissions per capita	99.81	4
Percentage of fossil fuel energy consumption to total energy consumption	90.16	6	CO_2 emissions per capita	99.58	12
5 Environment Harmony Competitiveness	61.29	101	Energy consumption per capita	97.60	18
5.1 Population and Environment	67.29	85	5.2 Economy and Environment	55.29	102
Percentage of population with access to Improved sanitation facilities	12.00	125	Land resource utilization efficiency	0.02	106
Motor vehicles per 1,000 people	100.00	1	Sulfur dioxide emissions per unit of GDP	97.11	36
			Carbon dioxide emissions per unit of GDP	87.87	66
			Energy consumption per unit of GDP	36.14	119

Table 134.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	2	2	3	4	3
Ecological Environment Competitiveness	11	0	0	4	4	3
Environment Carrying Competitiveness	15	1	3	6	2	3
Environment Management Competitiveness	10	1	1	1	4	3
Environment Harmony Competitiveness	10	2	1	1	3	3
Total	60	6	7	15	17	15

Chapter 135
Report on Global Environment Competitiveness of Tunisia

Score: 48.46
Rank: 82

Tunisia is the northernmost country in Africa. It is an Arab Maghreb country and is bordered by Algeria to the west, Libya to the southeast, and the Mediterranean Sea to the north and east. It covers155.4 thousand of square kilometers and has a population of 10.67 million. Its GDP reaches $45.86 billion in 2011. Through the index system and evaluation model, the environment competitiveness index of Tunisia ranks at 82 in 133 countries.

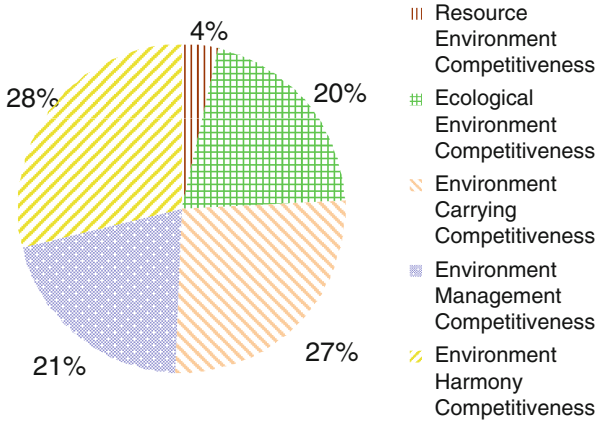

Fig. 135.1 Contribution of sub-index to GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_135,

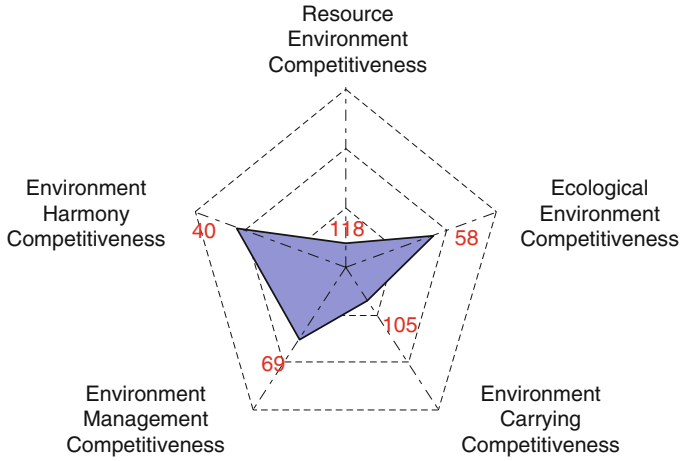

Fig. 135.2 Rank of sub-index of GEC

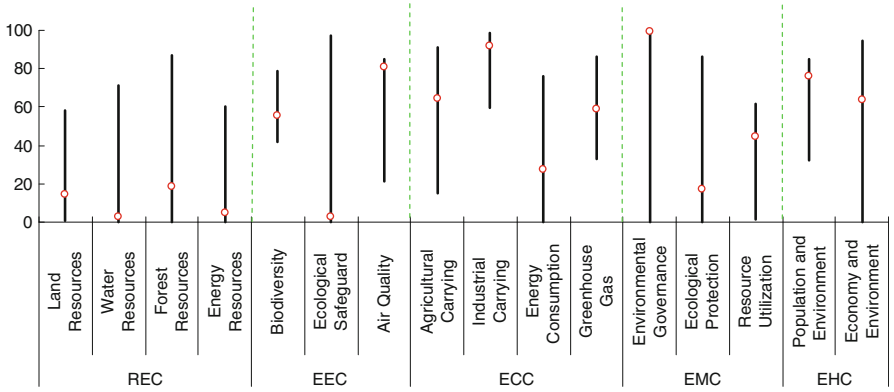

Fig. 135.3 Score and rank of the pillars of GEC

Table 135.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	8.73	118	Groundwater	1.44	105
1.1 Land Resources	14.05	59	Total internal renewable water resources	1.36	115
Land area per capita	2.60	60	1.3 Forest Resources	18.31	109
Percentage of arable land to total land area	30.91	44	Growing stock in forest and other wooded land	50.08	102
Arable land per capita	12.45	45	Proportion of land area covered by forest	7.71	108
1.2 Water Resources	2.61	118	Forest area per capita	0.67	98
Surface water	0.24	116	1.4 Energy Resources	4.92	73
Annual precipitation	7.39	116			

(continued)

Table 135.1 (continued)

Indicators	Score	Rank
Fossil energy	0.19	49
Energy production	0.77	68
Proportion of combustible renewable and waste to total energy consumption	15.00	52
Net energy imports of the energy consumption	10.61	53
2 Ecological Environment Competitiveness	49.59	58
2.1 Biodiversity	55.42	105
Threatened fish species	83.49	82
Threatened mammal species	92.93	78
Threatened plant species	99.65	51
GEF benefits index for biodiversity	0.50	99
2.2 Ecological Safeguard	2.54	121
Terrestrial protected areas	3.26	120
Marine protected areas	1.46	70
2.3 Air Quality	80.51	22
Inhalable particles (PM10)	83.21	50
Particulate matter (PM2.5)	87.67	48
Index of indoor air pollution	100.00	1
Nitrogen oxides emission	68.51	38
Sulfur dioxide emission	40.39	78
3 Environment Carrying Competitiveness	64.26	105
3.1 Agricultural Carrying	64.63	88
Cereal yield per unit of arable land	15.01	98
Fertilizer consumption per unit of arable land	96.58	51
Annual freshwater withdrawals for agriculture per unit of arable land	98.84	64
3.2 Industrial Carrying	91.74	64
Net exports of goods as a percentage of GDP	75.61	88
Electric power consumption per unit of value added of industry	92.67	58
SO_2 emissions per unit of value added of industry	99.59	94
Annual freshwater withdrawals for industry per value added of industry	99.10	36
3.3 Energy Consumption	27.66	125
Energy consumption per unit of land area	99.87	47
Ratio of clean energy consumption	0.28	108
Elasticity of energy consumption	9.35	122
Elasticity of electric power consumption	1.12	123
3.4 Greenhouse Gas	59.06	89
Growth rate of CO_2 emissions	53.36	59
Growth rate of Methane emissions	49.91	114
CO_2 emissions per unit of land area	99.84	63
CO_2 emissions per unit of energy consumption	38.84	75
4 Environment Management Competitiveness	49.78	69
4.1 Environmental Governance	99.00	21
Agricultural chemicals regulation	N/A	N/A
Percentage of the rural population with access to an improved water source	N/A	N/A
Percentage of the urban population with access to an improved water source	99.00	51
4.2 Ecological Protection	17.04	111
Area of plantation and afforestation	0.89	41
Biome protect	7.40	121
Overfishing of fishing resources	48.21	58
4.3 Resource Utilization	44.23	34
Utilization rate of water resources	2.50	18
Percentage of total internal renewable water resources to total water resources	83.98	28
Percentage of agricultural land to total land area	74.48	24
Percentage of fossil fuel energy consumption to total energy consumption	15.94	80

(continued)

Table 135.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
5 Environment Harmony Competitiveness	69.96	40	CO_2 emissions per capita	94.47	55
5.1 Population and Environment	76.34	34	Energy consumption per capita	93.91	48
Percentage of population with access to Improved sanitation facilities	85.00	71	5.2 Economy and Environment	63.58	78
Motor vehicles per 1,000 people	86.17	58	Land resource utilization efficiency	0.09	72
Renewable internal freshwater resources per capita	0.48	116	Sulfur dioxide emissions per unit of GDP	85.21	103
SO_2 emissions per capita	91.82	87	Carbon dioxide emissions per unit of GDP	82.70	83
			Energy consumption per unit of GDP	86.32	60

Table 135.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	0	0	5	2	7
Ecological Environment Competitiveness	11	1	1	4	2	3
Environment Carrying Competitiveness	15	0	0	4	7	4
Environment Management Competitiveness	10	0	4	2	0	2
Environment Harmony Competitiveness	10	0	0	3	5	2
Total	60	1	5	18	16	18

Chapter 136
Report on Global Environment Competitiveness of Turkey

Score: 48.00
Rank: 89

Turkey is a Eurasian country located in Western Asia (mostly in the Anatolian peninsula) and in Southeastern Europe. Turkey is bordered by eight countries: Bulgaria to the northwest, Greece to the west, Georgia to the northeast, Armenia, Azerbaijan (the exclave of Nakhchivan) and Iran to the east, Iraq and Syria to the southeast. The Mediterranean Sea and Cyprus are to the south, the Aegean Sea is to the west, and the Black Sea is to the north. It covers769.6 thousand of square kilometers and has a population of 73.64 million. Its GDP reaches $774.98 billion in 2011. Through the index system and evaluation model, the environment competitiveness index of Turkey ranks at 89 in 133 countries.

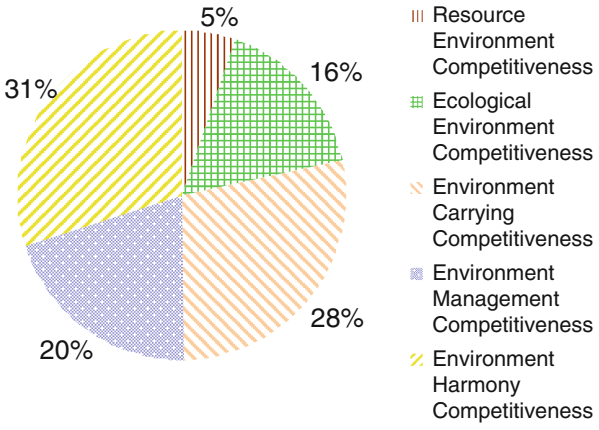

Fig. 136.1 Contribution of sub-index to GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_136,

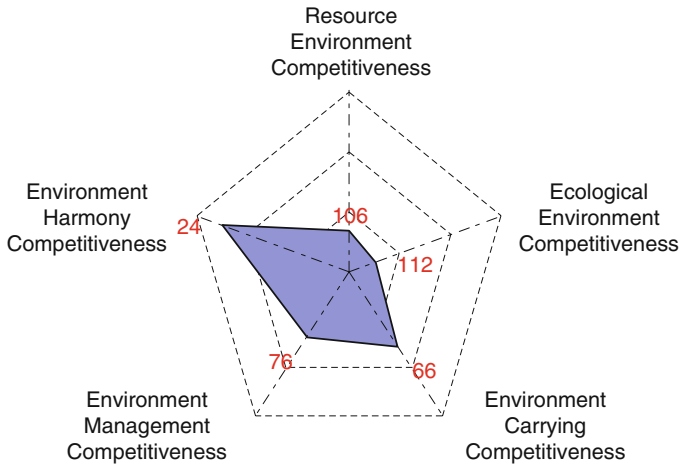

Fig. 136.2 Rank of sub-index of GEC

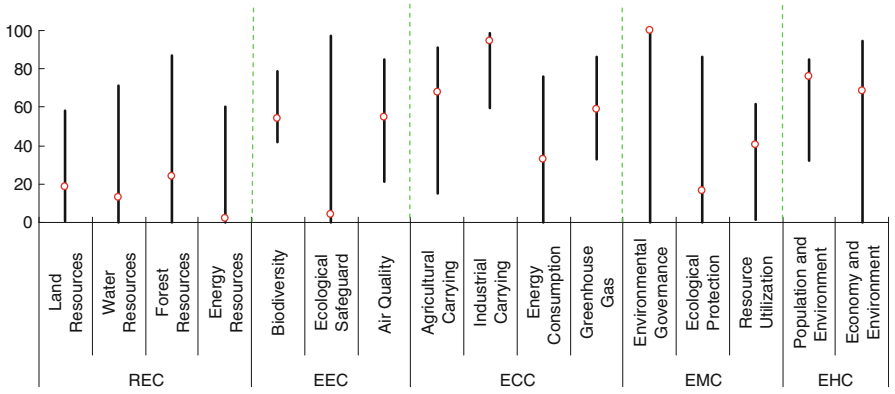

Fig. 136.3 Score and rank of the pillars of GEC

Table 136.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	12.73	106	Groundwater	12.88	55
1.1 Land Resources	18.22	35	Total internal renewable water resources	14.88	65
Land area per capita	1.86	84	1.3 Forest Resources	23.68	86
Percentage of arable land to total land area	45.21	27	Growing stock in forest and other wooded land	54.62	31
Arable land per capita	13.05	39	Proportion of land area covered by forest	17.43	84
1.2 Water Resources	12.73	73	Forest area per capita	1.08	85
Surface water	2.67	79	1.4 Energy Resources	1.78	109
Annual precipitation	20.47	92			

(continued)

Table 136.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
Fossil energy	0.44	40	Energy consumption per unit of land area	99.71	80
Energy production	0.45	90	Ratio of clean energy consumption	9.21	57
Proportion of combustible renewable and waste to total energy consumption	4.65	86	Elasticity of energy consumption	13.66	84
Net energy imports of the energy consumption	3.78	104	Elasticity of electric power consumption	10.15	87
2 Ecological Environment Competitiveness	39.47	112	3.4 Greenhouse Gas	58.72	92
2.1 Biodiversity	53.97	114	Growth rate of CO_2 emissions	52.17	65
Threatened fish species	66.98	118	Growth rate of Methane emissions	58.03	71
Threatened mammal species	90.76	96	CO_2 emissions per unit of land area	99.62	89
Threatened plant species	99.71	47	CO_2 emissions per unit of energy consumption	31.63	98
GEF benefits index for biodiversity	6.20	41	4 Environment Management Competitiveness	48.65	76
2.2 Ecological Safeguard	4.16	113	4.1 Environmental Governance	99.70	15
Terrestrial protected areas	4.89	113	Agricultural chemicals regulation	100.00	1
Marine protected areas	3.05	55	Percentage of the rural population with access to an improved water source	99.00	30
2.3 Air Quality	55.07	80	Percentage of the urban population with access to an improved water source	100.00	1
Inhalable particles (PM10)	74.45	79	4.2 Ecological Protection	16.74	112
Particulate matter (PM2.5)	79.49	89	Area of plantation and afforestation	4.43	15
Index of indoor air pollution	31.80	63	Biome protect	11.10	114
Nitrogen oxides emission	62.00	118	Overfishing of fishing resources	38.79	75
Sulfur dioxide emission	36.28	118	4.3 Resource Utilization	40.14	52
3 Environment Carrying Competitiveness	67.09	66	Utilization rate of water resources	0.76	45
3.1 Agricultural Carrying	67.63	59	Percentage of total internal renewable water resources to total water resources	87.41	20
Cereal yield per unit of arable land	26.58	70	Percentage of agricultural land to total land area	59.76	51
Fertilizer consumption per unit of arable land	92.20	77	Percentage of fossil fuel energy consumption to total energy consumption	12.64	90
Annual freshwater withdrawals for agriculture per unit of arable land	97.80	73			
3.2 Industrial Carrying	94.71	23			
Net exports of goods as a percentage of GDP	89.02	27			
Electric power consumption per unit of value added of industry	92.78	57			
SO_2 emissions per unit of value added of industry	99.75	75			
Annual freshwater withdrawals for industry per value added of industry	97.30	67			
3.3 Energy Consumption	33.19	68			

(continued)

Table 136.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
5 Environment Harmony Competitiveness	72.06	24	CO_2 emissions per capita	90.21	73
5.1 Population and Environment	75.71	38	Energy consumption per capita	89.70	65
Percentage of population with access to Improved sanitation facilities	90.00	62	5.2 Economy and Environment	68.42	41
Motor vehicles per 1,000 people	82.72	68	Land resource utilization efficiency	0.29	37
Renewable internal freshwater resources per capita	3.73	64	Sulfur dioxide emissions per unit of GDP	93.10	71
SO_2 emissions per capita	90.79	93	Carbon dioxide emissions per unit of GDP	88.04	65
			Energy consumption per unit of GDP	92.26	31

Table 136.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	0	1	4	8	1
Ecological Environment Competitiveness	11	0	0	1	5	5
Environment Carrying Competitiveness	15	0	2	3	10	0
Environment Management Competitiveness	10	1	4	3	0	2
Environment Harmony Competitiveness	10	0	0	3	7	0
Total	60	1	7	14	30	8

Chapter 137
Report on Global Environment Competitiveness of Turkmenistan

Turkmenistan is located in South-Central Europe. It borders Caspian Sea to the west, Kazakhstan to the north, Uzbekistan to the northeast and Afghanistan to the east, south of Iran. It covers469.9 thousand of square kilometers and has a population of 5.11 million. Its GDP reaches $28.06 billion in 2011. Through the index system and evaluation model, the environment competitiveness index of Turkmenistan ranks at 122 in 133 countries.

