Education for Sustainability 5

Margarita Pavlova
Madhu Singh *Editors*

Recognizing Green Skills Through Non-formal Learning

A Comparative Study in Asia

Springer

Education for Sustainability

Volume 5

Education and sustainability remain two of the most important topics at this inflection point in human history. As multiple intertwined crises challenge the creation of a sustainable, just, peaceful future, education for sustainability remains ever more critical. This series builds on a variety of international efforts. As part of the United Nations Sustainable Development Goals (SDGs 2015-2030) and as echoed by the Aichi-Nagoya Declaration on Education for Sustainable Development (2014), education must speak to climate change, biodiversity, sustainable consumption and production, and the urgency of the civilizational crisis we face. Supporting this aim, there is a call for research and coordinated actions with an emphasis on the principles of human rights, gender equality, democracy, and social and environmental justice. There is also a great need for attention to the importance and relevance of traditional knowledge and indigenous wisdom in all geographical, socio-cultural, and educational contexts. While the Decade of Education for Sustainable Development (DESD) (2005-2014) has been completed, the status and advocacy of education for sustainable development remains prominent. The United Nations goals of Education for All (2000) and the Millennium Development Goals (MDGs 2000-2015) were complementary and provided a rationale for the critical importance of environmental education and education for sustainable development. The United Nations Educational, Scientific and Cultural Organization's (UNESCO) Muscat Agreement in 2014 advocated seven global education targets, one of which was to cultivate skills for global citizenship and environmental sustainability. Many of these lofty aims remained unrealized and are ever more urgent as the predicted social and environmental crises of the twenty-first century unfold dramatically before our students' eyes.

With this background, and in light of UNESCO's Education 2030 Agenda (2017) and their world-wide consultations on Futures of Education: Learning to Become (2019), this Education for Sustainability Book Series was launched. Its purpose is to echo and enhance the global importance of education for a sustainable future as an educational vision. We hope the Series will provide insights on a broad range of issues related to the intersection of, and interaction between, sustainability and education. The Series will showcase innovative practice, discusses salient theoretical topics, and use cases as examples.

For further information on this important book series, to become involved, or to propose a manuscript, please contact any of the co-editors. We are interested in new approaches; humanistic, socially-critical, and radical perspectives; examples that tell a larger story; and manuscripts that speak to the crisis and challenges we face in education and in sustainability.

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Note from the editor, Margarita Pavlova:

The research and publication of this book would not have been possible without Madhu Singh, my respected colleague and friend. We conceptualised this study at a UNESCO-UNEVOC meeting in Bonn several years ago and from there collaborated to establish a methodology and to identify and invite research teams from the seven countries and one territory that we worked with through the life of the project.

Madhu's expertise and detailed knowledge of RVA systems in the Asia-Pacific region contributed very valuable insights to this study. In addition, her close involvement in organising and participating in focused group discussions with all the research teams demonstrated her commitment to this project and her passion for the cause of our research, which is to develop and strengthen RVA to include skills associated with green economic restructuring. We envisaged that our work would be useful for governments in the region in supporting micro, small and medium enterprises in terms of increasing their profitability, decreasing their environmental impact and improving the well-being of all employees.

Sadly, Madhu Singh passed away before this book has been published. She will remain in the memory of all this project's participants. She was a great colleague with whom it was a pleasure to work, to discuss ideas and overcome challenges. Her positive attitude, open-mindedness and willingness to support team members were the exceptional qualities that contributed to the successful outcomes of this study. We would all like to acknowledge the important role Madhu Singh played at the UNESCO Institute for Lifelong learning in the area of RVA. Vale Madhu Singh.

We also recognise the work that many people and institutions have been involved in the process of producing this publication, and we thank all of them. Following Madhu's initiation of the project, the publication was coordinated by Programme Specialist, Ms. Marie Macauley, with the editing help of Ms. Taisia Muzafarova, under the supervision of Team Leader,

Raúl Valdés-Cotera. We also thank all colleagues at UIL who have taken the time to review and provide insightful feedback.

Series Editors Introduction

This ground breaking volume, edited by Margarita Pavlova and Madhu Singh, on *Recognising Green Skills Through Non-formal Learning: A Comparative Study in Asia,* is the latest book to be published in the Springer Book Series 'Education for Sustainability'. It is the 5th volume to be published to date in this book series.

It is widely accepted by governments and policy-makers worldwide that skills development for employability, and technical and vocational education and training (TVET), have a crucially important role to play if countries are to achieve the United Nations Sustainable Development Goals (SDGs). In fact, many argue that education and training is the Master Key to achieving the SDGs.

This book examines current debates on the need for green skills inclusion in the recognition, validation and accreditation (RVA) framework for all enterprises, in particular micro, small and medium firms (MSMEs), which have a decisive role to play in promoting green practices and green skills development in support of sustainable development. It surveys and examines practices and challenges in the Asia-Pacific region regarding environmental protection, through education and training, in four key industries, namely, automotive, PVC products, catering and waste management. It provides case studies of environmentally friendly good practices and presents recommendations for consciousness-raising to support green skills inclusion in education and training programmes. The research develops a Typology of Green Skills which can be applied by MSMEs.

The book reports on a regional research study which examined recognising green skills through non-formal learning across eight countries and territories in the Asia-Pacific region. The authors argue that implementation of the SDGs, including key aspects of Sustainable Development and Lifelong Learning, is closely related to green skills development in enterprises, much of which occurs through non-formal learning.

Margarita Pavlova and Madhu Singh are well qualified to write this important and timely book since they are well-known scholars working in the fields of TVET, and Education and Sustainability, who are particularly concerned with applied research. In addition to their substantial academic credentials each has been fully involved with

policy-making and improved practices in this area, and have hands-on international experience in various regions of the world, with particular reference to Asia-Pacific.

We are delighted to publish this particular title in the Springer Education for Sustainability Book Series. The purpose of the book series is to echo and enhance the global importance of education for a sustainable future, as an educational vision. We hope the Series will provide insights on a broad range of issues related to the intersection of, and interaction between, sustainability and education. The series showcases innovative practice, discusses salient theoretical topics and uses case studies as examples.

The Series adopts international education, environmental education, and lifelong learning perspectives and explores connections with the agenda of education for sustainable development. The intended audience includes university academics and students in educational studies, environmental education, climate change education, geography education, science education, curriculum studies, comparative education, educational leadership and teacher education; the staff of international agencies with responsibilities for education; and schoolteachers in primary and secondary schools.

Supported by the expertise of a distinguished and diverse International Advisory Board, this Series features authoritative and comprehensive global coverage, as well as diversified local, regional, national and international perspectives. As a complement to the 'Schooling for Sustainable Development' Book Series, it explores issues that go beyond primary and secondary schooling into university, vocational, and community education settings. These educational issues involve multiple stakeholders ranging from international agencies, governmental and non-governmental organisations, education and business leaders to teachers, parents and, critically, students and youth. Research topics covered include global themes related to environment, such as climate change prevention, mitigation, and adaptation; disaster prevention and risk reduction; biodiversity education and ecological education. They also include human ecological issues such as global citizenship, peace education, childhood development, arts education, intergenerational equity, women's and gender studies, and human rights education. Further, they include society-orientated issues such as governance, green skills for sustainable development, and patterns of applied learning and leadership for a sustainable future.

The authors and co-editors of books in the Series are responsible for the choice and presentation of information and views contained in their particular volume, and for the opinions expressed therein, which are not necessarily those of UNESCO or the universities where the co-editors of this Book Series are employed, and so do not commit these respective organisations.

Readers of this or other volumes in the Series who have an idea for writing or editing their own book, on any aspect of Education and Sustainability, are encouraged to approach the series editors either directly or through Springer with their inquiry.

July 2021

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Debate on the Need for Green Skills Inclusion in the Recognition, Validation and Accreditation (RVA) Framework

Chapter 1
Introduction: Unpacking Greening and Skills Recognition in Micro, Small, and Medium Enterprises

Margarita Pavlova

Abstract This first chapter presents the nature of the regional research study on recognising green skills through non-formal learning across seven countries and one territory in Asia and the Pacific Region (APR), the methodology and approach to data collection, and the analytical framework. Furthermore, this chapter establishes the rationale for the book by detailing the argument that implementation of Sustainable Development Goals (SDGs), including the key aspects of sustainable development and lifelong learning, is closely related to green skills development and recognition in enterprises. As such, the two starting points for this study are the invisibility of the decisive role of micro, small, and medium enterprises (MSMEs) (definition included in the glossary) in promoting green practices and green skills development, and the need for making visible the invisible outcomes of workers' participation in learning activities through green skills recognition (definition included in the glossary). This chapter also introduces the analytical framework that is used in the study to develop a holistic understanding of the principles and approaches required for green skills recognition. To frame the analyses presented in Chap. 2 of the book and the model presented in Part III, macro, meso, and micro-levels are included in this framework: political decisions and policies that countries, and, in the context of this study, one territory, use to move towards green transition and greening of education and training; the role of standards, learning outcomes, and quality assurance mechanisms related to green skills and their inclusion in RVA; and actions at the level of enterprises.

Keywords Sustainable development goals (SDGs) · Lifelong learning · Green skills development · Green skills recognition · MSMEs

Foreword

This book is the result of a regional research study initiated by the Education University of Hong Kong (EduHK), a UNEVOC Centre, and the UNESCO Institute for Lifelong Learning (UIL) in Hamburg, Germany. The project, "The inclusion of green

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skills in the recognition, validation, and accreditation (RVA) of outcomes of non-formal and informal learning: A comparative study in Asia and the Pacific Region" was implemented by selected technical and vocational education and training (TVET) institutions and some UNEVOC Network members between 2015 and 2017 in the People's Republic of China (PRC), Nepal, the Philippines, and one territory, Hong Kong Special Administrative Region (SAR), PRC, as well as by other organisations from Bangladesh, India, Malaysia, and Kazakhstan. The research team, led by Margarita Pavlova and Madhu Singh, comprised representatives from each participating country or territory and included university academics and representatives from government organisations. Their governments increasingly view research as an important foundation for evidence-based policy-making. Therefore, a productive research collaboration between seven countries and one territory through this study served as a regional platform for sharing current practices in greening industries and discussing the ways greening of skills required for this restructuring can be developed and recognised. Thus, this study can be viewed as an essential enabler for supporting green economic restructuring (definition included in the glossary) via the development of a model that can inform government policies in the region on green skills recognition through mechanisms such as RVA.

1.1 Rationale

The study reported in this book contributes to the implementation of the Sustainable Development Goals (SDGs) adopted in 2015 by the United Nations General Assembly that have been crafted to replace the Millennium Development Goals (MDGs) and Education for All (EFA) goals. The SDG targets and indicators measure countries' success across 17 areas of development. The recently published Asia and the Pacific SDG Progress Report 2020 (ESCAP 2020) assessed the progress towards these Sustainable Development Goal (SDG) targets in the region and stated that "the region's lack of progress on environmental sustainability is striking. To achieve its 2030 ambitions, the region needs to significantly accelerate its progress or reverse trends on most of the measurable environmental targets. Among the top priority targets are the ones related to climate action, including energy efficiency and the share of renewable energy in total energy consumption, greenhouse gas emissions, climate-related hazards and natural disasters, air quality and waste management in cities, and the impact of human activities on marine and coastal ecosystems" (ESCAP 2020). Although many factors have contributed to these results, it is important to acknowledge the role of industry in terms of its impact on the environment. According to a 2016 UNESCO regional review of TVET progress in the APR titled "Enhancing Relevance in TVET. Review of Progress in the Asia–Pacific since 2012: Enhancing Relevance in TVET—Review of Progress in the Asia–Pacific since 2012" (UNESCO 2016), the main barriers to progress on environmental sustainability are the lack of knowledge and/or technical capacity on how to develop environmentally friendly practices, lack of funds, and lack of information about the knowledge, skills, and

competencies required for green jobs (definition included in the glossary). In particular, the report states that "employers in many South-East Asia, South Asia, and Pacific countries assign a relatively low value to sustainability skills, such as resource efficiency and waste reduction" (UNESCO 2016). The cumulative impact of industries, as well as electricity and heat production, agriculture, transport, and buildings as measured by CO_2 generation, was equivalent to 49 gigatonnes in 2010 in the form of direct and indirect emissions (Intergovernmental Panel on Climate Change 2014). Therefore, the use of environmentally friendly practices by the companies plays a crucial role in improving environmental sustainability in the region.