Score: 43.26
Rank: 122

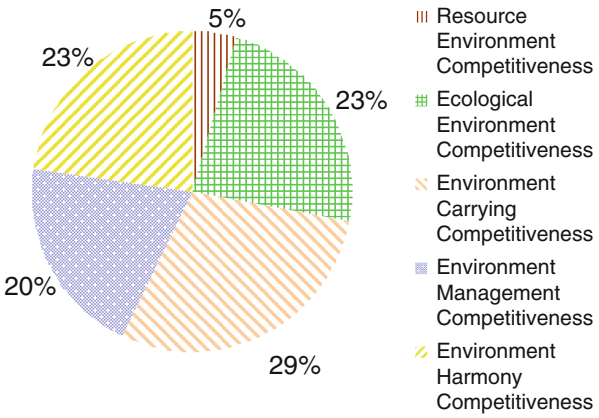

Fig. 137.1 Contribution of sub-index to GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_137,

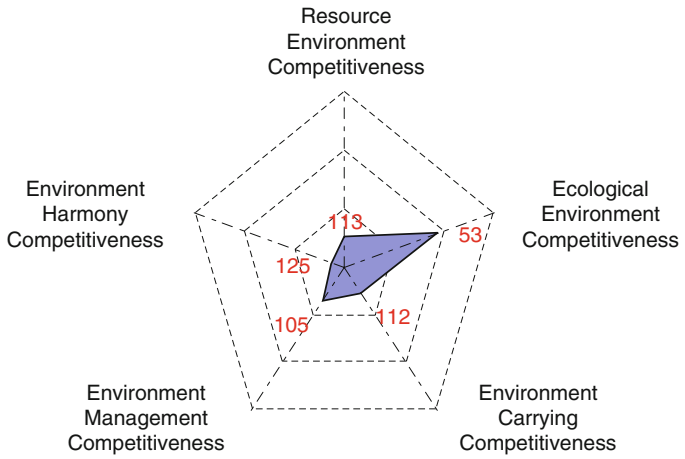

Fig. 137.2 Rank of sub-index of GEC

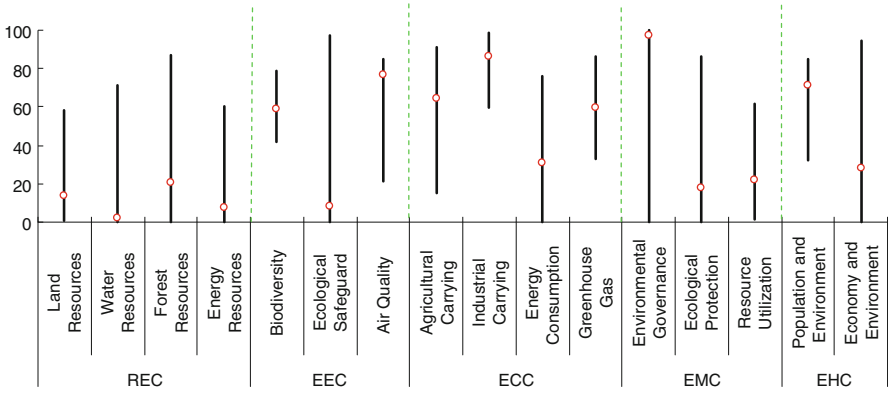

Fig. 137.3 Score and rank of the pillars of GEC

Table 137.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	9.78	113	Groundwater	0.08	125
1.1 Land Resources	13.86	61	Total internal renewable water resources	0.15	126
Land area per capita	16.57	13	1.3 Forest Resources	20.82	96
Percentage of arable land to total land area	6.70	108	Growing stock in forest and other wooded land	50.05	106
Arable land per capita	17.42	26	Proportion of land area covered by forest	10.29	101
1.2 Water Resources	1.94	120	Forest area per capita	5.64	30
Surface water	1.87	92	1.4 Energy Resources	7.53	55
Annual precipitation	5.67	119			

(continued)

Table 137.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
Fossil energy	0.40	42	Energy consumption per unit of land area	99.91	43
Energy production	9.28	13	Ratio of clean energy consumption	0.00	115
Proportion of combustible renewable and waste to total energy consumption	0.00	120	Elasticity of energy consumption	12.90	111
Net energy imports of the energy consumption	27.74	21	Elasticity of electric power consumption	10.88	55
2 Ecological Environment Competitiveness	50.67	53	3.4 Greenhouse Gas	59.58	83
2.1 Biodiversity	58.67	43	Growth rate of CO_2 emissions	38.13	114
Threatened fish species	94.81	28	Growth rate of Methane emissions	88.50	2
Threatened mammal species	95.11	49	CO_2 emissions per unit of land area	99.88	53
Threatened plant species	99.82	40	CO_2 emissions per unit of energy consumption	33.26	94
GEF benefits index for biodiversity	1.80	72	4 Environment Management Competitiveness	42.86	105
2.2 Ecological Safeguard	7.88	107	4.1 Environmental Governance	97.00	33
Terrestrial protected areas	7.88	108	Agricultural chemicals regulation	N/A	N/A
Marine protected areas	N/A	N/A	Percentage of the rural population with access to an improved water source	N/A	N/A
2.3 Air Quality	76.76	38	Percentage of the urban population with access to an improved water source	97.00	80
Inhalable particles (PM10)	73.72	82	4.2 Ecological Protection	17.90	109
Particulate matter (PM2.5)	78.57	91	Area of plantation and afforestation	N/A	N/A
Index of indoor air pollution	100.00	1	Biome protect	17.90	109
Nitrogen oxides emission	68.10	55	Overfishing of fishing resources	N/A	N/A
Sulfur dioxide emission	40.56	74	4.3 Resource Utilization	21.98	123
3 Environment Carrying Competitiveness	63.43	112	Utilization rate of water resources	4.09	10
3.1 Agricultural Carrying	64.56	90	Percentage of total internal renewable water resources to total water resources	1.72	127
Cereal yield per unit of arable land	32.92	57	Percentage of agricultural land to total land area	82.02	16
Fertilizer consumption per unit of arable land	92.51	75	Percentage of fossil fuel energy consumption to total energy consumption	0.11	125
Annual freshwater withdrawals for agriculture per unit of arable land	78.81	125			
3.2 Industrial Carrying	86.54	104			
Net exports of goods as a percentage of GDP	64.76	111			
Electric power consumption per unit of value added of industry	90.61	74			
SO_2 emissions per unit of value added of industry	99.56	100			
Annual freshwater withdrawals for industry per value added of industry	91.21	112			
3.3 Energy Consumption	30.92	110			

(continued)

Table 137.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
5 Environment Harmony Competitiveness	49.56	125	CO_2 emissions per capita	71.76	115
5.1 Population and Environment	71.15	62	Energy consumption per capita	67.73	108
Percentage of population with access to Improved sanitation facilities	98.00	33	5.2 Economy and Environment	27.98	127
Motor vehicles per 1,000 people	87.16	56	Land resource utilization efficiency	0.02	111
Renewable internal freshwater resources per capita	0.33	121	Sulfur dioxide emissions per unit of GDP	78.55	116
SO_2 emissions per capita	87.59	103	Carbon dioxide emissions per unit of GDP	6.83	131
			Energy consumption per unit of GDP	26.52	122

Table 137.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	0	2	2	3	7
Ecological Environment Competitiveness	11	1	1	5	2	2
Environment Carrying Competitiveness	15	1	0	3	5	6
Environment Management Competitiveness	10	1	1	1	0	4
Environment Harmony Competitiveness	10	0	0	2	1	7
Total	60	3	4	13	11	26

Chapter 138
Report on Global Environment Competitiveness of Ukraine

Ukraine is a country in Eastern Europe. It is bordered by the Russian Federation to the east and northeast, Poland, Slovakia and Hungary to the west, Romania and Moldova to the southwest, and the Black Sea and Sea of Above to the south and southeast. It covers 579.3 thousand of square kilometers and has a population of 45.71 million. Its GDP reaches $165.25 billion in 2011. Through the index system and evaluation model, the environment competitiveness index of Ukraine ranks at 96 in 133 countries.

Score: 47.41
Rank: 96

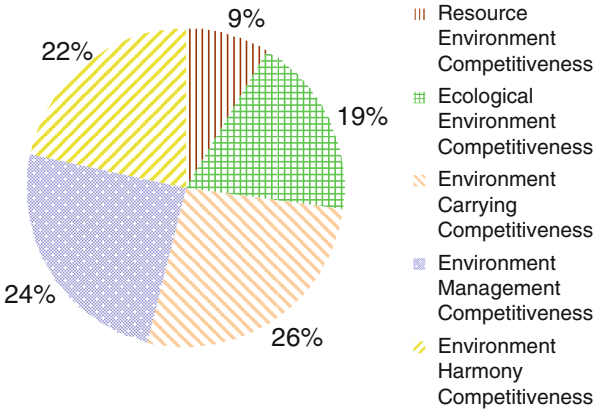

Fig. 138.1 Contribution of sub-index to GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_138,

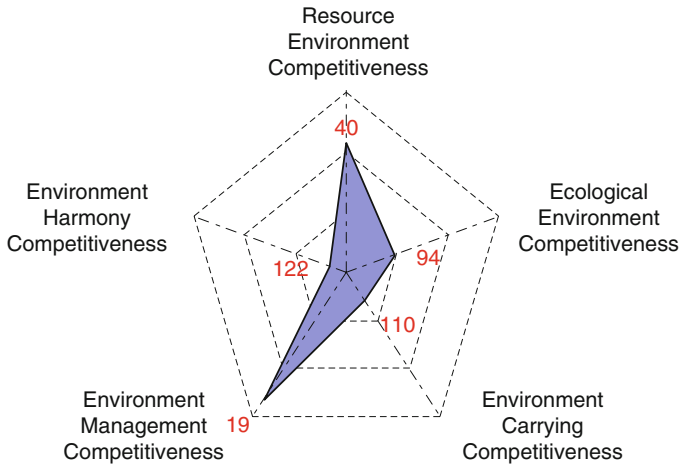

Fig. 138.2 Rank of sub-index of GEC

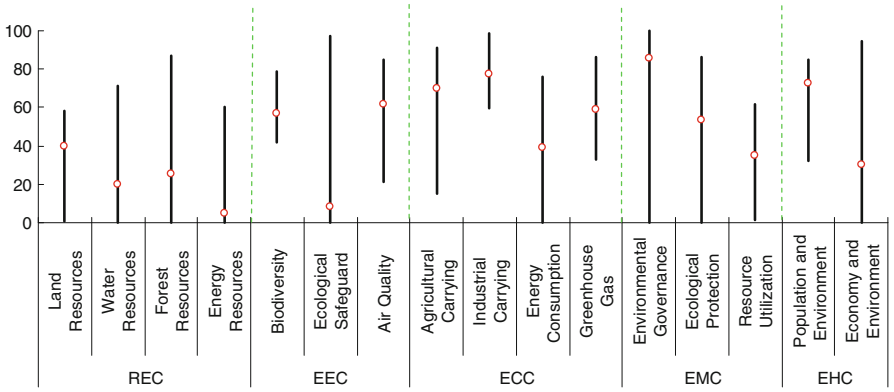

Fig. 138.3 Score and rank of the pillars of GEC

Table 138.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	20.30	40	Groundwater	4.93	88
1.1 Land Resources	39.46	3	Total internal renewable water resources	4.62	98
Land area per capita	2.26	71	1.3 Forest Resources	25.24	83
Percentage of arable land to total land area	95.24	3	Growing stock in forest and other wooded land	56.42	28
Arable land per capita	33.29	8	Proportion of land area covered by forest	19.67	82
1.2 Water Resources	19.59	52	Forest area per capita	1.48	71
Surface water	2.55	83	1.4 Energy Resources	4.96	72
Annual precipitation	66.26	15			

(continued)

Table 138.1 (continued)

Indicators	Score	Rank
Fossil energy	10.10	13
Energy production	1.67	42
Proportion of combustible renewable and waste to total energy consumption	1.21	105
Net energy imports of the energy consumption	7.32	77
2 Ecological Environment Competitiveness	44.13	94
2.1 Biodiversity	56.84	83
Threatened fish species	90.09	58
Threatened mammal species	94.02	64
Threatened plant species	99.07	74
GEF benefits index for biodiversity	0.50	99
2.2 Ecological Safeguard	8.09	105
Terrestrial protected areas	9.24	106
Marine protected areas	6.37	35
2.3 Air Quality	61.62	59
Inhalable particles (PM10)	89.05	16
Particulate matter (PM2.5)	86.18	62
Index of indoor air pollution	38.30	56
Nitrogen oxides emission	63.43	108
Sulfur dioxide emission	37.10	114
3 Environment Carrying Competitiveness	63.59	110
3.1 Agricultural Carrying	69.63	49
Cereal yield per unit of arable land	26.58	71
Fertilizer consumption per unit of arable land	97.60	47
Annual freshwater withdrawals for agriculture per unit of arable land	99.08	61
3.2 Industrial Carrying	77.28	126
Net exports of goods as a percentage of GDP	73.79	92
Electric power consumption per unit of value added of industry	70.24	121
SO_2 emissions per unit of value added of industry	99.10	118
Annual freshwater withdrawals for industry per value added of industry	66.00	126
3.3 Energy Consumption	38.90	29
Energy consumption per unit of land area	99.52	94
Ratio of clean energy consumption	33.55	21
Elasticity of energy consumption	12.95	109
Elasticity of electric power consumption	9.58	103
3.4 Greenhouse Gas	58.67	93
Growth rate of CO_2 emissions	43.67	96
Growth rate of Methane emissions	60.87	50
CO_2 emissions per unit of land area	99.49	96
CO_2 emissions per unit of energy consumption	45.67	56
4 Environment Management Competitiveness	57.62	19
4.1 Environmental Governance	85.47	78
Agricultural chemicals regulation	66.67	65
Percentage of the rural population with access to an improved water source	98.00	40
Percentage of the urban population with access to an improved water source	98.00	70
4.2 Ecological Protection	53.53	11
Area of plantation and afforestation	N/A	N/A
Biome protect	20.40	107
Overfishing of fishing resources	86.67	3
4.3 Resource Utilization	35.22	72
Utilization rate of water resources	1.11	33
Percentage of total internal renewable water resources to total water resources	33.91	106
Percentage of agricultural land to total land area	84.22	13
Percentage of fossil fuel energy consumption to total energy consumption	21.65	73

(continued)

Table 138.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
5 Environment Harmony Competitiveness	51.40	122	CO_2 emissions per capita	84.34	90
5.1 Population and Environment	72.78	52	Energy consumption per capita	78.64	91
Percentage of population with access to Improved sanitation facilities	95.00	47	5.2 Economy and Environment	30.03	125
Motor vehicles per 1,000 people	79.63	79	Land resource utilization efficiency	0.08	74
Renewable internal freshwater resources per capita	1.41	96	Sulfur dioxide emissions per unit of GDP	69.15	121
SO_2 emissions per capita	87.94	101	Carbon dioxide emissions per unit of GDP	23.93	130
			Energy consumption per unit of GDP	26.96	121

Table 138.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	2	3	2	6	1
Ecological Environment Competitiveness	11	0	1	3	4	3
Environment Carrying Competitiveness	15	0	2	3	6	4
Environment Management Competitiveness	10	0	2	2	3	2
Environment Harmony Competitiveness	10	0	0	2	4	4
Total	60	2	8	12	23	14

Chapter 139
Report on Global Environment Competitiveness of the United Arab Emirates

Score: 45
Rank: 114

The United Arab Emirates is a country situated at the southeast of the Arabian Peninsula in Western Asia on the Persian Gulf, bordered by Oman to the east and Saudi Arabia to the south, and sharing sea borders with Qatar to the west and Iran to the north. It covers 83.6 thousand of square kilometers and has a population of 7.89 million. Its GDP reaches $360.25 billion in 2011. Through the index system and evaluation model, the environment competitiveness index of The United Arab Emirates ranks at 114 in 133 countries.

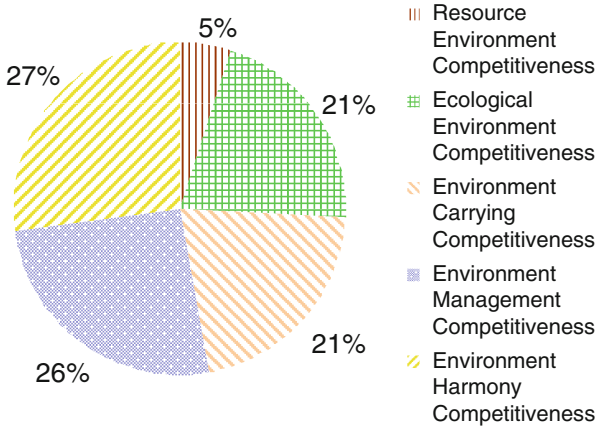

Fig. 139.1 Contribution of sub-index to GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_139,

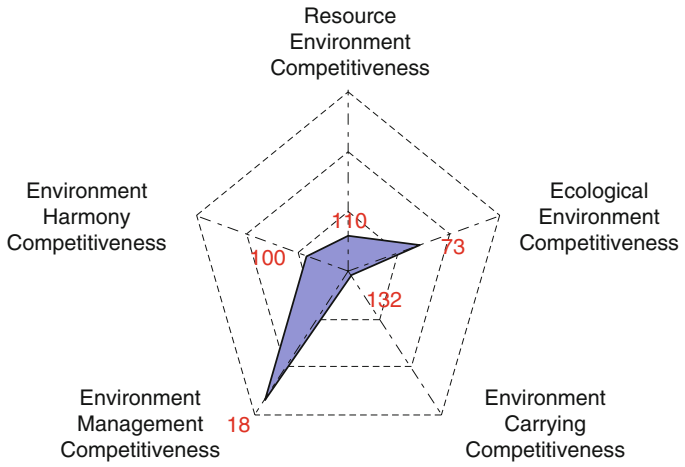

Fig. 139.2 Rank of sub-index of GEC

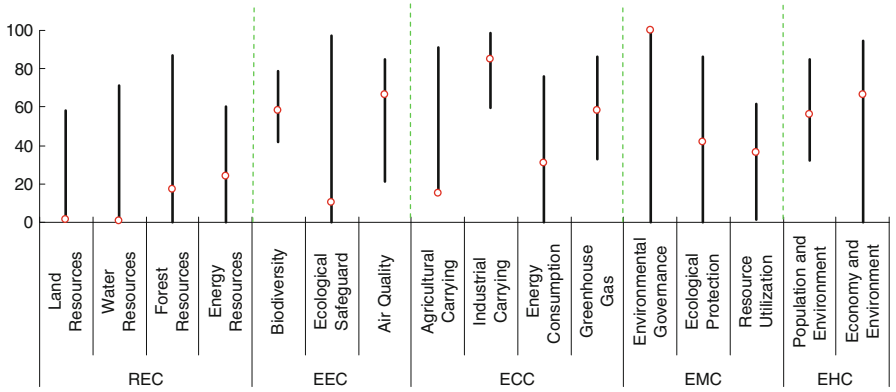

Fig. 139.3 Score and rank of the pillars of GEC

Table 139.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	10.98	110	Groundwater	0.16	121
1.1 Land Resources	1.10	131	Total internal renewable water resources	0.09	129
Land area per capita	1.89	83	1.3 Forest Resources	16.88	111
Percentage of arable land to total land area	0.85	129	Growing stock in forest and other wooded land	50.05	105
Arable land per capita	0.29	131	Proportion of land area covered by forest	4.46	112
1.2 Water Resources	0.73	129	Forest area per capita	0.28	113
Surface water	0.02	124	1.4 Energy Resources	23.90	7
Annual precipitation	2.64	127			

(continued)

Table 139.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
Fossil energy	33.83	4	Energy consumption per unit of land area	98.42	115
Energy production	23.71	6	Ratio of clean energy consumption	0.00	116
Proportion of combustible renewable and waste to total energy consumption	0.04	116	Elasticity of energy consumption	13.83	73
Net energy imports of the energy consumption	36.28	13	Elasticity of electric power consumption	11.55	38
2 Ecological Environment Competitiveness	47.08	73	3.4 Greenhouse Gas	57.96	99
2.1 Biodiversity	58.09	66	Growth rate of CO_2 emissions	53.77	57
Threatened fish species	93.87	36	Growth rate of Methane emissions	51.21	107
Threatened mammal species	96.20	37	CO_2 emissions per unit of land area	97.95	121
Threatened plant species	100.00	1	CO_2 emissions per unit of energy consumption	33.09	95
GEF benefits index for biodiversity	0.20	109	4 Environment Management Competitiveness	57.63	18
2.2 Ecological Safeguard	10.30	98	4.1 Environmental Governance	100.00	1
Terrestrial protected areas	14.95	93	Agricultural chemicals regulation	N/A	N/A
Marine protected areas	3.32	52	Percentage of the rural population with access to an improved water source	100.00	1
2.3 Air Quality	66.41	53	Percentage of the urban population with access to an improved water source	100.00	1
Inhalable particles (PM10)	35.04	123	4.2 Ecological Protection	41.69	37
Particulate matter (PM2.5)	65.42	116	Area of plantation and afforestation	0.41	61
Index of indoor air pollution	100.00	1	Biome protect	86.90	31
Nitrogen oxides emission	68.76	22	Overfishing of fishing resources	51.52	53
Sulfur dioxide emission	40.05	88	4.3 Resource Utilization	36.51	68
3 Environment Carrying Competitiveness	47.95	132	Utilization rate of water resources	82.43	2
3.1 Agricultural Carrying	15.29	132	Percentage of total internal renewable water resources to total water resources	55.56	81
Cereal yield per unit of arable land	25.90	76	Percentage of agricultural land to total land area	8.05	128
Fertilizer consumption per unit of arable land	16.43	128	Percentage of fossil fuel energy consumption to total energy consumption	0.00	126
Annual freshwater withdrawals for agriculture per unit of arable land	0.00	130			
3.2 Industrial Carrying	85.26	110			
Net exports of goods as a percentage of GDP	44.87	131			
Electric power consumption per unit of value added of industry	96.27	23			
SO_2 emissions per unit of value added of industry	99.94	30			
Annual freshwater withdrawals for industry per value added of industry	99.97	6			
3.3 Energy Consumption	30.95	109			

(continued)

Table 139.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
5 Environment Harmony Competitiveness	61.38	100	CO_2 emissions per capita	44.49	129
5.1 Population and Environment	56.07	123	Energy consumption per capita	35.77	123
Percentage of population with access to Improved sanitation facilities	97.00	39	5.2 Economy and Environment	66.69	54
Motor vehicles per 1,000 people	61.60	93	Land resource utilization efficiency	1.26	18
Renewable internal freshwater resources per capita	0.02	132	Sulfur dioxide emissions per unit of GDP	96.64	45
SO_2 emissions per capita	82.04	110	Carbon dioxide emissions per unit of GDP	81.84	87
			Energy consumption per unit of GDP	87.04	57

Table 139.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	3	0	0	1	10
Ecological Environment Competitiveness	11	2	1	3	3	2
Environment Carrying Competitiveness	15	0	2	1	3	9
Environment Management Competitiveness	10	3	0	2	3	1
Environment Harmony Competitiveness	10	0	1	3	2	4
Total	60	8	4	9	12	26

Chapter 140
Report on Global Environment Competitiveness of United Kingdom

United Kingdom is a sovereign state located off the north-western coast of continental Europe. The country includes the island of Great Britain, the north-eastern part of the island of Ireland and many smaller islands. It covers 241.9 thousand of square kilometers and has a population of 62.74 million. Its GDP reaches $2,445.41 billion in 2011. Through the index system and evaluation model, the environment competitiveness index of United Kingdom ranks at 9 in 133 countries.

Score: 56.58
Rank: 9

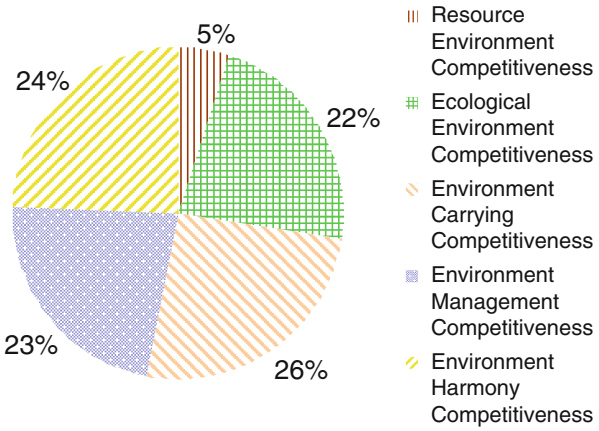

Fig. 140.1 Contribution of sub-index to GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_140,

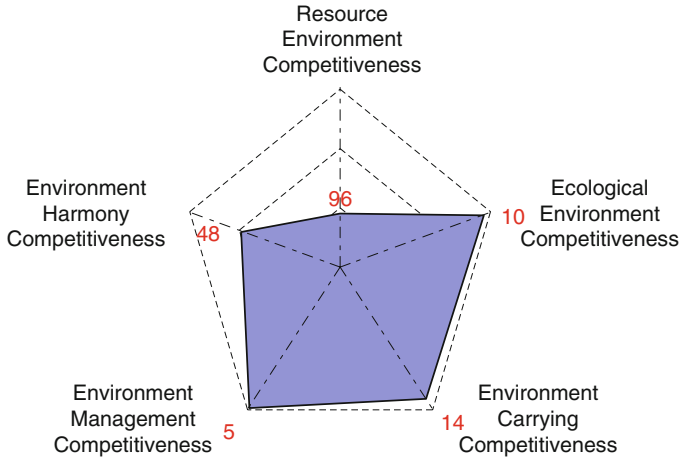

Fig. 140.2 Rank of sub-index of GEC

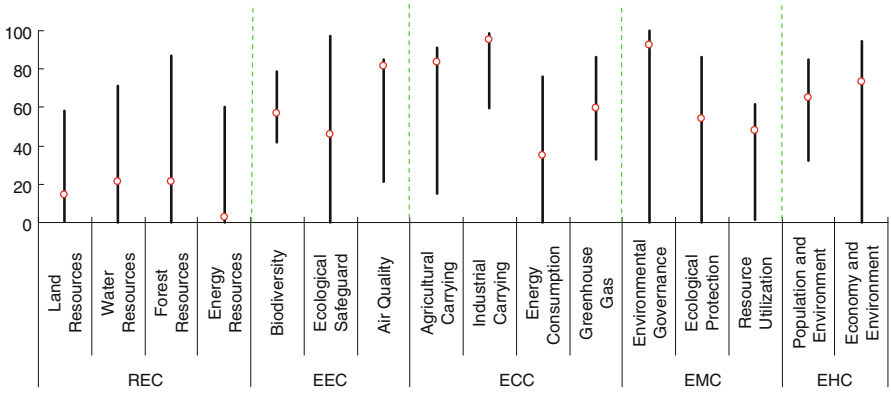

Fig. 140.3 Score and rank of the pillars of GEC

Table 140.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	14.27	96	Groundwater	5.80	84
1.1 Land Resources	14.36	56	Total internal renewable water resources	30.23	40
Land area per capita	0.67	118	1.3 Forest Resources	21.03	92
Percentage of arable land to total land area	42.44	30	Growing stock in forest and other wooded land	51.15	70
Arable land per capita	4.52	100	Proportion of land area covered by forest	13.98	89
1.2 Water Resources	21.05	50	Forest area per capita	0.32	109
Surface water	6.52	50	1.4 Energy Resources	2.91	101
Annual precipitation	41.65	44			

(continued)

Table 140.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
Fossil energy	0.18	50	Energy consumption per unit of land area	98.22	116
Energy production	2.41	33	Ratio of clean energy consumption	16.76	38
Proportion of combustible renewable and waste to total energy consumption	3.12	95	Elasticity of energy consumption	13.26	103
Net energy imports of the energy consumption	9.27	65	Elasticity of electric power consumption	10.84	56
2 Ecological Environment Competitiveness	63.37	10	3.4 Greenhouse Gas	59.50	85
2.1 Biodiversity	56.67	90	Growth rate of CO_2 emissions	51.85	66
Threatened fish species	79.72	96	Growth rate of Methane emissions	60.30	54
Threatened mammal species	97.28	22	CO_2 emissions per unit of land area	97.78	122
Threatened plant species	99.36	65	CO_2 emissions per unit of energy consumption	35.71	86
GEF benefits index for biodiversity	3.50	55	4 Environment Management Competitiveness	63.70	5
2.2 Ecological Safeguard	45.86	20	4.1 Environmental Governance	92.38	54
Terrestrial protected areas	71.47	10	Agricultural chemicals regulation	80.95	53
Marine protected areas	7.44	31	Percentage of the rural population with access to an improved water source	100.00	1
2.3 Air Quality	81.52	15	Percentage of the urban population with access to an improved water source	100.00	1
Inhalable particles (PM10)	90.51	12	4.2 Ecological Protection	54.11	10
Particulate matter (PM2.5)	91.09	29	Area of plantation and afforestation	2.88	20
Index of indoor air pollution	100.00	1	Biome protect	100.00	1
Nitrogen oxides emission	62.47	116	Overfishing of fishing resources	76.54	10
Sulfur dioxide emission	38.89	106	4.3 Resource Utilization	47.81	18
3 Environment Carrying Competitiveness	72.53	14	Utilization rate of water resources	0.35	65
3.1 Agricultural Carrying	83.83	6	Percentage of total internal renewable water resources to total water resources	92.95	9
Cereal yield per unit of arable land	74.33	8	Percentage of agricultural land to total land area	84.65	12
Fertilizer consumption per unit of arable land	80.65	110	Percentage of fossil fuel energy consumption to total energy consumption	13.30	88
Annual freshwater withdrawals for agriculture per unit of arable land	99.68	39			
3.2 Industrial Carrying	95.08	18			
Net exports of goods as a percentage of GDP	87.69	30			
Electric power consumption per unit of value added of industry	93.83	43			
SO_2 emissions per unit of value added of industry	99.95	27			
Annual freshwater withdrawals for industry per value added of industry	98.83	44			
3.3 Energy Consumption	34.77	48			

(continued)

Table 140.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
5 Environment Harmony Competitiveness	69.06	48	CO_2 emissions per capita	79.01	103
5.1 Population and Environment	64.95	97	Energy consumption per capita	75.42	96
Percentage of population with access to Improved sanitation facilities	100.00	1	5.2 Economy and Environment	73.17	13
Motor vehicles per 1,000 people	35.43	111	Land resource utilization efficiency	2.95	11
Renewable internal freshwater resources per capita	2.80	75	Sulfur dioxide emissions per unit of GDP	99.08	18
SO_2 emissions per capita	95.19	70	Carbon dioxide emissions per unit of GDP	94.06	27
			Energy consumption per unit of GDP	96.60	7

Table 140.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	0	1	6	5	2
Ecological Environment Competitiveness	11	2	5	0	3	1
Environment Carrying Competitiveness	15	2	3	4	2	4
Environment Management Competitiveness	10	4	3	2	1	0
Environment Harmony Competitiveness	10	1	4	0	3	2
Total	60	9	16	12	14	9

Chapter 141
Report on Global Environment Competitiveness of the United States

The United States of America is a federal constitutional republic comprising 50 states and a federal district. The country is situated mostly in central North America, where its 48 contiguous states and Washington, D.C., lie between the Pacific and Atlantic Oceans, bordered by Canada to the north and Mexico to the south. It covers 9,147.4 thousand of square kilometers and has a population of 311.59 million. Its GDP reaches $14,991.30 billion in 2011. Through the index system and evaluation model, the environment competitiveness index of The United States ranks at 26 in 133 countries.