Green skills development (or greening of skills in short) in the context of lifelong learning, which underpins many SDGs, goes hand-in-hand with environmental protection and climate change-related measures, as well as inclusive economic growth and decent work for all. Greening of skills is one of the focus areas for technical and vocational education and training (TVET) in UNESCO's 2030 education agenda. More specifically, the development of green skills (definition included in the glossary) in the APR is particularly urgent given the general shortage of such skills in the region. The 2015 TVET progress review report highlights that "employers [in the APR] cite difficulties finding candidates with relevant technical skills and competencies, industry-specific certifications, and/or professional qualifications, and many consider TVET graduates' problem solving/analytical skills and critical/creative thinking skills to fall below their job requirements" (UNESCO 2016, p. 23). There is, therefore, a clear need to align TVET training more closely with labour-market requirements, particularly in areas where there are critical skills shortages, such as "green skills and ICT skills area" (UNESCO 2016, p. 25). At the same time, the region's vulnerabilities in the overall green skills development (definition included in the glossary) effort should be acknowledged. Most of the places lagging behind in terms of green skills training provision are low- and lower-middle-income countries in the Pacific and South Asia, the two sub-regions most vulnerable to climate change impacts. Therefore, if greening TVET (definition included in the glossary) has the potential to accelerate economic growth and productivity, reduce poverty and unemployment, and address environmental problems, while only some countries have the resources to green TVET, the economic, social, and environmental gaps between countries are likely to deepen (UNESCO 2016).

Green skills can be developed through formal, non-formal, and informal learning (definitions included in the glossary) in support of governments' commitment to greening the economy. And they should be a part of lifelong learning (definition included in the glossary) that is designed to ensure that "all learners acquire knowledge and skills needed to promote sustainable development" (Hinzen and Schmitt 2016, p. 10).

As early as 2017, the UN Secretary-General's Envoy on Youth, Jayathma Wickramanayake, pointed out that "without skilled and employable young people, our

chances of achieving the [Sustainable] Goals are greatly diminished".[1] Thus, considering that the development of skills is essential for implementing all SDGs, this research is thereby crucial in moving the SDG agenda forward. Among the reasons for initiating this study were two key issues in particular.

The decisive role MSMEs play in green practices and green skills development

Solutions for diverse global problems can be often found in specific country contexts. MSMEs are the backbone of the economy for many countries, which is why the research study presented in this book takes up the issue of the decisive role that MSMEs of the formal and informal economies must play in contributing to environmentally sustainable development and promoting green skills. The ability of employees and employers to manage changing environmental requirements flexibly has become a decisive ethical, attitudinal, and valuable foundation on which sustainable development depends as well as the future sustainability of decent work. However, many of these skills, attitudes, and values are not acquired in formal settings such as schools or colleges, but by informal and non-formal means, on the job in the workplace, and through practice-based learning. Often these skills remain invisible or may lead to qualifications that are not formally recognised by authorities.

Making visible the invisible: Recognition of outcomes of workers' learning in the context of green economic restructuring

One of the objectives of this research has been to raise awareness about what education beyond formal education might entail, and for people to give thought to the meanings of terms such as "lifelong learning" and "recognising learning in non-formal and informal settings". In response to the call for green skills to be made more visible, the study presented in this book looks at how green skills can be included in RVA mechanisms in the public systems as well as in MSMEs and industries mainly employing TVET graduates. This research does not focus on the development of green skills.

The development of procedures for the recording, validating, and recognising skills; prior learning; and work experience obtained in non-formal and informal settings, together with the implementation of the UNESCO Guidelines for Recognition, Validation, and Accreditation of the Outcomes of Non-formal and Informal Learning (UIL 2012), have been defined at the global level by UNESCO as key strategies to make visible and give value to the hidden and unrecognised competences[2] that individuals have attained in various settings and to promote lifelong learning. This is the first study that looks at RVA in the context of promoting environmental sustainability.

[1] Statement by the UN Secretary-General's Envoy on Youth, Jayathma Wickramanayake, at the 3rd annual World Youth Skills Day under the theme: "Skills for the Future of Work" on July, 17 2017: https://www.un.org/sustainabledevelopment/blog/2017/07/with-relevant-skills-youth-can-help-accelerate-progress-on-the-sustainable-development-goals/.

[2] Skills in this research are interpreted in a broad sense and thus used interchangeably with competencies.

1.2 Aims

The research study aimed to explore environmentally friendly practices in MSMEs in four industries (automotive, catering, PVC manufacturing, and waste management), the extent to which green skills are embedded in these practices, and the ways RVA mechanisms are viewed and used by MSMEs. The outcomes of the research were intended to map environmentally friendly practices in the four industries, identify mechanisms used to recognise and assess existing skills, and identify factors and principles for effective green skills inclusion in RVA mechanisms to ensure that Asia and the Pacific Region (APR) is moving towards a sustainable future. In addition, the results of the study can be extended to benefit similar research in other geographical regions.

1.3 Terminology and Definitions Across the Cases Under Study

1.3.1 Green Skills and Greening

The "greening" of all industry sectors is important if we are to decrease environmental impacts and support progress towards the SDGs. The framework for this study links greening practices with the skills that are required to implement these practices. This section examines the interpretation of green skills and "greening" terminology that frame this study and highlights some insights from it.

The "greening" of business and industry or green economic restructuring refers to initiatives that promote economic growth but decrease environmental impacts by applying operational practices that reduce the use of materials, energy, and water and minimise waste and emissions. Therefore, greening refers to ways of moving away from traditional production processes, services, or organisational arrangements to production processes, services, or organisational arrangements that have a reduced environmental impact.

For this study, a broad interpretation of green skills is adopted: "Green skills are those skills needed to reduce environmental impacts and support economic restructuring with the purpose of attaining cleaner, more climate-resilient, and efficient economies that preserve environmental sustainability and provide decent work conditions".[3] As argued elsewhere (e.g. Pavlova 2018), research into green skills emerged after 2009 when the need to understand the nature of skills that can support green restructuring was identified. The European Centre for the Development of Vocational Training (Cedefop) was among the first to suggest a differentiation between generic (similar across different occupations) and specific (relevant to a particular occupation) green skills (2010). In this study, the term skills is used in a broad sense

[3] For full discussion on green skills, see Pavlova (2017a, b).

and refers to the ability to apply knowledge, use know-how to complete tasks and solve problems, and carry out the tasks that comprise a particular job (Cedefop); it is, therefore, very close to the concept of competencies and incorporates knowledge in its definition.[4]

The classification of generic green skills suggested by Pavlova (2014) is based on OECD (2013) categories of generic skills and a list of generic green skills proposed by Strietska-Ilina et al. (2011). It includes the following:

- cognitive competencies (e.g. environmental awareness and a willingness to learn about sustainable development; systems and risk analysis skills; innovation skills to identify opportunities and create new strategies to respond to green challenges);
- inter-personal skills (e.g. coordination, management, and business skills to facilitate holistic and interdisciplinary approaches that encompass economic, social, and ecological objectives; communication and negotiation skills for discussion of conflicting interests in complex contexts; marketing skills to promote greener products and services);
- intra-personal competencies (e.g. adaptability and transferable skills to enable workers to learn and apply new technologies and processes required to green their jobs; entrepreneurial skills to seize opportunities presented by low-carbon technologies) (Pavlova 2014).

Generic green skills identified above align with the key competencies or "soft" skills[5] employers already recognise as crucial for a modern workforce—but, importantly, they are also contextualised within the perspective of environmental awareness and an understanding of sustainable development (Pavlova 2017b).

The fourth component of the generic green skills classification, which is labelled technological skills, refers to environmentally friendly processes that are similar across different sectors:

- Quantification and monitoring (waste, energy, and water).
- Management systems (waste, energy, and water).
- Procurement and selection.
- Material use and impact quantification.
- Impact and use minimisation.
- Impact assessment.
- Risk management (Per Capita 2010).

This list of generic skills, in relation to "green processes", is the result of an analysis of greening approaches used in Denmark, Germany, the United Kingdom, and the United States (Per Capita 2010).

[4] However, in a narrow sense, skills are confined to "technical capacity".

[5] The term *soft skills* refers to inter-personal or "people" skills. Examples include behaving with respect (verbally and non-verbally) towards colleagues, being a good listener, and being helpful. Soft skills are complemented by *hard skills,* which are related to job content and are acquired by formal education, apprenticeships and internships, on-the-job training, etc.

Generic green skills described above under four categories are required for the workforce to understand issues of green economic restructuring, to interpret environmental legislation, to adopt processes that limit environmental impact, to be proactive in seizing opportunities that emerge due to the greening of economies, and to find solutions required for greening practices. *Generic green skills* include general knowledge, skills, attitudes, and values, and they are necessary for contributing to sustainable social, economic, and environmental development in **any job** (level two in Fig. 1.1). The development of generic green skills is important for the greening of all industries, as they enable a person to develop a green mindset, apply generic (soft) skills within environmental context, and adopt generic green operational practices that minimise environmental impacts.

The proposed four-category analytical framework for the classification of generic green skills (for more details, see Pavlova 2018) forms part of the typology of green skills suggested by Pavlova (2017b) that is based on a positive attitude towards sustainability and the development of green mind-sets (Fig. 1.1). Pavlova (2016) indicates that attitudes and values should be viewed as an essential element of green skills.

In addition, green skills include topping-up skills for greening all occupations and specific green skills for new green occupations (in such green industries as waste and water management, renewable energy, eco-tourism, and environmental consulting services)—third and fourth levels in Fig. 1.1. This model also suggests that generic green skills and green skills top-up are required for the greening of all occupations—and for green occupations, additional specific green skills are needed. The need for topping-up skills is usually associated with the introduction of green technologies and processes in industries and service sectors.

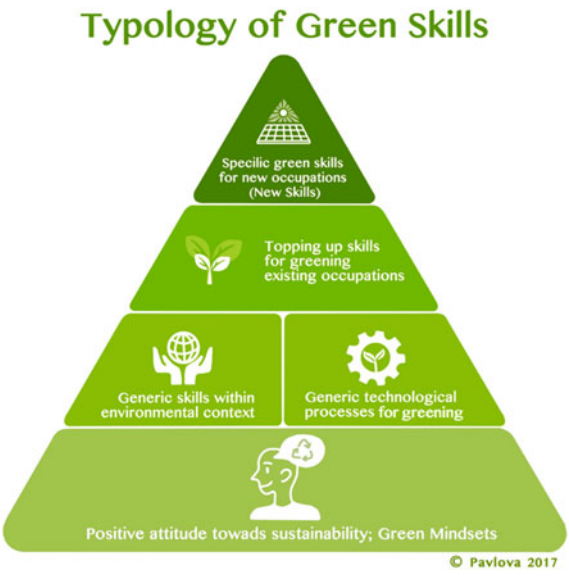

Fig. 1.1 Typology of green skills. *Source* Author

The concept of a green economy was first introduced with Pearce et al.'s (1989) *Blueprint for a green economy* for the UK Department of the Environment (Georgeson et al. 2017, p. 3). In 2008, in the context of the financial crisis and fears of a global recession, the term was revived and the UN Environment Programme (UNEP) championed the idea of "green stimulus packages" and identified specific areas where large-scale public investment could kick-start a "green economy" (Atkisson 2012). Although there is no internationally agreed definition of the green economy, the definition provided by UNEP in its 2011 Green Economy Report has been the most commonly used in recent publications (definition included in the glossary).