Score: 53.83
Rank: 26

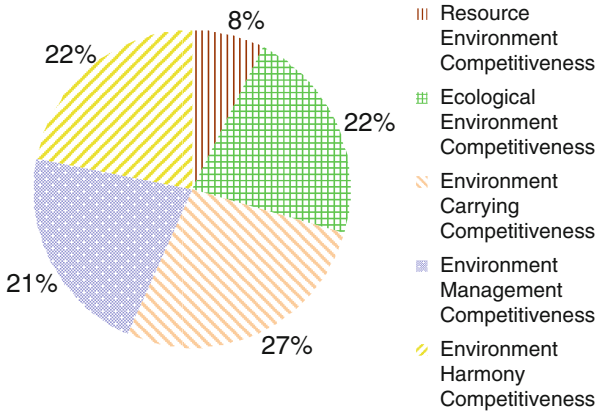

Fig. 141.1 Contribution of sub-index to GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_141,

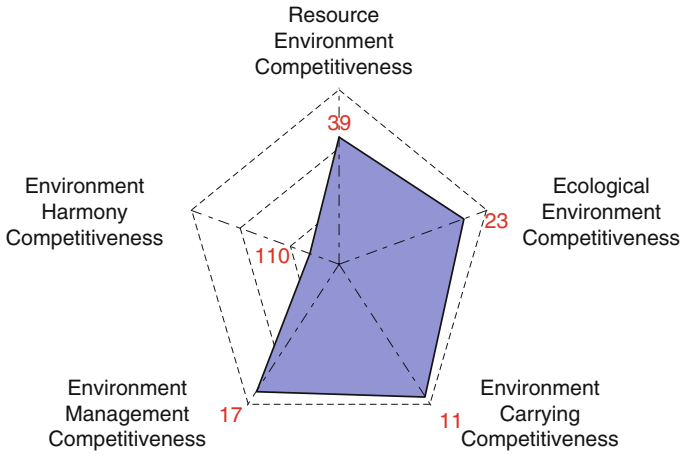

Fig. 141.2 Rank of sub-index of GEC

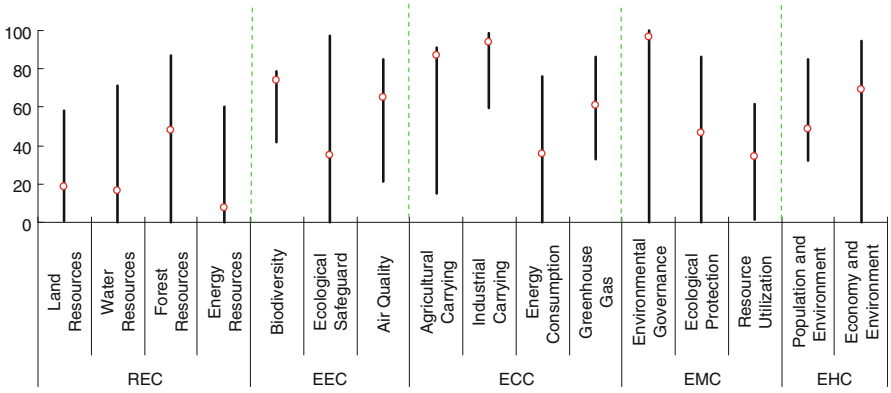

Fig. 141.3 Score and rank of the pillars of GEC

Table 141.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	20.44	39	Total internal renewable water resources	15.54	61
1.1 Land Resources	18.21	36	1.3 Forest Resources	47.63	15
Land area per capita	5.27	38	Growing stock in forest and other wooded land	100.00	1
Percentage of arable land to total land area	29.60	47	Proportion of land area covered by forest	38.98	51
Arable land per capita	24.06	13	Forest area per capita	6.81	26
1.2 Water Resources	16.69	61	1.4 Energy Resources	7.54	54
Surface water	3.44	67	Fossil energy	10.73	12
Annual precipitation	26.06	70	Energy production	5.63	17
Groundwater	21.74	36			

(continued)

Table 141.1 (continued)

Indicators	Score	Rank
Proportion of combustible renewable and waste to total energy consumption	4.37	89
Net energy imports of the energy consumption	9.83	61
2 Ecological Environment Competitiveness	58.67	23
2.1 Biodiversity	73.84	3
Threatened fish species	13.68	132
Threatened mammal species	79.89	115
Threatened plant species	87.22	122
GEF benefits index for biodiversity	94.20	2
2.2 Ecological Safeguard	35.19	32
Terrestrial protected areas	33.42	58
Marine protected areas	37.85	8
2.3 Air Quality	64.90	55
Inhalable particles (PM10)	86.86	30
Particulate matter (PM2.5)	86.68	57
Index of indoor air pollution	100.00	1
Nitrogen oxides emission	1.12	131
Sulfur dioxide emission	0.13	130
3 Environment Carrying Competitiveness	73.42	11
3.1 Agricultural Carrying	86.67	3
Cereal yield per unit of arable land	74.68	7
Fertilizer consumption per unit of arable land	91.16	84
Annual freshwater withdrawals for agriculture per unit of arable land	98.17	72
3.2 Industrial Carrying	93.68	36
Net exports of goods as a percentage of GDP	93.80	7
Electric power consumption per unit of value added of industry	89.86	86
SO_2 emissions per unit of value added of industry	99.87	48
Annual freshwater withdrawals for industry per value added of industry	91.20	113
3.3 Energy Consumption	35.41	42
Energy consumption per unit of land area	99.49	98
Ratio of clean energy consumption	20.22	32
Elasticity of energy consumption	13.48	96
Elasticity of electric power consumption	8.46	111
3.4 Greenhouse Gas	61.16	71
Growth rate of CO_2 emissions	52.61	62
Growth rate of Methane emissions	66.54	18
CO_2 emissions per unit of land area	99.35	105
CO_2 emissions per unit of energy consumption	34.71	88
4 Environment Management Competitiveness	57.79	17
4.1 Environmental Governance	96.30	35
Agricultural chemicals regulation	95.24	20
Percentage of the rural population with access to an improved water source	94.00	49
Percentage of the urban population with access to an improved water source	100.00	1
4.2 Ecological Protection	46.74	19
Area of plantation and afforestation	32.87	2
Biome protect	49.40	73
Overfishing of fishing resources	62.59	31
4.3 Resource Utilization	34.02	76
Utilization rate of water resources	0.63	51
Percentage of total internal renewable water resources to total water resources	65.60	64
Percentage of agricultural land to total land area	52.13	63
Percentage of fossil fuel energy consumption to total energy consumption	17.72	78
5 Environment Harmony Competitiveness	58.82	110
5.1 Population and Environment	48.48	128

(continued)

Table 141.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
Percentage of population with access to Improved sanitation facilities	100.00	1	5.2 Economy and Environment	69.16	34
			Land resource utilization efficiency	0.48	29
Motor vehicles per 1,000 people	0.00	133	Sulfur dioxide emissions per unit of GDP	97.02	38
Renewable internal freshwater resources per capita	10.94	35			
			Carbon dioxide emissions per unit of GDP	87.69	68
SO_2 emissions per capita	81.24	112			
CO_2 emissions per capita	53.14	128	Energy consumption per unit of GDP	91.46	34
Energy consumption per capita	44.52	120			

Table 141.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	1	3	6	4	0
Ecological Environment Competitiveness	11	2	1	4	0	4
Environment Carrying Competitiveness	15	3	1	4	6	1
Environment Management Competitiveness	10	1	2	3	4	0
Environment Harmony Competitiveness	10	1	1	3	1	4
Total	60	8	8	20	15	9

Chapter 142
Report on Global Environment Competitiveness of Uruguay

Uruguay is a country in the southeastern part of South America. It borders the state of Rio Grande do Sul, Brazil, to the north, and the provinces of Corrientes and Entre Ríos, Argentina to the west, limited by the Uruguay River. To the southwest, lies the estuary of the Río de la Plata. To the southeast lies the southern part of the Atlantic Ocean. It covers 175.0 thousand of square kilometers and has a population of 3.37 million. Its GDP reaches $46.71 billion in 2011. Through the index system and evaluation model, the environment competitiveness index of Uruguay ranks at 70 in 133 countries.

Score: 49.48
Rank: 70

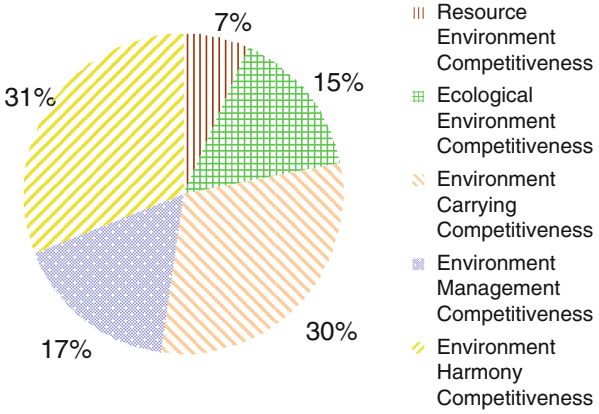

Fig. 142.1 Contribution of sub-index to GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_142,

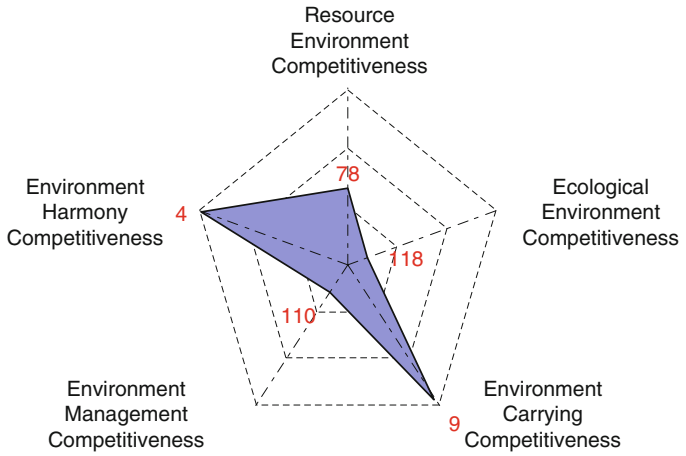

Fig. 142.2 Rank of sub-index of GEC

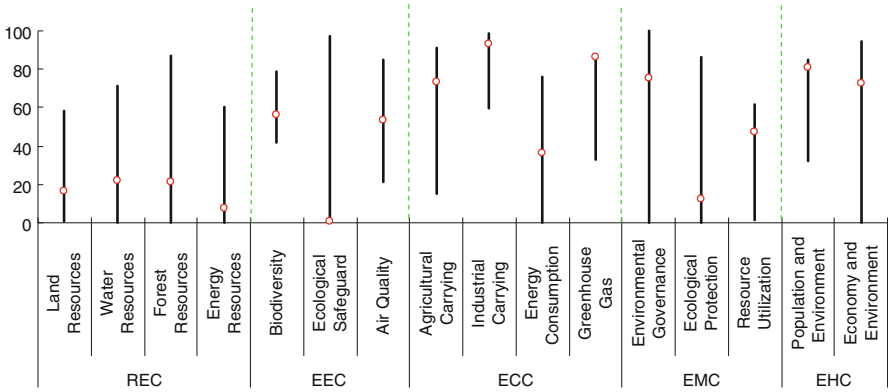

Fig. 142.3 Score and rank of the pillars of GEC

Table 142.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	16.40	78	Groundwater	18.90	42
1.1 Land Resources	16.49	42	Total internal renewable water resources	17.00	58
Land area per capita	9.34	27	1.3 Forest Resources	21.01	93
Percentage of arable land to total land area	17.38	76	Growing stock in forest and other wooded land	50.38	88
Arable land per capita	25.11	12	Proportion of land area covered by forest	11.97	97
1.2 Water Resources	21.91	49	Forest area per capita	3.70	49
Surface water	8.57	40	1.4 Energy Resources	7.76	51
Annual precipitation	43.18	42			

(continued)

Table 142.1 (continued)

Indicators	Score	Rank
Fossil energy	0.00	64
Energy production	0.61	74
Proportion of combustible renewable and waste to total energy consumption	33.14	29
Net energy imports of the energy consumption	6.13	88
2 Ecological Environment Competitiveness	38.18	118
2.1 Biodiversity	55.89	100
Threatened fish species	83.02	85
Threatened mammal species	94.02	64
Threatened plant species	100.00	1
GEF benefits index for biodiversity	1.20	80
2.2 Ecological Safeguard	0.43	129
Terrestrial protected areas	0.54	128
Marine protected areas	0.27	83
2.3 Air Quality	53.22	84
Inhalable particles (PM10)	18.25	131
Particulate matter (PM2.5)	97.21	11
Index of indoor air pollution	46.20	53
Nitrogen oxides emission	67.51	76
Sulfur dioxide emission	40.94	18
3 Environment Carrying Competitiveness	74.46	9
3.1 Agricultural Carrying	73.53	28
Cereal yield per unit of arable land	43.79	34
Fertilizer consumption per unit of arable land	89.39	88
Annual freshwater withdrawals for agriculture per unit of arable land	97.32	79
3.2 Industrial Carrying	93.21	46
Net exports of goods as a percentage of GDP	82.87	56
Electric power consumption per unit of value added of industry	91.27	69
SO_2 emissions per unit of value added of industry	99.93	31
Annual freshwater withdrawals for industry per value added of industry	98.78	47
3.3 Energy Consumption	36.04	38
Energy consumption per unit of land area	99.95	24
Ratio of clean energy consumption	18.97	35
Elasticity of energy consumption	14.22	41
Elasticity of electric power consumption	11.02	51
3.4 Greenhouse Gas	86.16	1
Growth rate of CO_2 emissions	100.00	1
Growth rate of Methane emissions	70.89	10
CO_2 emissions per unit of land area	99.96	33
CO_2 emissions per unit of energy consumption	59.96	33
4 Environment Management Competitiveness	41.68	110
4.1 Environmental Governance	75.24	91
Agricultural chemicals regulation	38.10	82
Percentage of the rural population with access to an improved water source	100.00	1
Percentage of the urban population with access to an improved water source	100.00	1
4.2 Ecological Protection	12.50	119
Area of plantation and afforestation	1.27	35
Biome protect	1.50	129
Overfishing of fishing resources	38.46	77
4.3 Resource Utilization	47.02	22
Utilization rate of water resources	0.10	91
Percentage of total internal renewable water resources to total water resources	36.42	102
Percentage of agricultural land to total land area	100.00	1
Percentage of fossil fuel energy consumption to total energy consumption	51.57	34

(continued)

Table 142.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
5 Environment Harmony Competitiveness	76.66	4	CO_2 emissions per capita	94.90	53
5.1 Population and Environment	80.84	13	Energy consumption per capita	91.32	60
Percentage of population with access to Improved sanitation facilities	100.00	1	5.2 Economy and Environment	72.48	16
Motor vehicles per 1,000 people	75.56	83	Land resource utilization efficiency	0.08	79
Renewable internal freshwater resources per capita	21.19	22	Sulfur dioxide emissions per unit of GDP	98.42	24
SO_2 emissions per capita	97.44	48	Carbon dioxide emissions per unit of GDP	96.10	9
			Energy consumption per unit of GDP	95.32	16

Table 142.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	0	2	6	6	0
Ecological Environment Competitiveness	11	1	1	1	5	3
Environment Carrying Competitiveness	15	3	2	8	2	0
Environment Management Competitiveness	10	2	1	1	3	3
Environment Harmony Competitiveness	10	2	4	2	2	0
Total	60	8	10	18	18	6

Chapter 143
Report on Global Environment Competitiveness of Uzbekistan

Uzbekistan is located in Central Asia. It locates in the Aral Sea to the northwest, border the Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Afghanistan. It covers 425.4 thousand of square kilometers and has a population of 29.34 million. Its GDP reaches $45.36 billion in 2011. Through the index system and evaluation model, the environment competitiveness index of Uzbekistan ranks at 127 in 133 countries.

Score: 40.30
Rank: 127

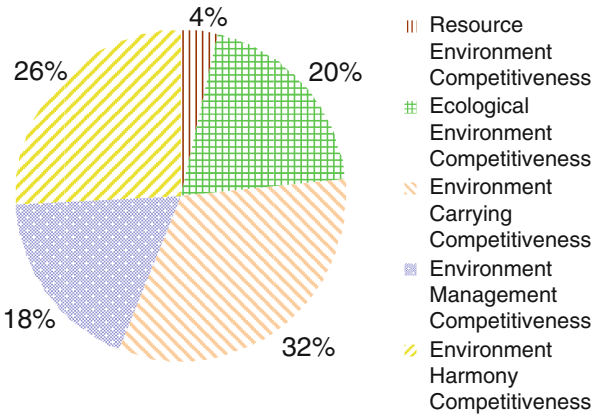

Fig. 143.1 Contribution of sub-index to GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_143,

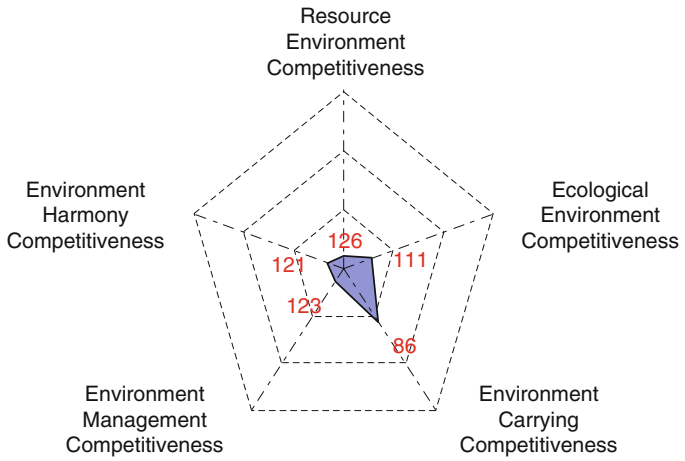

Fig. 143.2 Rank of sub-index of GEC

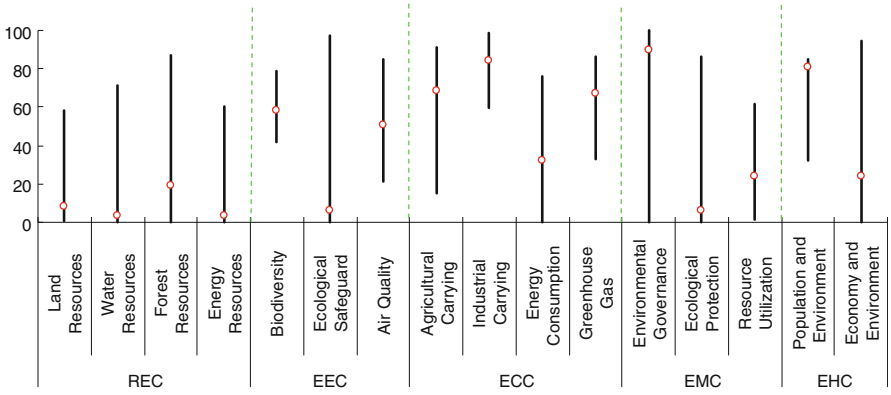

Fig. 143.3 Score and rank of the pillars of GEC

Table 143.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	7.47	126	Groundwater	2.94	95
1.1 Land Resources	8.20	96	Total internal renewable water resources	1.94	108
Land area per capita	2.59	61	1.3 Forest Resources	18.86	106
Percentage of arable land to total land area	17.02	79	Growing stock in forest and other wooded land	50.08	102
Arable land per capita	6.86	75	Proportion of land area covered by forest	9.01	103
1.2 Water Resources	3.76	114	Forest area per capita	0.78	94
Surface water	2.83	76	1.4 Energy Resources	3.11	97

(continued)

Table 143.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
Fossil energy	0.07	57	Energy consumption per unit of land area	99.78	64
Energy production	1.95	37	Ratio of clean energy consumption	2.80	86
Proportion of combustible renewable and waste to total energy consumption	0.00	119	Elasticity of energy consumption	14.34	34
Net energy imports of the energy consumption	16.01	33	Elasticity of electric power consumption	11.25	44
2 Ecological Environment Competitiveness	39.72	111	3.4 Greenhouse Gas	66.98	35
2.1 Biodiversity	58.52	49	Growth rate of CO_2 emissions	68.52	20
Threatened fish species	96.70	20	Growth rate of Methane emissions	59.54	63
Threatened mammal species	94.57	59	CO_2 emissions per unit of land area	99.74	76
Threatened plant species	99.12	72	CO_2 emissions per unit of energy consumption	38.56	77
GEF benefits index for biodiversity	1.10	81	4 Environment Management Competitiveness	36.43	123
2.2 Ecological Safeguard	5.98	111	4.1 Environmental Governance	89.50	63
Terrestrial protected areas	5.98	112	Agricultural chemicals regulation	N/A	N/A
Marine protected areas	N/A	N/A	Percentage of the rural population with access to an improved water source	81.00	76
2.3 Air Quality	50.93	92	Percentage of the urban population with access to an improved water source	98.00	70
Inhalable particles (PM10)	77.37	74	4.2 Ecological Protection	6.00	127
Particulate matter (PM2.5)	57.44	126	Area of plantation and afforestation	0.82	43
Index of indoor air pollution	26.30	72	Biome protect	12.90	113
Nitrogen oxides emission	66.87	87	Overfishing of fishing resources	N/A	N/A
Sulfur dioxide emission	40.29	84	4.3 Resource Utilization	23.93	119
3 Environment Carrying Competitiveness	65.69	86	Utilization rate of water resources	4.80	8
3.1 Agricultural Carrying	68.65	54	Percentage of total internal renewable water resources to total water resources	13.56	118
Cereal yield per unit of arable land	46.78	33	Percentage of agricultural land to total land area	74.05	26
Fertilizer consumption per unit of arable land	84.37	104	Percentage of fossil fuel energy consumption to total energy consumption	3.33	113
Annual freshwater withdrawals for agriculture per unit of arable land	82.10	118			
3.2 Industrial Carrying	84.32	113			
Net exports of goods as a percentage of GDP	79.38	74			
Electric power consumption per unit of value added of industry	71.60	119			
SO_2 emissions per unit of value added of industry	99.46	105			
Annual freshwater withdrawals for industry per value added of industry	86.83	119			
3.3 Energy Consumption	32.05	82			

(continued)

Table 143.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
5 Environment Harmony Competitiveness	52.16	121	CO_2 emissions per capita	90.46	70
5.1 Population and Environment	80.62	14	Energy consumption per capita	89.01	67
Percentage of population with access to Improved sanitation facilities	100.00	1	5.2 Economy and Environment	23.70	130
Motor vehicles per 1,000 people	95.68	33	Land resource utilization efficiency	0.03	96
Renewable internal freshwater resources per capita	0.67	112	Sulfur dioxide emissions per unit of GDP	80.41	112
SO_2 emissions per capita	96.46	62	Carbon dioxide emissions per unit of GDP	0.00	132
			Energy consumption per unit of GDP	14.37	124

Table 143.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	0	0	2	6	6
Ecological Environment Competitiveness	11	0	1	2	5	3
Environment Carrying Competitiveness	15	0	1	4	6	4
Environment Management Competitiveness	10	1	1	1	2	4
Environment Harmony Competitiveness	10	1	1	1	3	4
Total	60	2	4	10	22	21

Chapter 144
Report on Global Environment Competitiveness of Venezuela

Venezuela, RB is located in northern South America countries. It covers 916,400 square kilometres and borders Columbia to the west, Caribbean to the north, Brazil to the south and Guyana to the east. It covers 882.1 thousand of square kilometers and has a population of 29.28 million. Its GDP reaches $316.48 billion in 2011. Through the index system and evaluation model, the environment competitiveness index of Venezuela ranks at 12in 133 countries.

Score: 55.82
Rank: 12

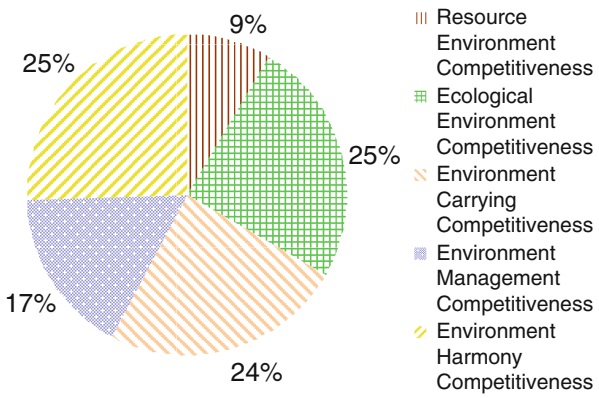

Fig. 144.1 Contribution of sub-index to GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_144,

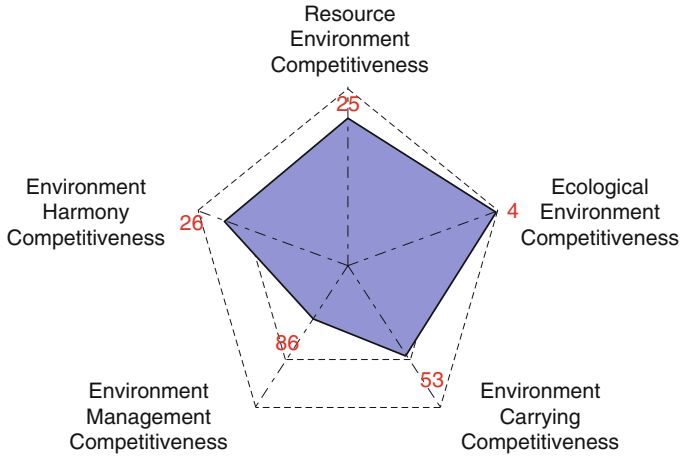

Fig. 144.2 Rank of sub-index of GEC

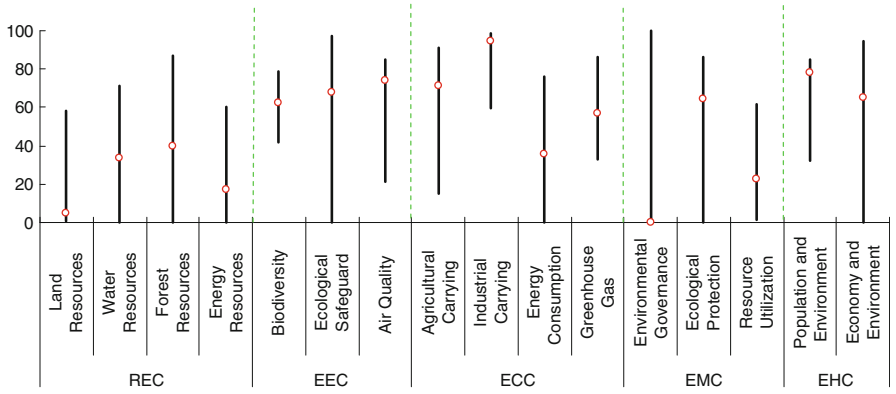

Fig. 144.3 Score and rank of the pillars of GEC

Table 144.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	23.93	25	Groundwater	31.53	25
1.1 Land Resources	4.86	122	Total internal renewable water resources	31.29	38
Land area per capita	5.41	37	1.3 Forest Resources	39.59	26
Percentage of arable land to total land area	4.84	112	Growing stock in forest and other wooded land	N/A	N/A
Arable land per capita	4.15	102	Proportion of land area covered by forest	61.06	15
1.2 Water Resources	33.22	30	Forest area per capita	10.95	22
Surface water	14.82	19	1.4 Energy Resources	16.91	25
Annual precipitation	55.24	27			

(continued)

Table 144.1 (continued)

Indicators	Score	Rank
Fossil energy	31.62	6
Energy production	6.75	16
Proportion of combustible renewable and waste to total energy consumption	1.33	103
Net energy imports of the energy consumption	32.00	15
2 Ecological Environment Competitiveness	68.75	4
2.1 Biodiversity	62.36	10
Threatened fish species	82.55	88
Threatened mammal species	82.61	110
Threatened plant species	96.03	100
GEF benefits index for biodiversity	25.30	15
2.2 Ecological Safeguard	68.07	6
Terrestrial protected areas	100.00	1
Marine protected areas	20.19	17
2.3 Air Quality	74.04	41
Inhalable particles (PM10)	92.70	5
Particulate matter (PM2.5)	87.12	54
Index of indoor air pollution	N/A	N/A
Nitrogen oxides emission	65.82	95
Sulfur dioxide emission	39.94	91
3 Environment Carrying Competitiveness	68.20	53
3.1 Agricultural Carrying	71.00	41
Cereal yield per unit of arable land	41.38	39
Fertilizer consumption per unit of arable land	83.81	105
Annual freshwater withdrawals for agriculture per unit of arable land	97.67	74
3.2 Industrial Carrying	94.49	25
Net exports of goods as a percentage of GDP	81.71	65
Electric power consumption per unit of value added of industry	96.85	19
SO_2 emissions per unit of value added of industry	99.95	28
Annual freshwater withdrawals for industry per value added of industry	99.43	25
3.3 Energy Consumption	35.82	40
Energy consumption per unit of land area	99.82	60
Ratio of clean energy consumption	19.71	33
Elasticity of energy consumption	13.54	92
Elasticity of electric power consumption	10.21	85
3.4 Greenhouse Gas	56.98	106
Growth rate of CO_2 emissions	40.47	107
Growth rate of Methane emissions	68.21	14
CO_2 emissions per unit of land area	99.77	70
CO_2 emissions per unit of energy consumption	35.96	85
4 Environment Management Competitiveness	46.64	86
4.1 Environmental Governance	0.00	131
Agricultural chemicals regulation	N/A	N/A
Percentage of the rural population with access to an improved water source	N/A	N/A
Percentage of the urban population with access to an improved water source	N/A	N/A
4.2 Ecological Protection	64.71	8
Area of plantation and afforestation	N/A	N/A
Biome protect	100.00	1
Overfishing of fishing resources	29.41	89
4.3 Resource Utilization	22.56	122
Utilization rate of water resources	0.03	117
Percentage of total internal renewable water resources to total water resources	50.24	87
Percentage of agricultural land to total land area	28.68	105
Percentage of fossil fuel energy consumption to total energy consumption	11.31	94
5 Environment Harmony Competitiveness	71.57	26

(continued)

Table 144.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
5.1 Population and Environment	77.76	29	Energy consumption per capita	80.04	86
Percentage of population with access to Improved sanitation facilities	91.00	58	5.2 Economy and Environment	65.38	66
Motor vehicles per 1,000 people	82.10	70	Land resource utilization efficiency	0.10	64
Renewable internal freshwater resources per capita	29.85	14	Sulfur dioxide emissions per unit of GDP	96.44	49
SO_2 emissions per capita	94.81	73	Carbon dioxide emissions per unit of GDP	79.72	92
CO_2 emissions per capita	82.89	93	Energy consumption per unit of GDP	85.27	64

Table 144.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	1	8	1	0	3
Ecological Environment Competitiveness	11	4	0	2	3	1
Environment Carrying Competitiveness	15	0	4	5	3	3
Environment Management Competitiveness	10	2	0	0	1	4
Environment Harmony Competitiveness	10	0	2	2	6	0
Total	60	7	14	10	13	11

Chapter 145
Report on Global Environment Competitiveness of Vietnam

Vietnam is the easternmost country on the Indochina Peninsula in Southeast Asia. The country is bordered by China to the north, Laos to the northwest, Cambodia to the southwest, and the South China Sea to the east. It covers 310.1 thousand of square kilometers and has a population of 87.84 million. Its GDP reaches $123.60 billion in 2011. Through the index system and evaluation model, the environment competitiveness index of Vietnam ranks at 101 in 133 countries.