In this study, the notions of green skills and the green economy are closely related, and green skills are key factors in the development of green economies. Most of the case studies, including Kazakhstan, Bangladesh, the Philippines, India, and Nepal, adopt a similar understanding of green skills—skills that are not limited to professional or technical skills but are interpreted as a set of competencies that may include knowledge, values, and positive attitudes towards environmentally friendly practices. For example, Kazakhstan defines green skills from the concept of a green economy that places a strong value on welfare and social justice while emphasising a significant reduction in environmental risks and depletion.

Within this broad conceptualisation of green skills, different countries demonstrate specificities in their interpretation of the term green skills. Malaysia's strong focus on green technology means that green skills are often understood as being directly related to that particular sector. Generally, and across countries, green skills are viewed as an ability of employees to perform activities that could lead to a reduction in pollution and a cleaner environment. In the People's Republic of China, green skills are seen as a requirement for all jobs, including the development of technical skills for sustainable products and services as well as non-technical skills (i.e. communication, negotiation, and support of sustainable business practices) to carry out the appropriate organisational change. India defines green skills as a means of promoting green jobs, with a view that it is essential for green skills to be integrated into wider training and skills development policy rather than being an additional, standalone subject separate from other forms of skills development. In Kazakhstan, green skills are related to actions aimed at reducing energy consumption, protecting ecosystems and biodiversity, and minimising pollution emissions and waste; they simultaneously require a high level of environmental competency, together with environmental knowledge and social and professionally significant qualities of a person.

1.3.2 Different Nomenclature for Skills Recognition

UNESCO uses the acronym RVA to refer to recognition, validation, and accreditation of outcomes from non-formal and informal learning. According to the UNESCO Guidelines (2012), recognition is a process of granting official status to learning outcomes and/or competences, which can lead to the acknowledgement of their

value in society. Validation is the confirmation by an official body that learning competences acquired by an individual have been assessed against reference points or standards through pre-defined assessment methodologies. Accreditation is a process by which an officially approved body, based on the assessment of learning outcomes and/or competences awards qualifications or grants equivalences, credits units or exemptions, or issues documents such as portfolios of competences. In some cases, the term accreditation applies to the evaluation of the quality of an institution or a programme as a whole.

A wide variety of other terms tend to be used for skills recognition across countries. In the USA, for example, RVA is referred to as prior learning assessment and recognition (PLAR). In the UK, the terms accreditation of prior learning (APL) and accreditation of prior experiential learning (APEL) are used. In the seven countries and one territory surveyed for this study, the term recognition of prior learning (RPL) is used. According to the Australian quality-training framework, "Recognition of Prior Learning (RPL) means recognition of competences currently held, regardless of how, when or where the learning occurred" (ANTA 2001, p. 9). Although the official term used in India is RPL, some recognition practitioners in industrial settings dispute this term, arguing that "competences" are more relevant in enterprises and industrial settings than "learning" (Saxena 2015).

1.4 Methodology

The study had three phases for each country or territory: Phase 1 consisted of identifying and analysing policies and legislations relevant to environmental protection and RVA, standards, regulatory processes, and quality assurance mechanisms in the selected seven countries and one territory; Phase 2 consisted of identifying participants, conducting interviews and observations with industry, and analysing data; and Phase 3 consisted of identifying existing patterns and developing recommendations for a model of inclusion of green skills into RVA.

The development of the research study was a collaborative and iterative process between two lead researchers, Margarita Pavlova and Madhu Singh, and research team leaders from each participating country or territory. They were the core of three focus groups that were integral to the study. In addition, research teams that hosted these meetings invited scholars and practitioners involved in green economic restructuring, green skills development, and RVA processes. During this study, three focus group discussions formed the basis for the development of building blocks and recommendations that aim to guide policy and practice on green skills inclusion in RVA. Each meeting lasted for 2 days that supported intensive interactions among teams and experts. The first focus group discussion was held in Hong Kong SAR, PRC, and was hosted by the Education University of Hong Kong in August 2015. This was followed by a second focus group discussion in August 2016 hosted by the UIL in Hamburg. The third meeting took place in Manila, in the Philippines, in

September 2017 and was hosted by the Colombo Plan Staff College (CPSC) and the Technical Education and Skills Development Authority (TESDA).

Focus group discussions promoted clarity and consensus on rationale, aims, and methodology. In addition, they allowed participants to share their case studies at different stages of the project and learn through presentation, exercises, and group work. The discussions not only highlighted the diverse ways in which government policies, industry practices, and educational approaches were working to achieve the greening of economies and lifelong learning through a variety of RVA models, but how the status of RVA varied across countries and enterprises. The results of the third focus group discussion are presented in Part III.2. It was aimed at developing recommendations for supporting green skills inclusion in RVA and was based on the results collected through the case studies.

Four industries were selected for this study: automotive, catering, PVC manufacturing, and waste management,[6] representing both the service and manufacturing sectors. They were selected as they have the potential to mitigate the negative effects of environmental degradation as well as play a role in the greening of industries and economies. To evaluate current practices in selected industries, this study applied a qualitative research methodology that aimed to understand aspects of MSME operations and their views on currently little-known issues of greening and RVA.

The research used a case study approach to investigate practices and perspectives in a real-life context, using multiple primary and secondary sources of evidence, such as interviews with MSMEs representatives, observations of environmentally friendly practices of MSMEs, and the analysis of relevant documents such as laws, policies, and industry regulations that enabled a detailed examination of issues related to the greening of economies, the required development of skills, and their recognition. Each case study was conducted using the instruments for data collection developed by EduHK and UIL, adapted within the setting. The researchers conducting case studies followed internal ethics procedures relevant to the study context. For all enterprises, participation was on a voluntary basis.

1.4.1 Selection of Enterprises

Each country or territory used the same approach for data collection, with some contextualisation. Researchers were asked to visit eight enterprises in each of the four industries: automotive, catering, PVC production, and waste management (32 in total). Of these enterprises, four had to be small- to medium-sized enterprises in a formal sector and the other four had to be micro-enterprises in the informal sector. Table 1.1 presents the actual number of enterprises visited and interviewed in

[6] Although these four industries were targeted, some research teams were not able to reach out to some industries due to absence of such companies in particular locations or limited resources available to research teams. In case of India, renewable industry sector was added as a priority area for greening economy in this country.

Table 1.1 Number of enterprises interviewed in each industry sector

Country/territory	Total no. of enterprises	Automotive	Catering	PVC manufacture	Waste management
Bangladesh	30	13	15	0	2
People's Republic of China	32	8	8	8	8
Hong Kong SAR, PRC	16	4	8	0	4
India[a]	47	0	0	0	22
Kazakhstan	12	4	4	0	4
Malaysia	5	2	2	1	0
Nepal	20	8	4	6	2
Philippines	29	7	8	6	8
Total	191	46	49	21	50

[a] India included 25 enterprises from the renewable energy sector
Source Author

each country or territory: although the cases are not identical in terms of size, they present rich contextualised data that are useful for addressing the aims of the study and increasing the understanding of micro-level realities. The intention was not to compare one country or territory to another but to develop a model that can help governments to ensure the role of MSMEs in greening economies and the role of RVA in these processes.

The following definitions were applied for the identification of companies:

- Formal enterprises are regulated by labour laws, whereas informal enterprises are unregulated.
- Micro-enterprises are composed of between two to ten workers, whereas small and medium enterprises (SMEs) consist of more than ten employees.

Hence, this methodology focused on data collection from MSMEs in both formal and informal settings to understand their greening practices and recognition of on-the-job learning. Further details on the companies are presented in Table 1.2.

1.4.2 Data Collection Methods

The use of interviews and observation as primary data collection approaches in this study was determined by its qualitative nature, which sought to understand the experiences, different perspectives, and attitudes of MSMEs. Thus, both the attitudes and understandings of employers and managers and practices in real-work environments were investigated. In exploring attitudes and knowledge of individuals, we used the interview method, which is recommended for evaluating attitudes in relation to

Table 1.2 Enterprise profile

Country/territory	Total no. of enterprises	No. of employees across all enterprises	Formal	Informal
Bangladesh	30	974	13	17
People's Republic of China	32	785	16	16
Hong Kong SAR, PRC	16	327	12	4
India	47	23[a]	24	23
Kazakhstan	12	26[b]	6	6
Malaysia	5	48	3	2
Nepal	20	501	N/A	20
Philippines	29	1490	24	5
			98	93

[a] The number interviewed
[b] Only the formal enterprises
Source Author

particular issues (see Bird 2009). According to Patton (2005), interviews enable the observation of behaviours that may be hard to observe directly. For this study, a semi-structured approach was chosen to help identify context-specific practices or behaviours.

Although interviews are a widely used tool for qualitative research, they have limitations: answers may be restricted to what respondents can think of in a particular moment, and subjects might misinterpret questions or the same question might be understood differently depending on subjects' backgrounds and experiences. Therefore, to minimise possible limitations, direct observation of practices was also used in the study. According to Raudenbush and Sampson (1999), observations enable a more objective examination of existing practices in a specific context, although they do not help in the understanding of people's attitudes, knowledge, or mechanisms underlying practices. Thus, the two methods of primary data collection complemented each other to bring about an understanding of the practices and attitudes of employers, employees, and workers in MSMEs. The input from the questionnaires and the observation checklist were collated. Companies were not identified (unless otherwise agreed to by the company).

Semi-structured interviews

During visits to enterprises, experts from each country or territory conducted semi-structured interviews designed by EduHK and UIL to record and examine environmentally friendly practices, or the potential for introducing environmentally friendly practices, in respective industries. They also identified mechanisms for recognising and assessing existing skills, and the potential for green skills inclusion in the RVA of prior non-formal and informal learning.

The interview schedule consisted of several sections: general information about the participating companies such as environmental policies and regulations, respondents' conception of green skills and the need for them, the use of RVA, the inclusion of green skills in RVA, workplace learning and training programmes, and suggestions on how to support the use of RVA for green skills recognition (see Appendix A). Although the interview was mainly semi-structured, some questions were single-choice, and others had multiple choices and rating scales. The term "skills" was used in the interviews in a broad sense and referred to knowledge, skills, values, attitudes, and behaviours. This was clearly explained to interviewees before interviews were conducted.

Observation

This study employs observation for the systematic recording of practices (see Marshall and Rossman 2006) for several reasons: firstly, because it enables the researcher to witness environmentally friendly practices and behaviours as they occur, which often results in more accurate information (Sapsford, Jupp, and Open University 1996); secondly, because it allows researchers to observe any abnormalities (Creswell 1994). An observation checklist was developed based on an Australian unit of competencies, "AHCWRK202A Observe environmental work practices" (Appendix B), and was supplemented with information obtained from interviews.

Observations in this study looked at whether organisations

- followed environmental workplace practices;
- sought to improve environmental work practices;
- recognised and reported on potential environmental threats;
- maintained environmental records.

As Sapsford, Jupp, and Open University (1996) argue, "It is possible to use more-structured observation to collect data on a large scale by employing a team of observers all using the same observation schedule in the same way" (p. 61). The extent of implementation was assessed on three levels—limited, moderate, and fully present. Thus, the use of observation lists ensures consistency for data collection across companies and across the seven countries and one territory.

1.4.3 Data Analysis

To analyse enabling conditions for the inclusion of green skills in RVA, the study adopted a comprehensive systemic approach at three levels—macro, meso, and micro (Table 1.3). Macro-level analysis concerns policies and regulations in countries or territories. Meso-level analysis addresses occupational and curriculum standards and recognition systems and procedures. Micro-level analysis, the focus of this research, includes practical greening operations, learning needs, and recognition of green skills in the workplace.