Score: 46.78
Rank: 101

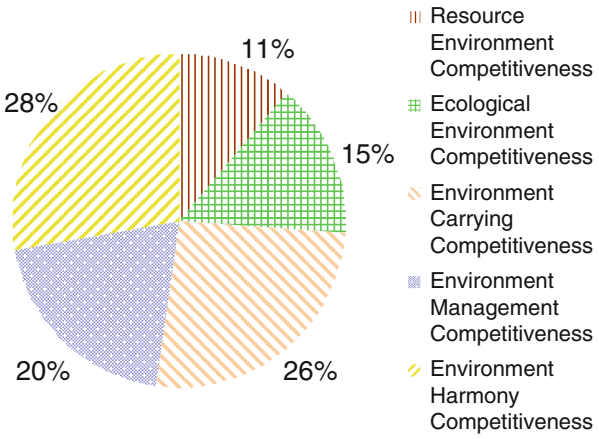

Fig. 145.1 Contribution of sub-index to GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_145,

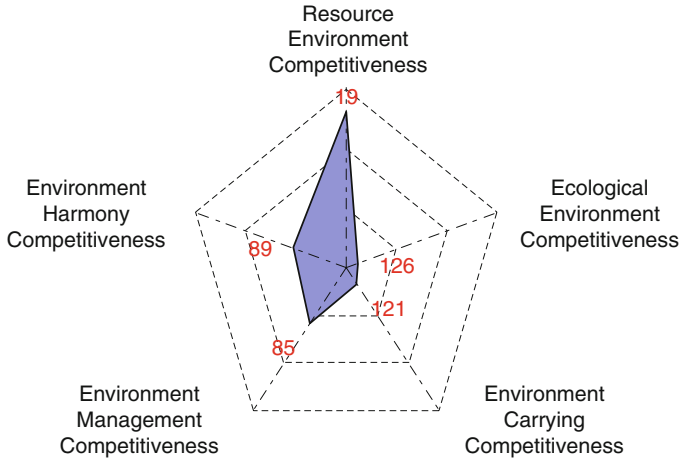

Fig. 145.2 Rank of sub-index of GEC

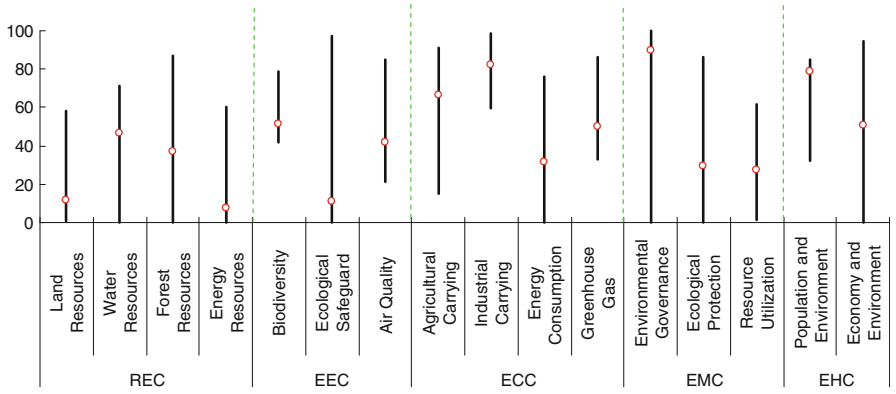

Fig. 145.3 Score and rank of the pillars of GEC

Table 145.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	26.18	19	Groundwater	33.15	21
1.1 Land Resources	11.93	72	Total internal renewable water resources	58.46	15
Land area per capita	0.61	119	1.3 Forest Resources	37.19	34
Percentage of arable land to total land area	35.48	38	Growing stock in forest and other wooded land	52.64	45
Arable land per capita	3.46	111	Proportion of land area covered by forest	52.66	25
1.2 Water Resources	46.76	14	Forest area per capita	1.11	82
Surface water	29.51	2	1.4 Energy Resources	7.75	52
Annual precipitation	65.91	17			

(continued)

Table 145.1 (continued)

Indicators	Score	Rank
Fossil energy	0.16	52
Energy production	0.77	70
Proportion of combustible renewable and waste to total energy consumption	26.60	33
Net energy imports of the energy consumption	14.12	40
2 Ecological Environment Competitiveness	35.22	126
2.1 Biodiversity	51.17	127
Threatened fish species	67.92	116
Threatened mammal species	70.65	123
Threatened plant species	93.06	110
GEF benefits index for biodiversity	12.10	27
2.2 Ecological Safeguard	10.80	97
Terrestrial protected areas	16.58	89
Marine protected areas	2.12	62
2.3 Air Quality	41.57	121
Inhalable particles (PM10)	60.58	102
Particulate matter (PM2.5)	58.63	123
Index of indoor air pollution	7.10	101
Nitrogen oxides emission	64.08	105
Sulfur dioxide emission	39.91	92
3 Environment Carrying Competitiveness	60.81	121
3.1 Agricultural Carrying	66.37	66
Cereal yield per unit of arable land	54.05	23
Fertilizer consumption per unit of arable land	67.45	120
Annual freshwater withdrawals for agriculture per unit of arable land	81.73	119
3.2 Industrial Carrying	82.09	120
Net exports of goods as a percentage of GDP	50.29	125
Electric power consumption per unit of value added of industry	85.44	103
SO_2 emissions per unit of value added of industry	99.78	72
Annual freshwater withdrawals for industry per value added of industry	92.87	104
3.3 Energy Consumption	31.69	93
Energy consumption per unit of land area	99.60	89
Ratio of clean energy consumption	6.87	62
Elasticity of energy consumption	12.85	112
Elasticity of electric power consumption	7.44	115
3.4 Greenhouse Gas	49.66	126
Growth rate of CO_2 emissions	26.57	126
Growth rate of Methane emissions	54.58	89
CO_2 emissions per unit of land area	99.53	94
CO_2 emissions per unit of energy consumption	41.06	67
4 Environment Management Competitiveness	47.02	85
4.1 Environmental Governance	89.98	62
Agricultural chemicals regulation	80.95	53
Percentage of the rural population with access to an improved water source	93.00	51
Percentage of the urban population with access to an improved water source	99.00	51
4.2 Ecological Protection	29.33	84
Area of plantation and afforestation	4.55	14
Biome protect	36.60	90
Overfishing of fishing resources	55.09	46
4.3 Resource Utilization	27.64	108
Utilization rate of water resources	0.37	62
Percentage of total internal renewable water resources to total water resources	39.10	99
Percentage of agricultural land to total land area	39.16	92
Percentage of fossil fuel energy consumption to total energy consumption	31.94	50
5 Environment Harmony Competitiveness	64.68	89

(continued)

Table 145.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
5.1 Population and Environment	78.97	20	Energy consumption per capita	95.74	33
			5.2 Economy and Environment	50.38	111
Percentage of population with access to Improved sanitation facilities	75.00	83	Land resource utilization efficiency	0.12	61
			Sulfur dioxide emissions per unit of GDP	89.03	91
Motor vehicles per 1,000 people	98.64	14			
Renewable internal freshwater resources per capita	4.95	53	Carbon dioxide emissions per unit of GDP	53.29	125
SO_2 emissions per capita	98.24	35	Energy consumption per unit of GDP	59.10	114
CO_2 emissions per capita	96.04	48			

Table 145.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	1	4	6	2	1
Ecological Environment Competitiveness	11	0	0	0	2	9
Environment Carrying Competitiveness	15	0	1	0	7	7
Environment Management Competitiveness	10	0	1	2	6	1
Environment Harmony Competitiveness	10	0	2	3	3	2
Total	60	1	8	11	20	20

Chapter 146
Report on Global Environment Competitiveness of Yemen

Yemen, Rep is located on southwest end of Arabia Peninsula. It borders Saudi Arabia, Oman on the Red Sea, the Gulf of Aden adjacent, and the Arabia sea. It covers 528.0 thousand of square kilometers and has a population of 24.80 million. Its GDP reaches $33.76 billion in 2011. Through the index system and evaluation model, the environment competitiveness index of Yemen ranks at 125 in 133 countries.

Score: 41.60
Rank: 125

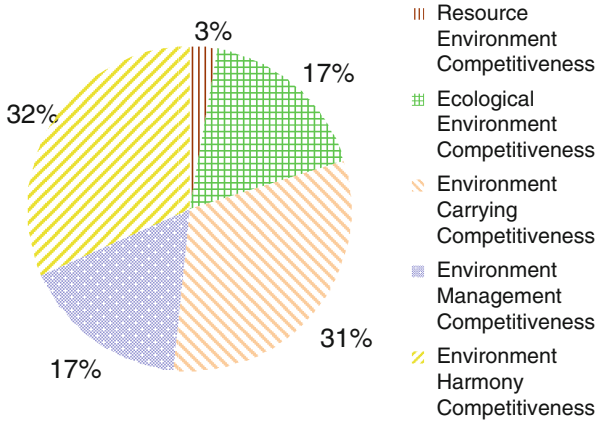

Fig. 146.1 Contribution of sub-index to GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_146,

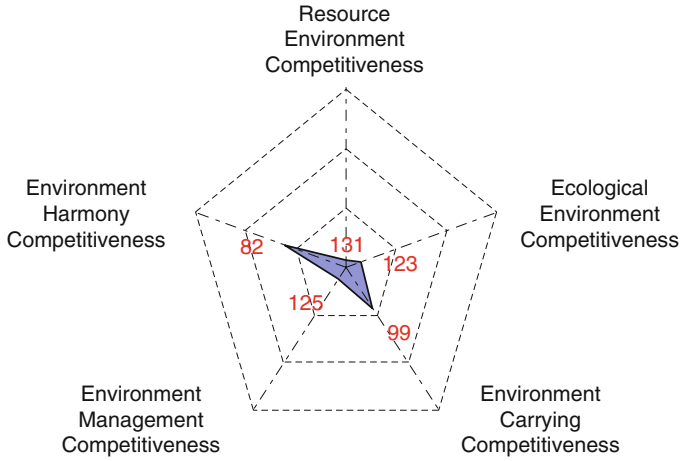

Fig. 146.2 Rank of sub-index of GEC

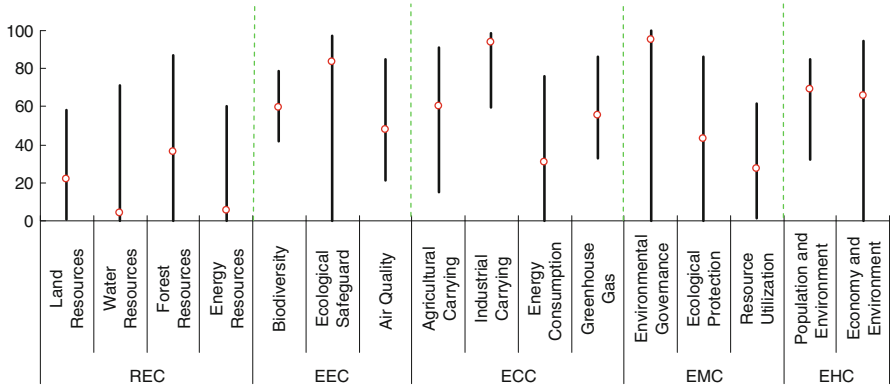

Fig. 146.3 Score and rank of the pillars of GEC

Table 146.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	6.02	131	Groundwater	0.37	118
1.1 Land Resources	3.25	126	Total internal renewable water resources	0.20	125
Land area per capita	3.81	46	1.3 Forest Resources	15.54	119
Percentage of arable land to total land area	3.56	116	Growing stock in forest and other wooded land	50.02	114
Arable land per capita	2.19	120	Proportion of land area covered by forest	1.22	122
1.2 Water Resources	1.57	121	Forest area per capita	0.15	120
Surface water	0.04	122	1.4 Energy Resources	5.97	62
Annual precipitation	5.66	120			

(continued)

Table 146.1 (continued)

Indicators	Score	Rank
Fossil energy	0.24	48
Energy production	0.83	66
Proportion of combustible renewable and waste to total energy consumption	1.57	100
Net energy imports of the energy consumption	35.27	14
2 Ecological Environment Competitiveness	36.33	123
2.1 Biodiversity	56.29	94
Threatened fish species	89.15	62
Threatened mammal species	95.11	49
Threatened plant species	90.78	114
GEF benefits index for biodiversity	3.20	61
2.2 Ecological Safeguard	1.56	124
Terrestrial protected areas	1.09	124
Marine protected areas	2.26	60
2.3 Air Quality	47.45	106
Inhalable particles (PM10)	75.18	76
Particulate matter (PM2.5)	58.45	124
Index of indoor air pollution	14.80	83
Nitrogen oxides emission	68.32	46
Sulfur dioxide emission	40.25	86
3 Environment Carrying Competitiveness	64.88	99
3.1 Agricultural Carrying	61.68	106
Cereal yield per unit of arable land	8.12	117
Fertilizer consumption per unit of arable land	99.03	29
Annual freshwater withdrawals for agriculture per unit of arable land	95.75	88
3.2 Industrial Carrying	95.18	17
Net exports of goods as a percentage of GDP	86.06	39
Electric power consumption per unit of value added of industry	95.99	25
SO_2 emissions per unit of value added of industry	99.31	110
Annual freshwater withdrawals for industry per value added of industry	99.37	26
3.3 Energy Consumption	30.99	107
Energy consumption per unit of land area	99.98	14
Ratio of clean energy consumption	0.00	116
Elasticity of energy consumption	14.33	35
Elasticity of electric power consumption	9.67	99
3.4 Greenhouse Gas	58.12	97
Growth rate of CO_2 emissions	60.11	37
Growth rate of Methane emissions	53.03	99
CO_2 emissions per unit of land area	99.95	36
CO_2 emissions per unit of energy consumption	17.40	120
4 Environment Management Competitiveness	34.81	125
4.1 Environmental Governance	60.46	120
Agricultural chemicals regulation	61.90	72
Percentage of the rural population with access to an improved water source	47.00	110
Percentage of the urban population with access to an improved water source	72.00	127
4.2 Ecological Protection	18.79	107
Area of plantation and afforestation	N/A	N/A
Biome protect	3.30	124
Overfishing of fishing resources	34.29	83
4.3 Resource Utilization	30.50	94
Utilization rate of water resources	6.84	6
Percentage of total internal renewable water resources to total water resources	60.00	76
Percentage of agricultural land to total land area	52.50	62
Percentage of fossil fuel energy consumption to total energy consumption	2.65	114
5 Environment Harmony Competitiveness	65.94	82

(continued)

Table 146.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
5.1 Population and Environment	73.41	47	Energy consumption per capita	98.77	6
			5.2 Economy and Environment	58.48	95
Percentage of population with access to Improved sanitation facilities	52.00	95	Land resource utilization efficiency	0.02	109
			Sulfur dioxide emissions per unit of GDP	74.05	120
Motor vehicles per 1,000 people	95.93	32			
Renewable internal freshwater resources per capita	0.10	129	Carbon dioxide emissions per unit of GDP	74.58	101
SO_2 emissions per capita	95.60	68	Energy consumption per unit of GDP	85.27	64
CO_2 emissions per capita	97.67	35			

Table 146.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	0	0	2	3	9
Ecological Environment Competitiveness	11	0	0	2	4	5
Environment Carrying Competitiveness	15	0	4	4	2	5
Environment Management Competitiveness	10	1	0	0	4	4
Environment Harmony Competitiveness	10	0	0	3	3	4
Total	60	1	4	11	16	27

Chapter 147
Report on Global Environment Competitiveness of Zambia

Score: 52.51
Rank: 40

Zambia is located in the south central Africa a landlocked country. It borders Angola to the west, Democratic Republic of Congo, Tanzania to the northeast, Mawlawi to the east and Mozambique to the southeast and Zimbabwe, Botswana and Namibia to the northeast. It covers743.4 thousand of square kilometers and has a population of 13.47 million. Its GDP reaches $19.21 billion in 2011. Through the index system and evaluation model, the environment competitiveness index of Zambia ranks at 40 in 133 countries.

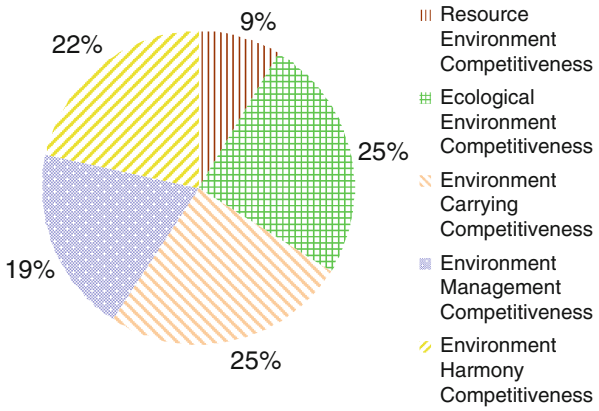

Fig. 147.1 Contribution of sub-index to GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_147,

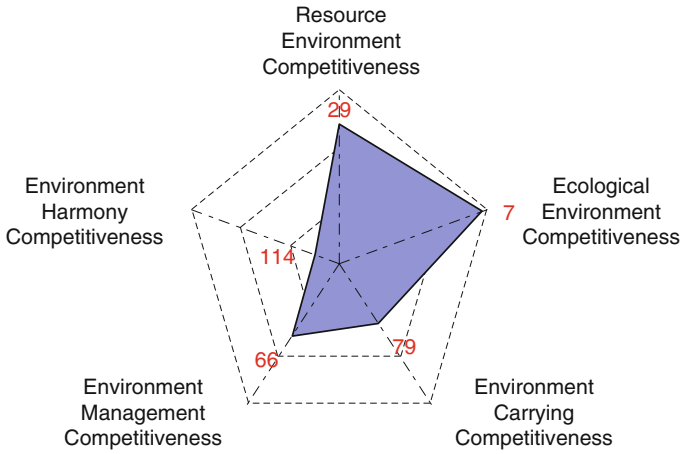

Fig. 147.2 Rank of sub-index of GEC

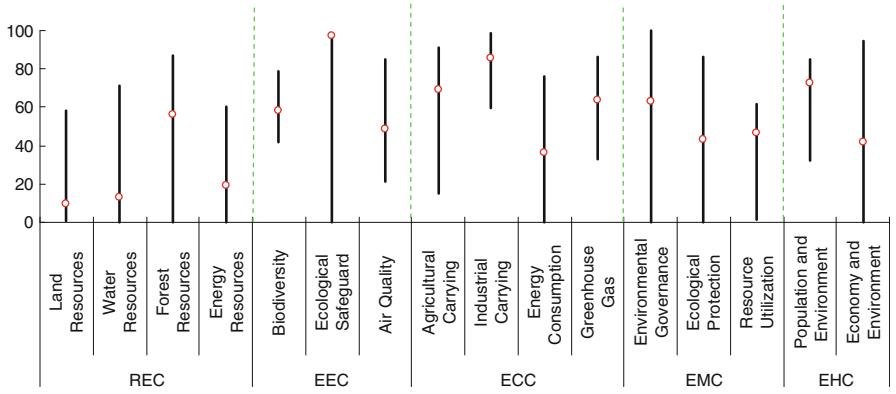

Fig. 147.3 Score and rank of the pillars of GEC

Table 147.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	22.78	29	Groundwater	9.07	69
1.1 Land Resources	9.79	86	Total internal renewable water resources	5.44	92
Land area per capita	9.92	26	1.3 Forest Resources	56.23	8
Percentage of arable land to total land area	7.60	107	Growing stock in forest and other wooded land	58.35	20
Arable land per capita	11.81	47	Proportion of land area covered by forest	77.68	5
1.2 Water Resources	12.76	72	Forest area per capita	25.52	10
Surface water	1.53	96	1.4 Energy Resources	19.15	19
Annual precipitation	35.02	57			

(continued)

Table 147.1 (continued)

Indicators	Score	Rank
Fossil energy	0.00	64
Energy production	0.58	75
Proportion of combustible renewable and waste to total energy consumption	85.97	7
Net energy imports of the energy consumption	11.68	48
2 Ecological Environment Competitiveness	66.20	7
2.1 Biodiversity	58.55	48
Threatened fish species	90.57	53
Threatened mammal species	95.11	49
Threatened plant species	99.47	60
GEF benefits index for biodiversity	3.80	52
2.2 Ecological Safeguard	97.55	1
Terrestrial protected areas	97.55	4
Marine protected areas	N/A	N/A
2.3 Air Quality	48.42	102
Inhalable particles (PM10)	80.29	58
Particulate matter (PM2.5)	80.92	84
Index of indoor air pollution	2.30	116
Nitrogen oxides emission	63.65	107
Sulfur dioxide emission	39.59	95
3 Environment Carrying Competitiveness	66.45	79
3.1 Agricultural Carrying	68.98	52
Cereal yield per unit of arable land	24.55	79
Fertilizer consumption per unit of arable land	97.79	43
Annual freshwater withdrawals for agriculture per unit of arable land	99.41	48
3.2 Industrial Carrying	85.92	108
Net exports of goods as a percentage of GDP	70.33	99
Electric power consumption per unit of value added of industry	81.59	110
SO_2 emissions per unit of value added of industry	95.90	128
Annual freshwater withdrawals for industry per value added of industry	95.84	84
3.3 Energy Consumption	35.99	39
Energy consumption per unit of land area	99.98	10
Ratio of clean energy consumption	19.19	34
Elasticity of energy consumption	14.01	58
Elasticity of electric power consumption	10.76	61
3.4 Greenhouse Gas	63.90	50
Growth rate of CO_2 emissions	33.80	117
Growth rate of Methane emissions	54.12	94
CO_2 emissions per unit of land area	100.00	4
CO_2 emissions per unit of energy consumption	97.77	2
4 Environment Management Competitiveness	49.99	66
4.1 Environmental Governance	62.76	117
Agricultural chemicals regulation	57.14	74
Percentage of the rural population with access to an improved water source	46.00	111
Percentage of the urban population with access to an improved water source	87.00	114
4.2 Ecological Protection	42.90	28
Area of plantation and afforestation	0.08	90
Biome protect	100.00	1
Overfishing of fishing resources	N/A	N/A
4.3 Resource Utilization	46.68	24
Utilization rate of water resources	0.06	100

(continued)

Table 147.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
Percentage of total internal renewable water resources to total water resources	52.69	86	Renewable internal freshwater resources per capita	7.20	47
Percentage of agricultural land to total land area	37.18	94	SO_2 emissions per capita	84.53	107
Percentage of fossil fuel energy consumption to total energy consumption	96.79	3	CO_2 emissions per capita	99.70	10
5 Environment Harmony Competitiveness	57.16	114	Energy consumption per capita	96.16	29
5.1 Population and Environment	72.49	55	5.2 Economy and Environment	41.82	120
Percentage of population with access to Improved sanitation facilities	49.00	101	Land resource utilization efficiency	0.01	121
Motor vehicles per 1,000 people	97.78	20	Sulfur dioxide emissions per unit of GDP	5.87	129
			Carbon dioxide emissions per unit of GDP	97.87	5
			Energy consumption per unit of GDP	63.54	110

Table 147.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	3	3	1	6	1
Ecological Environment Competitiveness	11	2	0	5	1	3
Environment Carrying Competitiveness	15	2	0	6	3	4
Environment Management Competitiveness	10	1	2	0	5	2
Environment Harmony Competitiveness	10	2	1	2	0	5
Total	60	10	6	14	15	15

Chapter 148
Report on Global Environment Competitiveness of Zimbabwe

Zimbabwe is located in southeastern Africa inland. It adjacent to Zambia. To the east of Zimbabwe borders all and adjacent Mozambique, southwest Botswana, south exit is a part and South Africa. It covers 386.9 thousand of square kilometers and has a population of 12.75 million. Its GDP reaches $9.66 billion in 2011. Through the index system and evaluation model, the environment competitiveness index of Zimbabwe ranks at 78 in 133 countries.

Score: 48.99
Rank: 78

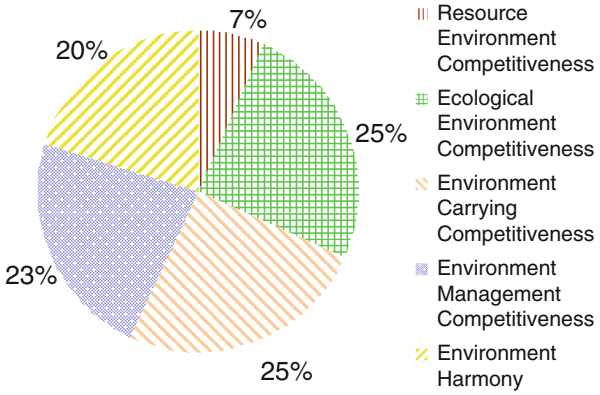

Fig. 148.1 Contribution of sub-index to GEC

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5_148,

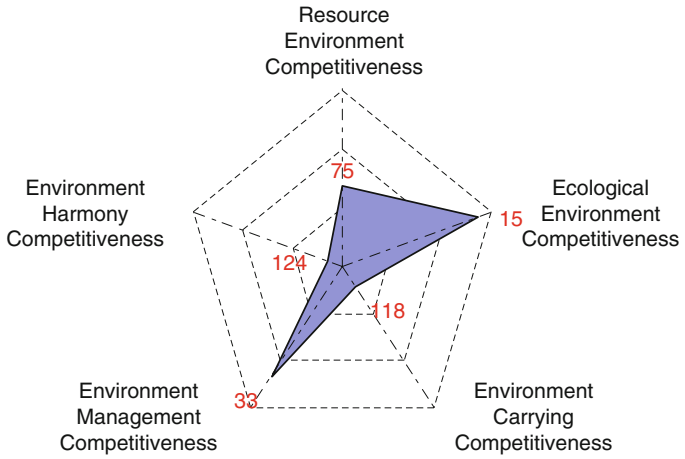

Fig. 148.2 Rank of sub-index of GEC

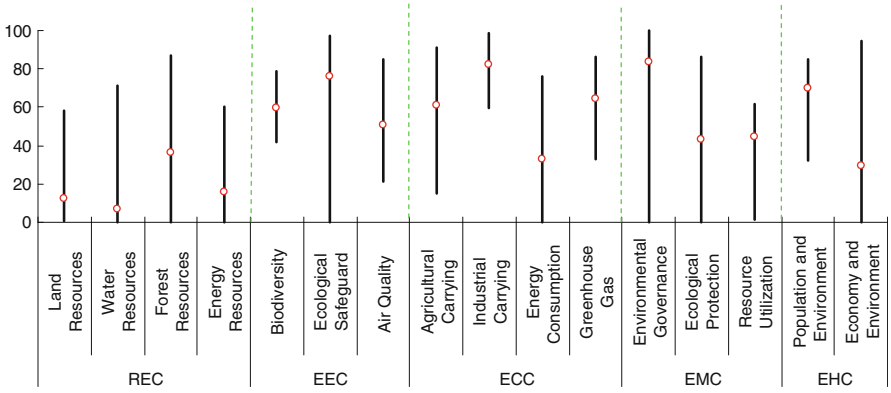

Fig. 148.3 Score and rank of the pillars of GEC

Table 148.1 Score and rank of all indicators of GEC

Indicators	Score	Rank	Indicators	Score	Rank
1 Resource Environment Competitiveness	16.56	75	Total internal renewable water resources	1.60	112
1.1 Land Resources	12.05	70	1.3 Forest Resources	36.58	37
Land area per capita	5.44	35	Growing stock in forest and other wooded land	51.81	57
Percentage of arable land to total land area	17.85	75	Proportion of land area covered by forest	46.31	37
Arable land per capita	15.05	30	Forest area per capita	8.36	24
1.2 Water Resources	6.71	102	1.4 Energy Resources	16.07	28
Surface water	0.53	111	Fossil energy	0.55	37
Annual precipitation	22.50	84	Energy production	0.69	72
Groundwater	2.19	103			

(continued)

Table 148.1 (continued)

Indicators	Score	Rank
Proportion of combustible renewable and waste to total energy consumption	69.83	15
Net energy imports of the energy consumption	11.34	50
2 Ecological Environment Competitiveness	60.74	15
2.1 Biodiversity	59.34	28
Threatened fish species	98.58	9
Threatened mammal species	95.11	49
Threatened plant species	99.18	70
GEF benefits index for biodiversity	1.90	70
2.2 Ecological Safeguard	75.82	5
Terrestrial protected areas	75.82	8
Marine protected areas	N/A	N/A
2.3 Air Quality	50.48	94
Inhalable particles (PM10)	75.18	76
Particulate matter (PM2.5)	88.51	43
Index of indoor air pollution	4.90	106
Nitrogen oxides emission	67.71	70
Sulfur dioxide emission	40.76	55
3 Environment Carrying Competitiveness	62.34	118
3.1 Agricultural Carrying	60.66	114
Cereal yield per unit of arable land	4.28	125
Fertilizer consumption per unit of arable land	97.74	44
Annual freshwater withdrawals for agriculture per unit of arable land	98.77	66
3.2 Industrial Carrying	82.33	117
Net exports of goods as a percentage of GDP	74.92	89
Electric power consumption per unit of value added of industry	65.68	122
SO_2 emissions per unit of value added of industry	99.21	115
Annual freshwater withdrawals for industry per value added of industry	89.53	116
3.3 Energy Consumption	32.97	69
Energy consumption per unit of land area	99.95	25
Ratio of clean energy consumption	6.48	63
Elasticity of energy consumption	14.05	53
Elasticity of electric power consumption	11.40	40
3.4 Greenhouse Gas	64.25	44
Growth rate of CO_2 emissions	41.09	104
Growth rate of Methane emissions	61.73	40
CO_2 emissions per unit of land area	99.97	27
CO_2 emissions per unit of energy consumption	77.38	17
4 Environment Management Competitiveness	55.54	33
4.1 Environmental Governance	83.50	79
Agricultural chemicals regulation	N/A	N/A
Percentage of the rural population with access to an improved water source	69.00	91
Percentage of the urban population with access to an improved water source	98.00	70
4.2 Ecological Protection	42.85	32
Area of plantation and afforestation	0.14	79
Biome protect	99.80	15
Overfishing of fishing resources	N/A	N/A
4.3 Resource Utilization	44.49	32
Utilization rate of water resources	0.85	38
Percentage of total internal renewable water resources to total water resources	49.04	88
Percentage of agricultural land to total land area	50.11	69
Percentage of fossil fuel energy consumption to total energy consumption	77.94	13
5 Environment Harmony Competitiveness	49.79	124

(continued)

Table 148.1 (continued)

Indicators	Score	Rank	Indicators	Score	Rank
5.1 Population and Environment	69.80	69	Energy consumption per capita	95.08	42
Percentage of population with access to Improved sanitation facilities	44.00	105	5.2 Economy and Environment	29.79	126
			Land resource utilization efficiency	0.01	123
Motor vehicles per 1,000 people	86.17	58	Sulfur dioxide emissions per unit of GDP	65.64	122
Renewable internal freshwater resources per capita	1.16	103	Carbon dioxide emissions per unit of GDP	53.50	123
SO_2 emissions per capita	97.34	49	Energy consumption per unit of GDP	0.00	126
CO_2 emissions per capita	98.15	29			

Table 148.2 Rank distribution of the individual indicators of GEC

Sub-index	Number of the individual indicators	Rank 1–10	Rank 11–30	Rank 31–60	Rank 61–100	Rank 101–133
Resource Environment Competitiveness	14	0	2	5	4	3
Ecological Environment Competitiveness	11	3	1	2	4	1
Environment Carrying Competitiveness	15	0	2	4	3	6
Environment Management Competitiveness	10	0	1	3	5	0
Environment Harmony Competitiveness	10	0	1	2	1	6
Total	60	3	7	16	17	16

Appendix

Global Environmental Competitiveness of 133 Countries and Scores of Secondary Index Evaluation

Number	Country	Rank	Environmental competitiveness	Resource environmental competitiveness	Ecological environmental competitiveness	Environmental bearing capacity	Environmental management competitiveness	Environmental coordination capacity
1	Albania	67	49.1	28.9	51.2	76.8	30.6	64.8
2	Algeria	107	44.6	19.2	43.2	68.7	52.8	60.2
3	Angola	79	48.0	27.5	55.1	67.6	41.0	59.5
4	Argentina	81	47.6	29.0	36.8	71.1	57.5	62.4
5	Armenia	58	49.7	23.7	47.5	75.1	71.8	61.3
6	Australia	49	51.0	39.6	56.3	61.8	39.0	59.3
7	Austria	5	56.4	30.0	68.1	68.5	73.3	65.5
8	Azerbaijan	92	46.0	27.4	44.9	70.0	50.2	56.0
9	Bangladesh	95	45.5	33.6	32.8	73.8	43.3	57.3
10	Belarus	80	48.0	36.1	45.6	66.8	49.7	54.7
11	Belgium	25	53.4	29.2	60.7	68.3	60.5	65.2
12	Benin	43	51.7	30.5	72.3	72.5	56.2	50.6
13	Bolivia	39	52.1	32.4	65.6	71.2	49.9	57.4
14	Bosnia and Herzegovina	123	41.6	31.2	29.7	72.8	31.4	52.8
15	Botswana	38	52.2	24.2	77.1	69.0	50.0	58.8
16	Brazil	4	56.9	39.7	63.5	67.9	56.5	66.3
17	Bulgaria	84	47.4	32.7	49.4	69.8	53.7	51.2
18	Cambodia	40	52.0	33.9	70.8	71.1	38.1	55.9
19	Cameroon	71	48.7	28.8	53.6	72.6	40.2	60.0
20	Canada	2	57.2	51.1	45.2	64.8	57.8	68.6
21	Chile	45	51.5	25.3	54.7	72.3	59.7	66.0