Table 1.3 Macro, meso, and micro-levels of analysis

Macro-level (secondary data)	How government policies, industry practices, and educational approaches operate in different contexts to achieve the greening of economies and to support green skills development and recognition
Meso-level (secondary data)	Standardisation and quality assurance related to green skills and their inclusion in RVA
Micro-level (primary data)	Green practices and green skills development and recognition in MSMEs

Source Author

Macro-level

The macro-level includes political decisions ensuring environmental regulations and the legal basis of RVA and entreprise-based training. An important starting point for the analysis has been to understand the influence of government, and the joint role of government and sectoral stakeholders in enforcing, at the level of country or territory, the political and legislative requirements of green practices in MSMEs and green skills inclusion in RVA. Political decisions ensuring the legal basis of RVA in enterprises as well as direct funding and financial involvement and the governance of green skills recognition are also the areas for analysis at this level.

This area of analysis, which focuses on government policies and RVA legislation, is considered to be of crucial importance for the promotion of a sustainable lifelong learning system, where bridges are developed between formal, non-formal, and informal learning and where training and qualifications systems take into account the outcomes of non-formal and informal learning at the enterprise level. The analysis at the government level considers questions such as: How much importance do education and training systems attach to practice-based training as well as workplace learning in attaining the goals of sustainable development? Is there a long-term strategy to facilitate changes in behaviour patterns that contribute to sustainable development? Is there a comprehensive workforce development strategy at the government level to address the greening of skills that includes both formal and non-formal education and training? Greening of skills is one of the focus areas for TVET in the United Nations' SDGs, so to what extent are countries or territories greening TVET by also considering non-formal and on-the-job training in enterprises to be an integral part of TVET?

Meso-level

At the meso-level, standardisation and quality assurance, including quality of input, processes, and outputs, are used to understand the principles and enabling factors in including green skills in RVA. On the input side, this study analyses activities addressing the need for green skills that have taken place in the context of developing green qualifications and green occupational standards through sectoral bodies such as sector skills councils devoted to promoting green jobs and green sectors. What is the potential of using this increasing standardisation and formalisation of green qualifications for recognising green skills in MSMEs? Incorporation of the notions of

the value chain and skills standards into the company's standards as measured through International Organization for Standardization (ISO) quality management systems is of interest for this study, as these processes provide a potential for improving the situation in MSMEs.

"Processes" refers to the role of regulatory agencies, inter-institutional relationships, and multi-stakeholder partnerships that are important to ensure quality processes in the development of green skills standards and maintaining recognition procedures and tools. Certification and the accompanying entitlements relate to the output side and are an option for individuals and enterprises interested in the official recognition of green skills. Thus, analysis on this level ensures an understanding of advocacy processes and support for MSMEs in standardising the use of RVA for green skills recognition.

Micro-level

The micro-level, the primary focus of the research reported here, is the level of collection of primary data from MSMEs. The study was interested in their views, as employers and employees, on greening their practices: developing green skills and using recognition mechanisms. Ultimately, the crucial question concerned the usefulness of skills recognition for individuals and enterprises, the involvement of local stakeholders in supporting MSMEs, and the factors that could enable green operations, promote green skills development, and stimulate interest in RVA.

As stated in the rationale, the underpinning ideas for this research are government policies and standards that will have little impact if employers and training providers do not engage with green practices and are unable to include them in RVA mechanisms to support the SDGs. It is for this reason that the study analyses green practices and green skill requirements at the local level, in addition to identifying several needs at the macro-level for transitioning to a green economy.

Our analysis also considers a comparison of macro-level needs with realities in MSMEs, such as compliance with government regulations on the one hand and the views of MSMEs on required skills, attitudes, and behaviours on the other. We believe this comparison facilitates the development of principles and the identification of enabling factors that frame an advancement of the model for supporting the inclusion of green skills in RVA. The research considered the important role of employers in promoting green skills and green enterprises, specifically the extent to which employers considered training and skills development and recognition initiatives to be advantageous in terms of a company's cost–benefit analysis of engaging in such activities. Berger and Pilz (2009) have highlighted the importance of touting the clear advantages to companies in terms of cost–benefit analysis if a long-term acceptance of skills development initiatives is to be expected. Since employers' acceptance cannot be assumed, Pilz (2017) has suggested that state targets and training regulations should be defined as clearly as possible and written in a comprehensive non-bureaucratic way, so that it is possible to secure these advantages.

Green skills development and recognition in enterprises depend on opportunities in the education and training system as well as options within the employment system. Consideration needs to be given to how skilled workers can be appropriately deployed

in green jobs so that the competences held by the workforce can be applied to adapt to more sustainable practices of job, improve their performance vis-à-vis the changing profile of jobs greened, or promote career mobility as well as job security. Factors playing a role here include not only the demand for green activities but also such aspects as the role of workplace health and safety and the availability of decent work. Even more important, however, are salaries. The likelihood that green skills training and RVA will bring success depends on there being a long-term monetary advantage to individual employees in acquiring green skills and having those skills recognised.

Skills training within the employment system should pay attention to making training as attractive as possible. All green skills training programmes should, therefore, be assessed in terms of the extent to which they motivate participation (Young and Raffe 1998). State bodies should work towards ensuring that learning processes culminate in a test of skills development that is then recognised and certified according to accredited procedures. This is the only way to ensure transparency with respect to the standard achieved by individual participants and enhance worker mobility.

As previously mentioned, the primary focus of the research reported here is at the micro-level, which concerns MSMEs. More specifically, we analysed data on environmentally friendly practices in the four industries, challenges to and opportunities for exercising green practices, and the similarities and differences across industries and countries/territories in interpreting the notion of green practices. The aim was to analyse data on green practices related to workplace procedures as well to rules and regulations, the disposal of waste, use of renewable resources, recording of environmental-related data, use of brochures and events, innovations and use of new technologies, incentives in the enterprises, marketing strategies, and advisory services for consumers. Data analysis at the macro and meso-levels addressed secondary data, including documents and legislation, which were analysed based on the UNESCO Guidelines.

Data analysis for each country or territory focused on the following:

- greening practices;
- strengths, weaknesses, and gaps in current RVA services;
- the need for establishing such mechanisms and services;
- inclusion of green skills into mechanisms of recognition of prior non-formal and informal learning.

Moreover, in the analysis of green practices, we sought to understand the ease or difficulty with which workers were able to translate green practices into green skills requirements. We focused analysis on the importance given to green skills by employers and employees, and their understanding of green skills in terms of technical, cognitional, inter-personal, and intra-personal skills. We also analysed differences between “green practices” and “green skills” as perceived by interviewees.

In terms of RVA, the analysis focused on the level of understanding of these mechanisms and their usefulness for current practices. We also analysed the benefits enterprises can expect from establishing such mechanisms and services and on how

the introduction of RVA mechanisms could be helpful, and why. This approach to data analysis helped us to shed light on perceptions of the ways that green skills recognition could help enterprises to equip their members with competences that nurture green behaviour. Regarding the inclusion of green skills into mechanisms of skills recognition, the analysis was based on case studies and focused on understanding whether or not skills recognition in relation to green jobs has been formalised in the qualifications frameworks of countries or territories, and if it is viewed within enterprises as a human resources development tool. As the RVA process usually takes place either before or after training, an important area of analysis was understanding how the inclusion of green skills in RVA could be embedded into non-formal workplace training opportunities organised internally by enterprises or externally through non-formal or formal training providers.

All data collected were analysed by country/territory research teams. Considering the primary outcome of this study, that is to identify critical factors for the development of a model that governments can use to promote green skills in RVA frameworks, the focused group discussions were used to provide additional thinking into the ways data can be contextualised and analysed. Thus, experts in the field of environmental protection in the host countries or territory were also invited to take part in focus group discussions. Project participants were, therefore, exposed to information regarding, for example, the implementation of RVA in relation to the Hong Kong Qualifications Framework and its applications within industries, concepts, and international research concerning RVA and green skills, how Germany was using RVA to recruit skilled and qualified artisans in green trades by building on the practical experiences of refugees, and private-sector perspectives on environmentally friendly practices in the tourism and waste management industries.

Comparative data analysis took place during the third focus group discussion that took place in Manila, the Philippines, in September 2017 and was hosted by the Colombo Plan Staff College (CPSC) and the Technical Education and Skills Development Authority (TESDA). This discussion was used as an additional tool for analysing data from different places to pool together the insights from different contexts, different industries, as well as across the three levels of analysis in order to arrive at a model that included principles related to the following:

- policies and laws;
- advocacy and support;
- implementation and benefits (see Chap. 3).

1.5 Book Structure

This book is based on evidence collected during the 2015–2017 study period in each participating country/territory and analysed through a systematic (i.e. carried out in a step-by-step procedure) multi-level approach. Results presented in this book reflect differences and similarities across countries and identify enablers that can support a transition to greener economies. Initial analysis conducted by experts is presented

in Part II. Subsequent analysis by EduHK and UIL and results of focus group discussions that assisted in the development of a comprehensive holistic framework are presented in Part III. The book opens with debates on contemporary issues in the greening of skills and their inclusion in RVA frameworks.

Throughout, the aim is to develop an understanding of how to approach the greening of skills through RVA in order to support the greening of MSMEs operating in formal and informal economic sectors. The analytical model developed as a result of policy analysis, data collected from MSMEs, and focus group discussions underpins the approach presented in Part III and is designed to ensure that the greening of skills and RVA mechanisms can work together to stimulate green economic transitions. This book provides evidence and cogent arguments for policy-makers and draws clear conclusions with respect to the factors for, and effects of, recognising green skills in non-formal settings. Heretofore, there is much talk about the potential role of green skills and RVA, but very few tangible results.

Mechanisms for the recognition of prior learning (RPL)—or RVA as it is referred to by UNESCO—can be an important means for individuals to realise their labour-market suitability or employability in the area of green skills. For people already employed, RVA can help to further their green skills. RVA can also help to identify the overall stock of green skills and qualifications in an organisation, thus, making it easier for employers to invest in green skills training for their employees. More flexible and customised training courses can be offered by enterprises and NGOs by using RVA to gauge the existing skill levels of individuals. The training becomes more profitable to invest in for the organisation when it is expressed in terms of industry sector standards, which employers and employees regard as relevant in the changing world of work.

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Chapter 2
Overview of the Regional Practices and Challenges on Environmental Protection in Four Industries

Margarita Pavlova

The greening of all industries in order to help reduce their ecological footprint is an important factor in transitioning to an environmentally sustainable world and meeting many SDG targets. Governments in the Asia and the Pacific region (APR) have recognised these challenges and have taken a range of measures (including the introduction of laws and regulations) to work towards green economic restructuring.

This chapter provides an overview of the environmental challenges relevant to the four industry sectors examined in this book (automotive, PVC production, catering and waste management). It also illustrates governments' efforts to address these issues in an attempt to green economic restructuring in APR. In particular, policies and legislation, green restructuring initiatives and the introduction of new workplace practices will be examined in the context of the above industries, based on the analysis of secondary sources and some results of the case studies. This green restructuring is having a significant impact on the dynamics of, and requirements for, skills that should be addressed by TVET and work-placed learning, and also included in RVA. Initiatives undertaken by the governments in the region are important indicators that can enable to formulate TVET policies and to navigate the demands and dynamics of necessary skills.

2.1 The Automotive Industry

The automotive industry is one of the biggest industries in the Asia and the Pacific region. Being a global production hub and having a strong purchasing market, it is predicted to continue to flourish between 2017 and 2021 (PR Newswire 2017).

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In 2017, more than 44 million vehicles were manufactured within the APR, with the People's Republic of China (PRC) being the largest vehicle producer, followed by Japan and the Republic of Korea (Statista 2017). Since 2009, PRC has been the world's largest automotive manufacturing country as well as being the largest automotive market. In 2016, annual vehicle production in PRC accounted for nearly 30% of worldwide vehicle production; the country's output exceeded production in the European Union, United States and Japan combined. In addition, in India, it is predicted that light vehicle and passenger car sales will continue to grow rapidly.

Southeast Asia is also becoming an important player in automotive manufacturing, yet the development of the industry differs greatly among Southeast Asian countries. The main driver behind these developments is cheap labour. Thailand is the most developed country among the Association of Southeast Asian Nations (ASEAN) in terms of automobile manufacturing (PR Newswire 2017; ASEAN UP 2018). This is because the world's leading automobile manufacturers, such as Ford, Honda, Toyota and BMW have located production lines in Thailand. Thai production volume peaked at 2 million in 2016 and the export volume of automobiles from Thailand reached over 1 million (PR Newswire 2017). Other ASEAN countries such as the Philippines, Malaysia, Vietnam and Indonesia also have a significant number of vehicle manufacturers.

The steady growth of the automotive industry in Asia and the APR has led to serious environmental concerns. Promotion of good practices in the APR started in the 1990s when, in 1994, the Asia–Pacific Economic Cooperation (APEC) set up the APEC Automotive Dialogue (AD) with an aim to endorse best practices in the automotive sector within the region, to promote the efficient use of resources, and to improve the recovery and recycling ratios of end-of-life vehicles. In 2014, the 20th APEC AD was held in Beijing and endorsed the Asia–Pacific Region Automotive Industry Sustainable Development Declaration submitted by PRC. Over 140 automotive industrial representatives from APEC member countries and territories attended the meeting. Specific measures in addressing the challenges of environmental pollution, energy security, and promoting eco-cars were discussed. The declaration also highlights the commitment of the APEC member countries and territories to foster the development of a circular economy and reduce the negative impact of the automotive industry on the environment.

In addition to collective efforts, individual governments have been taking measures to support the greening of the sector. These measures include

- Support of public transport.
- Promotion and production of eco-cars.
- Tax incentives to producers.
- Boosting consumer demand through tax and other incentives such as free driving permits and lower parking fees for eco-cars.
- Raising awareness through eco-stickers (to inform about emission standards and CO_2 rating).
- Introduction of strict emission standards and fuel efficiency standards for cars (e.g. in Japan, Sri Lanka).

Thailand and Indonesia are the leaders driving eco-car production. Both governments have launched schemes (namely the Eco-Car Program in Thailand and Low Cost Green Cars scheme in Indonesia) that offer incentives for the production of eco-cars that meet emission and local standards requirements. Promotion was done to advertise the benefits and merits of owning eco-cars in terms of low cost, fuel efficiency and environmental friendliness (Wijeratne and Lau 2015). In addition, Thailand has introduced a tax rebate for electric vehicles that are assembled domestically as well as for batteries and components made in the country. The policy aims to attract car manufacturers to set up production lines in Thailand and to boost consumer demand.

The benefit of this tax scheme is threefold:

- It lowers retail prices of "greener" vehicles, making them more attractive to customers.
- The binding condition for the excise tax is to fulfil domestic production requirements, and as a result, it can help sustain the position of Thailand as the region's environmentally friendly automotive production country.
- Automotive policy closely aligns with the government's environment protection policy (Tunmuntong 2017). The government also requires all manufacturers and importers of light-duty vehicles to display an eco-sticker to inform buyers on the emissions, safety and fuel economy rating of new cars.

Japan introduced an Automobile NOx–PM Act, which focuses on the reduction in the total amount of nitrogen oxides and particles from cars in specific regions and sets up vehicle emission standards. This has ruled out the oldest, most polluting vehicles from in-use fleets. In 2003, the Tokyo Retrofit Program came into effect, retrofitting older in-use diesel vehicles with PM control devices (catalytic converters or particulate filters), or replacing them with newer, cleaner models. Compliance stickers were created for trucks, buses and other vehicles that meet emissions regulations of the Automobile NOx/PM Act to raise public awareness and to promote the use of such compliant vehicles (Japan Automobile Manufacturers Association 2015). Since 2007, the Ministry of the Economy, Trade and Industry (METI) of Japan began to encourage the adoption of eco-cars through tax breaks on fuel-efficient cars. Currently, 90% of new cars sold in Japan qualify for "eco-car tax incentives". In 2016, the Japanese Government announced plans to tighten the tax breaks for fuel-efficient vehicles. Beginning in May 2017, the tax incentive was only applicable to vehicles that exceeded the fuel efficiency standards by 10% or more, i.e. an average of 17 km per litre (Denton 2016). In addition, an Act on the Quality Control of Gasoline and Other Fuels is also in place.

In PRC, the government spent more than RMB 4.5 billion or USD 0.7 billion in 2016 to encourage the industry to become a leader in the development of electric vehicle technology and to investigate new measures to combat heavy pollution. In addition, Beijing has set a target of 5 million new-energy vehicles on the road by 2020 and will spend billions subsidising the purchase of electric, hybrid and fuel-cell cars. Other inducements, such as free driving permits (a permit for a private car costs about RMB 900,000 or USD 138,600 in Shanghai), lower parking fees and

consumption tax exemptions have been offered (South China Morning Post 2016). In addition, PRC set new fuel consumption limits in 2018 to improve the energy efficiency of new vehicles as it aims to cut fuel consumption in light commercial vehicles by 20% from 2012 levels by 2020.

These and other initiatives highlight the importance that governments in the region attach to the reduction of pollution and to increase energy efficiency. The issues discussed above are echoed by the case studies presented in Part II. The increase in vehicle emission pollution is a shared problem across PRC, Hong Kong SAR, PRC, Malaysia, Kazakhstan, the Philippines and Nepal. Increased demand for fuel supply has been witnessed in PRC, Hong Kong SAR, PRC, Kazakhstan and the Philippines, while urban congestion is also reported in Malaysia, Hong Kong SAR, PRC, and Kazakhstan. Poor public transportation is an issue for Malaysia, PRC and Kazakhstan. Among the issues specific to these places are rule-breaking operations by some car-washing companies in PRC; the increased impact of waste for end-of-life vehicles in Malaysia; poor practices in car servicing and reconditioning of old cars in Bangladesh; absence of standards for vehicle registration (so many are not equipped with exhaust gas filters); low quality of fuel; and bad practices in maintenance workshops in Kazakhstan. These were all reported by this study.

2.2 PVC Production

Polyvinyl chloride (PVC) is one of the five general plastics widely used in industry, agriculture, national defence, chemical building materials and other areas. The APR has 56% of PVC global market share, making it the largest market. The People's Republic of China is the world's top PVC manufacturer and consumer (Henry n.d.). India is also in the business of PVC production. The manufacturing standards in India, mainly involving PVC pipe manufacturing, do not take into account the risk of lead poisoning for workers. Lead has been used as a cost-effective stabiliser for PVC, so PVC products can have a long service life. Thus, when lead powder is mixed into the product it can be easily inhaled. In addition, this process requires a longer fabrication time that in turn leads to additional energy use. Usually, it is up to the company/brand or business to uphold its own corporate social responsibility (CSR) practices and take care of its workers to prevent occupational risks at the facility. However, the majority of manufacturers do not follow adequate safety procedure due to the costs involved. Workers in the unorganised sector are regularly exposed to lead-based chemicals, which may cause lead poisoning (Multani 2010).

Thus, due to its toxicity and the damage it caused to the environment (Greenpeace 2003), as well as the high energy consumption required during production processes, more and more governments and corporations globally and in the region have started to phase out the manufacture and use of PVC products. The Republic of Korea banned PVC from food wrapping and other PVC-coated wrapping materials. In Japan, the incineration of PVC, that caused concern on dioxin release, led the Japanese Government to enact a new container- and wrapping-materials law in 2000.

The law prompted several major Japanese makers of household goods and cosmetics, including the Shiseido Kao Corporation and Lion Corporation, to announce timelines for when they would switch from PVC-based wrapping to eco-based wrapping and containers (ibid.). PRC has introduced a reduction in export subsidies for PVC products (Henry n.d.).

In terms of environmental challenges for the PVC industry reported by the study, PRC, Malaysia and the Philippines stated that the biggest environmental challenge is the ways companies are dealing with the waste resulting from production of PVC (as PVC is a non-degradable material) and dealing with PVC waste at the end of PVC products' life (as the incineration of PVC generates a dioxin that is detrimental to human and animal health). In addition, Malaysia and Nepal report another challenge related to the cost of introducing new high-technology systems that could decrease environmental risks. Enterprises in Nepal pay little attention to collecting and analysing data relating to environmental risks. PVC industry in the Philippines is expanding, thus its environmental impact should be closely monitored by government agencies.

2.3 Catering

Many countries in the region have standards with respect to regulations in the catering industry, particularly food safety, hygiene standards, building designs, control of pollution in catering services and licensing of services. Operators in PRC, for example, need to apply for a 'catering service permit'; before they apply, they are expected to meet relevant law and regulation guidelines. Every province has different administrative regulations; for example, in Guangdong, operators need to follow up to 15 laws and regulations including:

- Food Safety Law of the People's Republic of China
- Specifications for Examining Catering Service Permits
- Code of Design for Buildings in the Catering Industry (JGJ64-89)
- Circular on Further Strengthening the Work on Prevention and Control of Pollution in the Catering Service Industry (Sui Fu 2008, No. 46) (Chu 2013).

In addition to the above, all operators and food outlets need to follow requirements on fire safety, environmental protection and hygiene. Environmental laws they need to follow include the Environmental Protection Law of the People's Republic of China and the Law of the People's Republic of China on Prevention and Control of Water Pollution (Chu 2013).

Food waste is one of the main issues for the catering industry in terms of environmental impact, as if it is not sorted and recycled it creates significant pressure on municipal waste treatment. Compared to many European countries where, for example, diners who intentionally waste food by overloading their plates at buffets are charged a fine (e.g. Germany and Switzerland), designated grocery stores donate unwanted but edible food to food banks and charities (a law in France), or catering

operators use leftover food waste to generate energy (a sector-wide voluntary agreement in UK) (Smithers 2012), countries in the APR, in general, do not have strong mechanisms in place to fight food waste. Nevertheless, there are a number of important initiatives in place by some governments.

All shopping malls and hotels in Singapore are mandated to report their food waste. The government expanded this initiative to cover more caterers, so that eventually all hotels, food industries and food and beverage retail outlets, including food courts, will be expected to curtail food waste. Eligible companies that fail to report food waste data to the government, as required under the Environmental Public Health Act, will be fined up to $5,000 (Sim 2014). In Singapore, the government will also partner with retail food establishments to minimise food waste by providing incentives for them to install waste-recycling infrastructure or waste-sorting equipment, as well as assisting food outlets to optimise operations or systems to reduce waste or increase recycling. The government National Environmental Agency Fund is a fund provided to the industry to start recycling projects and to help to cut down waste at food outlets (NEA 2016).

Japan introduced a Food Recycling Law in 2001 (revised in 2007) that aims to reduce the amount of food waste and promote its recycling into feed and fertiliser. The recycling volume targets vary between food retailers, manufacturers, wholesalers and catering services and restaurants; for the last two, it is equal to 40% (Kobayashi n.d.). Food businesses that produced 100 tons of waste or more in the last fiscal year must report each year on the quantity of food waste produced and the status of their recycling activities.

In India, where one-sixth of the population (190 million people) lives without certainty of food every day, food waste is a problem. Annual food wastage is as much as 67 million tonnes (Vijayakumar 2017). In attempt to reduce food waste in the catering industry, the Ministry of Consumer Affairs, Food and Public Distribution of India proposed to legally fix portion sizes in restaurants and star hotels (ibid.). Questionnaires were prepared to distribute to the industry to collate data on people's thoughts on the appropriateness of this measure.

Consumer food wastage in PRC is expected to continue increasing in the coming years, due to growing affluence, escalating urbanisation, and food waste in the catering and restaurant sector. Although national policies and regulations relevant to food loss and food waste exist, they focus on 'postharvest losses (especially at storage)' (Liu 2013); none are concentrated on consumer food waste. Food waste management systems are the responsibility of local governments and municipalities. Both the National Development and Reform Commission (NDRC) and the Ministry of Agriculture in PRC are responsible for food waste policy-making, but they work independently. The government is trying to take a lead role by combatting governmental food waste: under its 'eight-point rules', government banquets were cut in amount and size to help reduce food waste (ibid.).