(continued)

L. Jianping et al. (eds.), *Report on Global Environmental Competitiveness (2013)*, Current Chinese Economic Report Series, DOI 10.1007/978-3-642-54678-5,

Number	Country	Rank	Environmental competitiveness	Resource environmental competitiveness	Ecological environmental competitiveness	Environmental bearing capacity	Environmental management competitiveness	Environmental coordination capacity
22	China	103	44.9	29.6	56.0	54.6	42.8	50.2
23	Colombia	8	56.2	34.6	63.4	72.5	54.4	68.1
24	Congo, Rep.	64	49.4	30.2	50.1	67.1	43.6	64.0
25	Costa Rica	19	53.8	26.5	67.1	72.8	47.5	67.9
26	Cote d'Ivoire	54	50.0	25.1	75.4	70.1	49.9	51.1
27	Croatia	32	52.5	28.6	54.9	71.2	64.8	64.4
28	Cuba	68	48.8	33.5	43.0	73.0	47.8	60.3
29	Cyprus	52	50.8	24.0	60.6	65.3	60.9	62.9
30	Czech Republic	11	55.3	35.8	62.6	66.9	74.8	59.7
31	Denmark	42	51.8	38.6	39.9	69.0	56.5	65.6
32	Dominican Republic	36	52.3	28.7	65.7	73.6	45.9	62.0
33	Ecuador	7	56.2	26.2	82.5	71.9	53.5	64.4
34	Egypt	105	44.7	17.4	42.4	74.4	57.0	59.5
35	El Salvador	91	46.4	29.6	30.7	74.7	49.5	63.2
36	Eritrea	127	39.8	21.9	39.5	72.4	36.2	48.3
37	Estonia	31	52.5	33.2	72.0	63.9	57.6	53.3
38	Ethiopia	90	46.4	24.0	61.4	72.8	51.0	48.5
39	Finland	33	52.4	35.4	48.3	67.6	61.6	64.2
40	France	12	55.2	33.4	60.7	71.6	62.0	65.7
41	Gabon	13	55.1	36.3	63.6	70.9	38.0	68.5
42	Georgia	109	44.4	25.2	37.6	73.1	27.0	64.2
43	Germany	3	57.2	32.5	83.6	64.6	48.1	64.8
44	Ghana	55	49.9	27.9	60.0	72.6	56.8	55.5
45	Greece	27	53.0	29.0	60.7	70.7	62.5	62.8
46	Guatemala	51	51.0	25.7	70.2	71.2	31.9	63.0
47	Guinea	88	46.6	27.0	44.1	71.1	43.2	60.8
48	Haiti	116	43.3	29.6	28.8	71.7	50.1	55.0
49	Honduras	66	49.2	27.8	61.3	71.0	33.3	60.6
50	Hungary	30	52.5	38.3	40.1	68.9	73.4	62.6
51	India	112	44.2	38.6	33.7	62.8	38.9	52.2
52	Indonesia	34	52.4	36.0	53.0	71.1	67.3	57.2
53	Iran	110	44.3	22.7	44.7	67.9	62.4	51.7
54	Iraq	128	38.6	19.3	28.7	68.2	50.3	50.9
55	Ireland	86	46.9	26.8	32.2	68.2	58.4	65.9
56	Israel	77	48.2	23.6	58.7	68.6	39.2	62.2
57	Italy	22	53.6	29.7	62.1	65.6	59.6	65.7
58	Jamaica	48	51.2	25.4	62.7	71.0	61.2	59.4
59	Japan	24	53.4	31.1	61.4	63.9	55.1	66.2
60	Jordan	115	43.7	19.7	32.4	61.2	74.4	59.1
61	Kazakhstan	124	41.1	31.5	34.2	66.7	59.4	40.5

(continued)

Number	Country	Rank	Environmental competitiveness	Resource environmental competitiveness	Ecological environmental competitiveness	Environmental bearing capacity	Environmental management competitiveness	Environmental coordination capacity
62	Kenya	106	44.6	22.8	55.7	72.6	35.0	53.0
63	Korea, Rep.	76	48.3	30.2	40.5	68.1	58.5	61.6
64	Kuwait	126	40.2	16.1	31.9	66.1	78.7	48.5
65	Kyrgyz Republic	119	43.2	22.6	39.6	74.3	49.7	53.8
66	Latvia	10	55.3	34.9	68.3	67.2	56.6	62.7
67	Lebanon	104	44.8	24.2	29.4	69.0	62.3	61.9
68	Lesotho	121	42.8	22.3	29.2	72.1	50.0	60.4
69	Libya	133	37.1	18.8	28.3	65.2	52.9	46.6
70	Lithuania	20	53.8	36.3	62.8	67.5	58.2	59.1
71	Luxembourg	18	54.0	30.3	70.6	66.0	50.0	63.9
72	Macedonia	85	47.3	35.0	40.0	71.0	50.2	55.7
73	Madagascar	114	43.9	25.3	27.6	73.7	59.0	58.3
74	Malaysia	21	53.7	30.6	67.3	61.7	65.9	61.1
75	Mali	111	44.2	22.1	34.2	71.9	50.1	61.7
76	Mauritania	132	37.6	18.1	29.8	71.4	30.6	53.2
77	Mauritius	63	49.5	32.8	37.3	77.5	53.8	63.5
78	Mexico	57	49.8	28.4	54.0	67.7	52.1	61.4
79	Moldova	70	48.7	37.7	31.8	71.0	72.5	55.6
80	Mongolia	97	45.5	21.9	57.4	71.2	66.7	45.4
81	Morocco	94	45.6	26.8	32.0	71.2	62.2	59.4
82	Mozambique	89	46.6	29.2	65.0	72.5	35.3	46.8
83	Myanmar	56	49.9	30.0	41.4	74.5	56.6	64.9
84	Namibia	99	45.4	24.0	62.0	68.9	36.4	50.9
85	Nepal	59	49.6	27.3	57.8	73.9	60.7	54.6
86	Netherlands	37	52.2	28.4	59.1	68.0	52.0	66.3
87	New Zealand	9	55.4	26.6	65.6	67.5	61.7	71.3
88	Nicaragua	17	54.2	29.3	77.6	72.2	50.3	58.8
89	Niger	87	46.7	25.6	45.2	71.8	63.3	55.0
90	Nigeria	74	48.4	30.2	62.0	68.4	41.6	53.1
91	Norway	15	54.8	27.9	57.3	69.6	57.3	74.1
92	Oman	122	42.8	16.8	52.5	75.2	36.8	53.5
93	Pakistan	108	44.5	23.7	52.0	71.9	37.1	53.7
94	Panama	16	54.3	27.6	62.6	70.4	65.4	66.2
95	Paraguay	41	51.8	31.3	41.4	78.8	73.7	63.0
96	Peru	53	50.8	27.7	54.3	74.2	58.9	61.0
97	Philippines	50	51.0	27.8	54.7	74.3	59.1	61.2
98	Poland	14	54.9	34.6	71.3	64.9	61.3	58.6
99	Portugal	72	48.7	27.5	43.4	67.5	55.4	64.8
100	Qatar	130	38.4	19.0	29.5	55.5	50.4	54.1
101	Romania	65	49.3	35.3	44.9	71.0	49.9	58.6
102	Russia	61	49.6	46.8	50.1	58.6	30.1	55.4

(continued)

Number	Country	Rank	Environmental competitiveness	Resource environmental competitiveness	Ecological environmental competitiveness	Environmental bearing capacity	Environmental management competitiveness	Environmental coordination capacity
103	Saudi Arabia	69	48.8	16.5	76.4	67.2	65.3	51.1
104	Senegal	47	51.3	29.3	72.0	71.8	34.7	58.3
105	Serbia	82	47.5	36.6	42.5	72.0	67.7	46.9
106	Singapore	78	48.2	19.3	39.1	62.3	64.1	73.1
107	Slovak	6	56.3	33.4	67.6	68.3	72.4	62.2
108	Slovenia	44	51.6	29.0	58.7	69.4	51.2	63.6
109	South Africa	118	43.3	24.1	45.2	70.8	41.4	52.5
110	Spain	26	53.2	25.9	67.1	73.5	56.0	63.4
111	Sri Lanka	29	52.8	25.7	66.8	73.3	54.3	63.2
112	Sudan	101	45.1	23.7	39.5	71.1	60.0	56.6
113	Sweden	28	52.8	33.5	48.2	71.5	58.0	67.4
114	Switzerland	1	57.4	25.7	73.0	71.8	74.4	68.2
115	Syria	117	43.3	25.4	29.9	70.7	56.9	56.4
116	Tajikistan	100	45.2	21.6	38.3	79.0	50.7	60.3
117	Tanzania	60	49.6	28.4	74.9	72.6	33.5	51.6
118	Thailand	35	52.3	32.1	59.3	66.4	65.2	59.0
119	Togo	75	48.4	32.5	55.1	71.7	54.9	49.8
120	Tunisia	120	42.8	26.0	31.0	69.4	38.4	60.2
121	Turkey	83	47.4	29.6	32.6	70.4	62.4	62.4
122	Turkmenistan	131	38.0	23.4	35.6	72.4	50.8	38.5
123	Ukraine	113	44.1	40.4	35.9	70.1	44.8	44.5
124	United Arab Emirates	102	45.0	18.0	57.5	61.5	48.0	57.1
125	United Kingdom	23	53.5	28.1	69.3	68.7	47.5	65.4
126	United States	62	49.5	35.4	52.3	54.8	49.6	60.1
127	Uruguay	98	45.5	22.8	29.2	73.7	51.2	67.7
128	Uzbekistan	129	38.4	23.0	33.7	72.0	50.8	41.8
129	Venezuela, RB	96	45.5	29.6	40.0	70.2	56.0	53.5
130	Vietnam	93	46.0	30.0	40.9	70.8	56.1	53.8
131	Yemen, Rep.	125	40.9	19.2	29.7	71.1	58.5	54.1
132	Zambia	46	51.4	30.5	77.1	71.9	64.3	44.1
133	Zimbabwe	73	48.6	28.8	75.4	68.6	50.1	43.3

Postscript

This book is listed in key research projects 2013 of National Research Center for Overall Economic Competitiveness, the major research results during 2012–2013 of the "Innovation Team of Fujian Normal University on Overall Competitiveness in Industrial and Regional Economy" by a local university special project supported by central finance, 2012–2013 phased research results of the first Young Talents Support Program supported by Central Organization Department (Group Office of the word (2013) No. 31 document). The phased research results of the general project of 2010 supported by National Social Science Fund (Project No.: 10CJL006 and Project No.: 10BJL046), the project supported by the Program 2010 for New Century Excellent Talents in University of the Ministry of Education (Project No.: NCET-10-0017), the project supported by the Program for New Century Excellent Talents in University of Fujian Province (Project No.: JA10074S), the project supported by Science and Technology Innovation Team of Colleges and Universities in Fujian Province (Fujian [2012] no. 03) and the Program for building Innovation Team of Fujian Normal University as well as the final research result of the key research projects during 2012–2013 of the political economics of Fujian Normal University as Fujian provincial key discipline and the key projects serving the construction of the West Coast of Taiwan Strait by Fujian provincial universities.

In the twenty-first century, the competition between different countries and regions is not only based on economic strength as the main body of the comprehensive national strength contest. Long-neglected environmental issues are increasingly pushed to the foreground of international and regional competition, not only as a regional economic element of competition, but also increasingly becoming a key competitive factor, and presented increasingly fierce trend. The relationship between global environmental issues and other non-environmental areas such as international politics, economy and culture, national sovereignty is more and more closed. Redistribution of environment factors and natural resources utilization among various countries and regions is reflected in the trend of globalization, as well as the interests of the competition, International competition has exceeded the boundaries of economic competition; environmental issues have become an emerging field of

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international competition. It's world's common focus on taking environmental means and measures. Only enhancing the competitiveness of the global environment can we reinforce a continuous improvement of the world, a low-carbon world, a harmonious and tolerant world.

At present, the global environmental problems have already brought serious threat to the development of human beings. The solution of these problems needs the mutual concern and cooperation of international community. Therefore, the world needs to pay attention to strengthening the research of global environment competitiveness in the present and future which is the major issue for a long time. Especially in the post-crisis era, only by constantly enhancing and improving the global environment competitiveness, can we effectively use the opportunity of economic globalization, overcome the challenges of economic globalization, and share larger interests in the economic globalization, in order to promote global economic balance, strength and sustainable growth. In view of this, in order to continue to deepen the study of conditions and levels of global environmental competitiveness, from the second half of 2011, under the strong support and enthusiastic help of Mr. Sheng Fulai, Senior Economist of the Division of Technology, Industry and Economy of UNEP, Fujian Normal University Sub-center of the National Bureau of Economic Research Center immediately set up a research team to research on "Global Environment Competitiveness Report (2013)," to give new meaning to the economic environment from a competitive perspective, and to explore the issues of global environment competitive from three angles of theory, method and empirical study, so as to provide valuable decision-making reference to countries around the world focusing on the sustainable development of environment and economy and society. On March 25–26, 2013, Fujian Normal University held the "International Symposium on Green Economic Transition and Environmental Competitiveness Index System" in Fuzhou, China, jointly by the United Nations Environment Programme (UNEP), China's Ministry of Environmental Planning of Environmental Protection Academy, Environmental and Economic Policy Research Center of Ministry of Environmental Protection. More than 40 well-known experts and scholars in the field of environmental economy took part in the meeting, went into the discussion of index system and evaluation research on global environmental competitiveness submitted to the meeting by research group. The meeting played an important role in deepening the research on perfecting the book. In the process of research, Professor Li Jianping, former president of Fujian Normal University, personally as the leader of the research group and one of the chief editors, directly instructed and participated into the research and authorization of the book draft. Professor Li Minrong, Party Secretary of Administration of Press and Publication (Copyright Bureau) of Fujian Province,and another chief editor of this book, directly instructed and participated into the research, modification and authorization of the book draft. Wang Jinnan, vice-president and Chief Engineer of China's Ministry of Environmental Planning, Environmental Protection Academy, paid positive guidance and great support to this book and as one of the chief editors. Professor Li Jianjian, President of School of Economics, Fujian Normal University, participated into the organization and implementation of this project. Professor Huang Maoxing,

Standing Deputy Director of Fujian Normal University Sub-center of National Comprehensive Economic Competitiveness Research Center and Vice-president of School of Economics, Fujian Normal University, did lots of specific things for the research of this subject from subject planning to final draft.

Since December 2011, the Research Group has carried out all-around and in-depth research on the theoretical innovation and the indicator evaluation system for the competitiveness of global environment, and traced the latest research dynamics and the measurement indicator data, with the research objects relating to 133 nations and regions of the whole world. This book contains more than one million words. It's arduous to acquire, input and analyze the miscellaneous data, including collection and input of 7,000 base data, calculation, arrangement and analysis of more than 30,000 data, preparation of over 420 diagrams, over 300 statistical tables and 7 competitiveness charts. For such a complicated and toilsome work, every one of the compilation team contributed a lot. Great gratitude is paid to Dr. Li Junjun, Dr. Lin Shoufu, Dr. Ye Qi, Dr. Wang Zhenzhen, Dr. Chen Hongzhao, Dr. Chen Weixiong, Dr. Zhou Limei, Dr. Zheng Wei, Dr. Yi Xiaoli, Dr. Wang Ying, as well as the graduate students Zhang Baoying, Yang Xuexing, Wu Yuning, Yang Ting, Lei Xiaoqiu, Chen Xianlong, Guo Shaokang, Wu Qimian, Ye Wanjun, Zhang Xuan, Qiu Xueping. They worked for over 10 h every day instead of vacation and holiday and contributed a lot for data acquisition and measurement of this research.

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Due to time limit, there could be some careless omission and defects in this book. Any comment or criticism is gratefully welcomed.

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