For the catering industry, three environmental challenges have been reported by the study that are common across the seven countries and one territory that comprise it. First, while PRC, Hong Kong SAR, PRC, Malaysia and Nepal acknowledged the harmfulness of random dumping of food waste, they find it hard to tackle the cause

of the problem. Many factors, such as an increase in population, the development of tourism, established habits and other contributing factors, have an influence on the issue. Another environmental challenge for the catering industry is food safety, as reported by Malaysia and PRC. The third challenge is faced by Bangladesh and Kazakhstan: there, most catering companies are small outlets with employees who have inadequate environmental competence and so are unaware of safe environmental operation practices.

2.4 Waste Management

Many countries in the region have a significant mismatch between their waste generation and their capacity for waste treatment, as well as inadequate waste-management systems and problematic consumption and disposal patterns. Waste-management systems in many countries in the region are weak (Park 2015). For example, India generated around 62 million tons of waste per year; however, according to official statistics, only about 75–80% of the municipal waste is collected, and only around 22–28% of this waste is processed and treated (Press Information Bureau Government of India 2016). The top countries for mismanaged plastic waste in the region are PRC (8.82 million tons per year), followed by Indonesia (3.22 million tons per year), the Philippines (1.88 million tons per year) and Viet Nam (1.83 million tons per year) (Park 2015). Eight out of ten major polluting countries that disposed plastic waste into the ocean are in the APR region. The majority of these are middle-income countries located in Southeast Asia, which is experiencing a rapid growth in the economy (ibid.).

Issues related to waste management have been recognised by governments in the region, as evidenced in their promotion of reducing the generation of waste, encouraging waste utilisation and recycling, supporting waste-to-energy conversion and reducing greenhouse gas emissions. To facilitate these processes, countries adopt different measures, including laws and regulations.

In 2016, for example, the Government of India reviewed rules that had governed solid waste management in the country for the past 16 years. It is a comprehensive policy for the collection, handling and managing of waste including municipal solid waste, e-waste (computers, mobile phones or other electronic/electrical gadgets), plastic waste and medical waste, and the rules are specific to waste generators (both domestic and commercial), manufacturers, producers, consumers, collection centres, dealers, dismantlers and recyclers. Measures include the introduction of a ‘user fee’—a fee to be paid to waste collectors—and a ‘spot fine’ for littering and non-segregation (Press Information Bureau Government of India 2016), encouraging partnerships in waste management whereby institutional generators, market associations, event organisers and the hotel and catering industry are required to segregate waste and manage it, in partnership with local bodies. Producers take responsibility for e-waste management and are required to contribute to a “deposit–refund scheme”, where a portion of the sale price is retained by the producer and is refundable to the consumer

once "end of life products" are channelled in the prescribed manner (TNN 2015). In terms of waste-processing facilities, the Indian Government aims to have them in cities with populations of 1 million or above. The government has established a Central Monitoring Committee that includes different stakeholders who monitor the implementation of these rules.

Other governments in the region are taking similar actions and are focusing on integrated waste-management approaches. In Thailand, the government has prioritised integrated waste management and plans to introduce a cluster approach for establishing joint waste-treatment facilities with local authorities. It is also looking at the feasibility of introducing a law on waste separation at source. The government is also proposing a draft law on Fiscal Measures for Environmental Management. The new draft act aims to combine all the economic instruments, including pollution tax, emission charges, product fees and insurance bonds, under one law to allow the inclusion of a certain fee in the cost of a product for the management of its end-of-life phase. In addition, the government is considering establishing a new fund to support the buy-back, collection, transportation, recycling and disposal of waste electrical and electronic equipment (WEEE). Another measure considered by the government is the introduction of a law that requires private-sector producers to manage their own collection and recycling systems and to meet national recycling targets (Taweechai 2013).

The Chinese Government is focusing on the integrated utilisation of waste. It refers to 'utilization of intergrown and associated ores in the mining process; solid waste, wastewater, waste gases, residual heat and residual pressure generated in production processes; as well as the recovery, utilization and renewal of various kinds of waste resources generated in the production and consumption procession' (HKTDC 2017). One of the priority tasks in waste management is to accelerate the development of the recovery and treatment of waste electronic products such as televisions, refrigerators, washing machines, air conditioners and computers, printers, mobile phones and telephones. In addition, waste management is directly related to pollution prevention. At the national level, the Law on Prevention and Control of Environmental Pollution Caused by Solid Waste (2004) regulates the prevention and treatment of solid waste. Another law on Prevention and Control of Solid Waste Pollution explicitly describes basic requirements for dumping, cleaning up, collection, transportation, recycling, treatment and disposal (GlobalRec 2005). As legal frameworks, such measures for the reduction of waste at source; recovery, recycle and reuse; separation at source; collaboration between the private sector and government; the introduction of industrial standards and regulations; and the control and monitoring of all wastes and toxic and hazardous substances have contributed to better environmental protection in the region. However, waste-management challenges are still among the major concerns.

In this study, several common issues faced by the waste-management industries of the countries and territory featured in the study were identified. First, Hong Kong SAR, PRC, Malaysia, Bangladesh, Kazakhstan and Nepal reported low recycling rates, particularly for municipal solid waste. Second, waste-collection, separation and disposal systems in Kazakhstan, the Philippines and Nepal are undeveloped. Among specific challenges, respondents reported the lack of sufficient manpower, resources

and time for hazardous waste disposal in PRC. High generation and disposal rates in Hong Kong SAR, PRC, are considered the most critical areas to be addressed within the waste management industry. The urgency is related to high population density and limited space for landfill sites. Bangladesh also faces an increase in population density, and its poor waste management has resulted in bad odours along roadsides, blockages in the drainage system, the spread of disease, fire hazards and physical injuries to workers. All waste collection and sorting has been done manually. Respondents from both the Philippines and Kazakhstan reported a lack of authority at the level of local administration, a lack of strict public compliance and weak enforcement powers for the management of waste and environmental protection at the local level. In Nepal and the Philippines, polluted water/ liquid waste discharge into rivers, lakes and seas and the illegal dumping of toxic and hazardous e-waste, chemical products and toxic substances are often seen. An increased volume of household, commercial, institutional and industrial waste in the Philippines creates significant challenges to the industry.

In summary, although environmental challenges might differ from industry to industry and from place to place, common trends have been identified by the study. Across four industries, common environmental issues associated with greening are related to the need to

- reduce greenhouse gas emissions, move towards waste reduction, recycling and recovery;
- focus on introducing green technologies and products and eco-innovation;
- improve energy-efficiency;
- reuse materials and minimise raw material extraction and consumption.

Case studies presented in Part II confirm that negative consequences of changes in the natural environment on health and other social implications boost governments' responses and have been reflected in a number of programmes and initiatives, including laws and regulations, awareness campaigns and incentives. Some examples include

- In PRC, the government has increased penalties for environmental damage by taking any behaviour that causes serious environmental damage into the scope of criminal law. It has also built a legal system for the protection of the ecological environment and the recycling and reutilisation of resources.
- The Government of Kazakhstan signed 19 international conventions and developed national action plans to improve legislation and implement international standards in environmental expertise, the issuing of permits, controls and inspections.
- Malaysia has introduced local taxes on fuel and has aligned this with policies to promote public transport with incentives and to discourage the use of private transport in congested areas.
- The Hong Kong SAR Government, PRC, also uses financial incentives to encourage the private sector to add value to environmentally friendly practices.

Laws and regulations specific to four industries have been enacted by the governments of the studied countries and territory to mitigate environmental impacts and to promote sustainable development. The Government of the Philippines, for example, has formulated a legal framework—Republic Act no. 9003 (Ecological Solid Waste Management Act of 2000)—to institute national programmes that will manage the control, transfer, transport, processing and disposal of solid waste in the country.

The Malaysian Government formulated specific policies and guidelines on food premises, food handling and catering operations to improve food safety. It developed a Management System Certification on food and consumer products manufacturing (SIRIM QAS International) that is based on ISOs on quality management, food safety, environmental management, supply chain security management systems and others. More than that, the Chinese and Malaysian governments have made resource saving and utilisation a compulsory target in their national development plans.

In addition to environmental legislation, governments have launched different programmes and initiatives to address environmental issues. In Kazakhstan, an initiative named "Green Bridge" was introduced as a tool for the country's sustainable development and transition to a green economy. Malaysia launched the "Product Certification Program" to educate consumers on eco-brand, eco-label and environmental products and to introduce the concept of green purchasing to local manufacturing industries, especially SMEs. Hong Kong SAR, PRC, established its Carbon-Smart Programme, which aims to encourage local enterprises to reduce carbon emissions and provides suggestions for environmentally friendly practices.

Many initiatives have been specific to particular industries; for example, for the automotive industry, Hong Kong SAR, PRC, is developing new technologies for manufacturing different automotive parts (for example, the use of nano-technology on coating which is more environmentally friendly). Some companies in the automotive sector in Malaysia practice the reuse, remanufacture and recycling of automotive components. The Philippines is ticketing violators who drive smoke-belching vehicles that fail emissions testing.

Despite the existing initiatives, regional progress towards achieving the SDGs is not on target and more measures are required to support MSMEs (which constitute a majority of enterprises in the region) in greening their practices (see discussion in the previous chapter).

2.5 Green Skills Development in Support of Green Economic Restructuring

Policies and initiatives to stimulate greening of industries are not necessarily directly supported by skills development policies and practices to ensure implementation of these changes. However, a number of approaches that were established to develop green skills in the APR were identified through analysis of cases presented in Part II.

Enacting specific policy

Malaysia and the Philippines are encouraging green skills through their enactment of specific policy. The Malaysian Government introduced green skills through various policies, acts, legislations and rules for specific industry sectors. A major policy that directly deals with green skills is the National Green Technology Policy (NGTP). According to this study's findings, green skills have been practiced in almost all industry sectors (formal and non-formal) but not in the catering industry, due to numerous barriers encountered. In the Philippines, green skills are implemented through the Philippine Green Jobs Act of 2016, the country's legal directive for promoting green economies amongst enterprises. This law reinforces the Philippines' commitment to the Paris Agreement on working closely with the United Nations and other countries to combat global warming, and it provides incentives to enterprises that practice environmental sustainability at the workplace.

Establishing an implemented organisation

India addressed green skills development through its Skill Council for Green Jobs, which mandates to address skills recognition in the following sectors: renewable energy, green transportation, green construction and waste management (solid, water and e-waste co-generation). Similarly, Nepal allocated responsibilities for promoting green skills to the Council for Technical Education and Vocational Training (CTEVT), a top organisation in the TVET sector. The council houses the liaison office of regional organisation: Colombo Plan Staff Colleges and is also a member of the UNEVOC Network coordinated by the UNESCO-UNEVOC International Centre for TVET. The major task of these two organizations is to promote capacity-building and knowledge management and research activities that are associated with greening the TVET agenda. The Green Technology Center in the Philippines has been established to promote models and standards for quality green TVET, and deliver green skills training courses.

Designing new green jobs or occupations

Green skills development required for newly created green jobs are specific to different contexts. In Bangladesh, the lack of available alternative sources of energy, together with a vulnerable situation with energy supply, has created a huge demand for solar energy in the country. Therefore, new green jobs related to this new industry include carbon trading specialists, solar energy engineers and technicians, mechanical engineers and compressed natural gas (CNG) conversion technicians. These new green occupations are expected to increase substantially.

In PRC, green jobs are mainly found in beautifying the ecological environment, producing new energies such as solar, wind and biomass energy, improving the efficiency of transport capacity, and the recycling and use of waste. In Nepal, the National Occupation Skill Standards include newly developed green jobs such as solar PV technician, micro-hydro operator, biogas technician, food preserver by drying (solar), block mason, and solar electric technician (repair and maintenance). The Philippines' economic development and climate change concerns have led to

the selection of the following sectors and industries for the establishment of green jobs: agriculture; fisheries; forestry; energy; construction; transport and automotive; manufacturing (including PVC production); services (i.e. catering); tourism; solid waste and waste-water management.

In summary, the demand for alternative energy (e.g. solar) combined with the lack of available sources and environmental challenges has led to the creation of new green jobs that require specific green skills.

Greening existing jobs or occupations/Introduction of environmental competencies in TVET standards

The inclusion of new types of skills/competencies into existing occupations has been achieved in Nepal for such specialisations as auto mechanics, solar energy, hospitality management and agroforestry. Drip irrigation and improved irrigation canals, environmentally friendly green roads, improved stoves, biogas, community forestry and farmer's user groups are examples of changing practices that required adjustments to existing occupations as well as to training delivered by TVET.

In Bangladesh, existing jobs that required greening included machine operators in tannery, brickfield managers, and architects, civil engineers, designers and masons in green building. For example, a brick-firing technology that has been widely used is the largest stationary source of greenhouse gas emission in Bangladesh. The Environmental Conservation Act aims to eliminate the use of wood, and so chimney kiln operators will have to adapt to a new greener technology.

Fifty-five TESDA qualifications (out of the 258) included environment-related knowledge, skills and attitudes in the Training Regulations (TR) and curriculum in the Philippines. For example, for automotive servicing, the set of competencies on liquefied petroleum gas conversion and repowering were included to promote cleaner emissions of vehicles. For ships' catering, TR includes precautions to prevent the pollution of the marine environment by implementing appropriate waste management and disposal systems. The three Rs (reduce, reuse, recycle) are included in the required knowledge and skills in TR for the catering services, automotive and PVC manufacturing, and waste management training.

The main factors that raised the demand for greening existing jobs may be due to the adoption of green technology and changes in the traditional industrial processes/practices and enterprises operations. Given that many of the skills, attitudes and values required for sustainable work are not acquired in formal settings in schools or colleges, but rather through informal and non-formal means—on-the-job, in the workplace and through practice-based learning—the role of each industry in green skills development is vital. The case studies presented in Part II provide details on the type of green skills employees use, and highlight the importance of the particular skills in the context of greening. In the Philippines country study, for example, 12 out of 16 employers mentioned the importance of intra-personal skills such as adaptability and transferable skills, and 4 out of 16 employers mentioned entrepreneurial skills. With respect to inter-personal skills, 10 (31.25%) out of 32 respondents mentioned that the enterprise promoted strategic leadership skills and communication/negotiation skills among staff; 7 (21.87%) out of 32 said that staff

possessed coordination, management and business skills; four had marketing skills; and only one respondent said that networking, IT and language skills were important in the work of the enterprise. The participating enterprises further described important green skills required for daily operations performed by employees. A large proportion (67.74% or 21 out of 31) of employers said that they put great emphasis on cognitive skills and cited appreciation of environmental awareness and a willingness to learn. Eight employers undertook system and risk analyses in relation to environmental impact, while two employers introduced new technologies in their enterprises. Government actions as well as learning at the workplace are therefore both important factors in green skills development.

2.6 Conclusion

This chapter examined environmental challenges faced by four industries in Asia and the Pacific region (automotive, PVC, catering and waste management). It highlighted the important role that governments play in regulating these industries in order to minimise their impact on the environment. In addition to policies and regulations, governments provided different incentives (e.g. tax incentives for eco-car producers, monetary incentives such as free driving permits and lower parking fees to eco-car consumers) or restrictions (e.g. reduction in export subsidies for PVC products and fines for excessive food-waste production); organised awareness campaigns (e.g. eco-stickers for cars; use of government as a model for the "right behaviour"); and used comprehensive systematic approaches for dealing with environmental issues (e.g. integrated waste management in Thailand, India and PRC). These developments at the macro level stimulate enterprises to reduce the environmental impact of their operations. To add another dimension to the discussion, this chapter also highlighted some findings from the study that reveal some common issues across the four industries, and some specific measures enacted by governments. The changes introduced by governments have had an impact on operational practices across different industry sectors and, thus, an influence on skills requirements.

Given that MSMEs are among the main environmental polluters in Asia, there is the need for motivating enterprises to include green practices and promote green skills development. Enterprises' development of environmental friendly behaviour and skills in support of greening operations is an essential part of actions required to support green restructuring. This chapter includes one example from the case studies that highlights the importance of particular skills for greening MSMEs. More details about this may be found in Part II.

This chapter seeks to categorise government initiatives related to green skills development and identified four common approaches that governments introduced. It also highlights the need to improve the greening of skills through workplace learning at micro, small and medium enterprises (MSMEs). Teaching employees

green behaviours and developing skills required for greener practices are particularly important in the framework of lifelong learning when eco-technologies and eco-innovation have been introduced into enterprises on a regular basis.

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Chapter 3
RVA in Asia and the Pacific Region

Madhu Singh

The development of procedures for the recognition, validation and accreditation (RVA) of skills, learning and work experience obtained in non-formal and informal settings is a priority of UNESCO, central to lifelong and life-wide learning. The aim is to make visible and give value to the hidden and unrecognised competences that individuals have attained in various settings, strengthen lifelong learning pathways and increase labour market inclusion.

RVA procedures have been introduced in several countries. The introduction of these procedures has been documented and shared widely through the UIL Global RVA Observatory and the Global Inventory of Regional and National Qualifications Frameworks 2017 (Cedefop, ETF, UNESCO, and UIL 2017). At the regional level, particularly in the European context, country examples on validation of non-formal and informal learning are reported in the European Inventory of the Validation of Non-formal and Informal Learning (European Commission 2017) and updated every 2 years.

UNESCO regards these developments across the world to be a consequence of the increasing importance given to lifelong learning, implying extended and prolonged opportunities for knowledge and skills development throughout the life of individuals. From a political perspective, RVA is becoming increasingly important because of the growing significance of skills development policies and national qualification frameworks that can be regarded as the first step towards more prominently recognising non-formal and informal learning. This perspective underpins the idea that qualifications should reflect learning outcomes and competences instead of educational programmes. From a research perspective, the use of RVA mechanisms is

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raising new questions regarding the different aspects of workplace learning, employability, concepts of skills and competences, as well as the potential to include the recognition of green skills in RVA mechanisms and workplace learning.

3.1 Skills Recognition Through Non-formal and Informal Learning

Recognition of non-formal and informal learning is a core component of the concept of lifelong learning, which has influenced international as well as national policies over the past decades, significantly changing the ways in which learning and its key elements and processes are to be understood. The lifelong learning system can be defined as a threefold structure:

- Formal learning takes place in an organised and structured educational environment, usually leading to a certificate or a diploma.
- Non-formal learning refers to a semi-structured training without a resulting in a formal qualification certification.
- Informal learning is the acquisition of practical competences, expertise, work practice and attitudes to perform which leads to no qualification, degree or certification.

Rogers (2015) refers to multiple ways of informal learning. These can be self-directed learning, incidental learning and unintentional learning. Incidental learning takes place alongside a task. The workers concentrate upon completing the tasks, but they are not typically aware of the task-related learning. Unintentional learning is that which takes place through everyday experience. Through RVA processes, non-formal and informal learning can lead to qualifications, given that a certain common definition of a set of skills, knowledge and competences serves as a reference for all learning.

3.1.1 The Need for Systematic Recognition Procedures in MSMEs

Considerable importance has been placed on informal learning in small, medium and micro enterprises (Dohmen 1998; Marsick and Watkins 2001). Studies on MSMEs in Europe (Weiß 2001) highlight that between 70 and 90% of a person's vocational knowledge and skills are acquired informally, outside formal learning arrangements. This happens while performing vocational tasks and solving problems, usually without an explicit intention to learn. Informal means of learning such as "learning from others" and "learning on the job" play an outstanding role particularly in small and medium enterprises. Development and recognition of skills should therefore not

be defined solely by analysing opportunities for learning or by assessing the skills that individuals acquire. Rather, it is necessary to consider occupation-specific contexts as well as the technical and organisational framework for learning (Singh 2000; see also Pilz et al. 2015; King and Palmer 2010).

However, in developing countries and emerging economies, studies (King 2011; Mehrotra 2016; NCEUS 2009; Singh 2005) have shown that although most skills in MSMEs are acquired through non-formal and informal learning on the job, there is currently no systematic recognition or documentation of informally acquired competences. MSMEs, especially in developing countries, are poorly informed about the benefits of, or the need for, recognising competences acquired by employees in a non-formal and informal way. The lack of financial resources often proves to be an obstacle in adopting lengthy procedures of RVA. Singh (2011) argued that more discussion is necessary on the question of how recognition and certification of skills in MSMEs can help workers to move into further learning and enhance their employability and mobility. The lack of arrangements for competence recognition makes workers less likely to secure decent employment. Thus, there is an urgent need for a bottom-up approach to skills recognition within MSMEs that goes beyond just restructuring existing vocational training systems.

Employees' informal competences have been shown to form an important part of an enterprise's capital (Ellström 1997). Enterprises depend on the unintentionally acquired competences of their members. Research conducted at the Technical University of Berlin on skills acquisition in the informal sectors of India, Peru, Rwanda, Chile and the Philippines (Institute for Scientific Co-operation 1997) have shown that the competences developed in informal sector enterprises were very different from those that were promoted and developed through traditional training courses, where the process of training rather than competences acquired was the focal point. Individuals working in the informal sector were predominantly dependent upon themselves for the development of their employment-related skills. MSMEs were found to put greater emphasis on the general competences versus instrumental skills such as technical, managerial and market-related competences.

General competences were perceived by enterprise members to be divided into two fields: personality-related competences (intra-personal) and social and organisational competences (inter-personal) (Institute for Scientific Co-operation 1997). Person-related general competences comprised curiosity and creativity, self-initiative and independence, learning to learn, sense of responsibility, frustration tolerance and ability to improvise. Social–organisational competences included abilities to communicate and empathise, cooperate, analyse and plan.

The Observatory of European SMEs (European Commission 2002) highlights the increasing importance of fostering key competences in small and medium enterprises (SMEs). These competences include learning to learn; information processing; deduction and analytical skills; decision-making, communication and language skills; the ability to work in a team; team-based learning and teaching; management and leadership; strategic thinking; self-management and self-development; and flexibility, creativity and problem solving (ibid.).

The notions of key competences or general competences correspond to the notion of green skills adopted in this study. As argued above, "green skills" or "green competencies" include generic green technical skills as well as cognitive, inter-personal and intra-personal skills within the environmental protection context. The idea of "competences" as a collection of abilities and skills in contrast to qualifications as a proof of vocational capabilities is important for the discussion on green skills recognition. According to Ellström (1997), competence refers to the actual capacities of an individual or working team, whereas qualification (such as a degree or diploma) denotes the knowledge, skills and competences that are officially required. Competences frequently comprise special knowledge that is acquired while working in specialised sectors serving niche markets. This knowledge is difficult to replace and, as remarked, forms a large part of an enterprise's capital (ibid.). Numerous studies both in the European as well as developing countries context show that enterprises place a higher value on employee competences such as communication, problem solving and flexibility, and abilities related to learning methodologies than they do on formal qualifications (European Commission 2002).

3.1.2 Lack of Recognition and Visibility of Skills in Enterprises: A Barrier to Transitioning into the Green Economy

To understand the importance of making individual skills in enterprises visible, Ellström (1997) makes a distinction between competence, understood as the property of an individual (or working team), and the demands or requirements posed by enterprises or work tasks. According to Ellström, the ability to use the entire spectrum of an individual's or a working team's competences will provide meaningful information on what job applicants and employees can do and what competencies are in need. The lack of transparency for competency at work is a problem for employees. While qualifications are becoming outdated increasingly rapidly, new knowledge and competences, such as those required for the green economy and production, are not documented anywhere. This is an obstacle to employability and thus the mobility of the worker. It is therefore crucial to make the outcomes of occupational learning visible through mechanisms for the recognition, validation and accreditation of non-formal and informal learning (ibid.).

The outcomes of this study are intended to fill these gaps. We believe issues of transparency and visibility of competences, skills and knowledge in general and emergent green skills in particular are not only crucial to the development of human capital of enterprises but also for their contribution to a greener environment, society and economy.

3.2 The Integrative Purposes of RVA: Education and the Labour Market

The following sections provide examples from the seven countries and one territory participating in the study as well as from countries outside the study that highlight RVA's inclusive nature. RVA serves several purposes: it promotes access to education, training and qualifications; workforce development; and participation in the labour market. It also contributes to social inclusion and democratic citizenship, as well as to the personal and professional development of individuals. While countries and territories tend to singularly concentrate on one or another purpose depending upon their specific contexts and circumstances, it is important to keep in mind the entire range of social, economic, cultural and personal purposes—particularly those relating to social inclusion, equity and personal self-esteem and self-awareness—as expressed in the integrative goals of lifelong learning and education for sustainable development (Singh 2015).

Many countries are committed to developing RVA as a policy tool alongside other measures with the aim of promoting a diversified lifelong learning system and granting flexible access opportunities. In PRC, it is practised in the field of adult education and vocational continuing education to motivate adults to take up further education and training. The Open University of China admits credits and exempts students from some courses based on the recognition of their prior knowledge. Those who have the College English Test 4 (CET-4) or above, for example, can apply to be exempted from the public English examination.

In 2011, the Shanghai Credit Bank of Lifelong Education operated by the Shanghai Open University oversaw the accreditation of six vocational subjects (such as accountancy and business administration), 166 courses and 139 vocational qualifications within academic education. The university integrates different kinds of educational institutions such as higher vocational colleges and adult schools. A variety of educational resources are used, such as self-directed learning leading to examinations and multi-media courses taught through television and radio. RVA in PRC also aims to address the challenges of skills shortages by placing an emphasis on continuing non-formal technical and vocational education and training (TVET) alongside formal TVET. It has set in motion educational reforms with the potential to be the most important tool in the furthering of greening and sustainability, with providers of non-formal TVET of both a not-for-profit and a for-profit character.

In the Philippines, the Expanded Tertiary Education Equivalency and Accreditation Program (ETEEAP), which was established in 1996, is seen as an important RVA framework for many Filipinos who have sought employment without beginning or finishing tertiary education but who have acquired competences in the workplace that correspond to those acquired in a formal college degree. Filipino students who have at least finished secondary education may be assessed through the standards in ETEEAP if they have gained substantial work experience (5 years as per the guidelines) related to the academic programme for which they are seeking an equivalent qualification.

RVA plays an important role in providing access to higher education institutions. In Malaysia, the Ministry of Education is responsible for RVA in public higher education institutions (which include polytechnics and community colleges). The Malaysian Accreditation Agency under the purview of the Private Higher Education Institutions Act 1996 oversees private higher education institutions. The agency has recommended curricular changes in community colleges to improve their collaboration with industries to assess competences with industry certification and, if required, green industries to develop a competency-based model. In economically developed countries such as Germany, RVA is promoted in rehabilitation courses administered through employment agencies for matching labour market competence requirements to the competence profiles of employment seekers. This is being done through close collaboration between qualification systems/frameworks and continuing vocational education and training (CVET) providers. In Denmark and Finland, providers of CVET have established support services to enable adults to use RVA at all levels of the formal education and training system leading to certified qualifications.

RVA has been shown to meet part of the new qualification requirements in different sectors (such as adult education, construction and social services). In Canada, RVA is used in this way to attract migrants to fill labour gaps. It also supports workers in private- and public-sector organisations to complete primary and upper secondary education to enhance the economic capacity of the workforce. In Denmark, employers are encouraged to invest in the training of those with very low skills who need to be brought into the productive economy, while in the USA and Australia, RVA is used to link non-credit workforce programmes to educational credit to lower some of the barriers to obtaining qualifications.

By contrast, most informal and non-formal workplace learning in developing and emerging countries has not met quality assurance requirements such as accreditation and is not recognised through any credit transfer arrangement. Recognition in the context of non-formal and informal learning takes place without being related to the formal system. However, this is expected to change with the establishment of a learning outcomes-based qualifications framework. RVA, by leading to a better matching of skills with labour market demands, can address skills shortages (Arthur 2009). We argue that efforts need to be made in MSMEs in Asia to put systems in place to ensure that informal learning in the workplace is encouraged, formalised and recognised.

3.3 RVA in Workplaces Compared to RVA for Access to Education

Both RVA for access to education/training as well as in the workplace need to be linked to standards. Regarding standards in an educational curriculum or qualification, work experience is verified by admission to universities and colleges, secondary education/certificate or primary education certificate, where professional practice

partly compensates for education. However, verification within enterprises operates in relation to professional or occupational standards and the work requirements of the enterprise (Aase 2017).

RVA in relation to education and training requires alignment with level descriptors and/or programme content; RVA in relation to workforce development and industry is dependent on different variables. Some of these have been mentioned by Harris (2014, p. 1) as

> robust social partner approaches to industrial relations and collective agreements. RPL in workplaces needs to connect to industry classification systems and benchmarks, skills standards, pay scales and industry or company-specific in-house training, as well as articulating to the learning outcomes of education programmes and associated qualifications, if need requires. It could be more complex than RVA in relation to education and training.

The different purposes of producing documentation of individuals' knowledge and skills have also been highlighted. While the purpose of documentation for access to education is to communicate formalised knowledge and skills for all stakeholders to see, industry-specific documentation models are mainly used in immediate work situations. Knowledge and skills that are developed through the workplace receive recognition from both management and colleagues through their utilisation in the immediate work situation. Industry-specific RVA supports the development of new occupational areas and improves legitimacy and equity. While education-specific RVA may contribute to lifelong learning by making continuing education more accessible, industry-specific RVA usually contributes to increased job security and higher employability by recognising workplace-acquired competences. It reduces, or completely abolishes, periods of unemployment and creates higher mobility and flexibility in the labour market (Aase 2017).

However, as Murphy (2014) points out, it is important to take account of the cross-sectoral understanding of RVA at all levels—individual, company, sectoral, professional and national. She argues that RVA in the context of training and education operates as learning in the workplace or for the workplace, while in the workplace it is used to motivate people to continue learning. RVA in the workplace also serves the purpose of guiding people back towards an education pathway.

3.4 Working with Standards

There are issues in dealing with the ways that industry sectors should adhere to standards, including how links are created between NQF and occupational standards. Should standards be regulated in detail or be more generic? Is there a need for a common conceptual taxonomy for transferable vocational skills and competences? These matters are important for labour mobility from one sector to another. If the implications for employees are taken into consideration and RVA is developed using a working-life focus, a modular structure in the form of competence units may help to identify skills shortages and address them from a lifelong perspective.

In the ensuing sections, therefore, we look at a variety of standards used for RVA from different countries and different working cultures, all in relation to different purposes.

3.4.1 RVA in Relation to VET Standards for Regulated Professions

To recruit skilled and qualified artisans in regulated professions, RVA is used in relation to vocational education and training (VET) standards. Such standards not only safeguard professional practice but also establish pathways to national and international mobility for professionals. Increasingly, VET standards are being used to reduce shortages in technical occupations within environmental fields by building on the practical experiences of refugees. In Germany, the Elbcampus Competence Centre of the Hamburg Chamber of Commerce—a new centre for vocational education and training in "green" trades—started an initiative to recruit skilled artisans by building on the practical experience of refugees and migrants in the field of construction, environmental protection and renewable energies. The first steps in the RVA process include a four-day demonstration of skills to identify refugees' informal competencies. This is followed by advanced training courses of 5–7 months to improve language (up to a certain level of proficiency, here B2 level) and green skills. Quality VET standards serve as benchmarks for competence assessment, after which the refugees have several options. They can either register for further technical qualifications, take up a job, apprenticeship or internship, or progress to academic studies (Hünemörder 2016). These green skills are supported through a partnership with the Deutsche Bundesstiftung Umwelt (DBU), a German foundation for the environment.

In Spain, the high demand for professional qualifications can be explained by a new law that will require accreditation of all workers in certain sectors such as care and health services. Such new regulatory requirements may make it easier for employers in these areas to motivate employees to embark on courses leading to a certified qualification (see Werquin 2010).

3.4.2 RVA in Relation to Industry-Based National Qualifications

Although many occupational sectors are now using RVA to regulate standards of practice, many countries that have developed industry-based national qualifications as part of their national skills strategies still lack a methodology for enterprise-based skills recognition. According to Skjerve (2017), for example, Norway's new skills strategy seeks to promote in-company RVA, but its success will depend on

building awareness at the enterprise level and changing the prevailing mindset on the learning-outcomes approach, qualifications, and having a coherent recognition system for informal learning and reference frameworks for both formal and non-formal qualifications. Norwegian enterprises conducting recognition in relation to a qualifications framework are given guidance on the definition of qualifications criteria—these include knowledge of the qualifications and titles that the RVA leads to; whether learning outcomes are defined in terms of knowledge, skills and broader competences (outcome-based) or in terms of an open text (input-based); who assures quality and how; whether the qualification is related to an academic subject such as engineering or commerce; what the relevance of that qualification is for education, the labour market or the environment; whether the qualification is an industrial certificate or diploma; whether the assessment is oral or written, the evaluators internal or external; whether the learning venue after RVA is to be a school, the workplace or a practice; vertical or horizontal career opportunities; what regulates entry requirements—law, regulation or practice; and who the partners are who give support in terms of teaching resources.

Norway's industrial certification system is determined by several stakeholders, such as trade unions, advisory groups and the Fafo Research Foundation. Education authorities are responsible for summative assessment/testing and the Ministry of Education and Research is responsible for the policy framework and funding. National standards for education and occupations are based on learning outcomes. By developing this guidance for enterprises, the country hopes to change and improve the knowledge base for skills policy making; promote an understanding of learning in all contexts including in-company learning; refine notions of qualifications, informal competences and learning outcomes; erect bridges between formal and non-formal systems of education and training; and provide guidance on learning and career pathways (Skjerve 2017).

3.4.3 RVA in Relation to a Quality-Management System

Where the purpose is career development and progression, RVA benefits from the use of ISO standards or quality management. These standards are usually based on requirements set by clients or the authorities. They can be used to describe, document and verify skills gained through work experience in an industry or sector, to be fully acknowledged inside or outside that industry or sector. Standards aligned to quality management may pertain to

- job specifics;
- work processes, including input and output;
- roles and responsibilities;
- skill requirements derived from these roles;
- types of training required.

In the context of quality management, competency assessment or RVA can be defined as a method to "describe, document and verify skills gained through work experience in an industry or sector, to be fully acknowledged outside this industry or sector" (Aase 2017).

3.5 RVA Methods and Procedures

Several countries have piloted a wide range of procedures and tools in SMEs. The EXEMPLO Toolkit for SMEs (Fietz and Junge 2006) highlights the experience and activities of European partners in recognising informal learning in companies. It focuses on the application of RVA tools in the context of small-scale enterprises and micro enterprises that are seeking to improve the visibility and transparency of informally acquired competences in the context of the recruitment of personnel or human resource development.

Determining what people know

Skills recognition in companies and enterprises is about determining what people know and can do regardless of when, how and what they have learned. In addition, it is about providing useful feedback to learners so that they can progress. It is fair to the workers in the workplace to have their assessment tied to specific learning- or performance-based outcomes or an industry certification so that they are guided along a pathway.

Profiling skills and knowledge through self-assessment

Recognition mechanisms give workers the opportunity to profile their skills and knowledge through self-assessment. This can help them plan their lives and help them screen jobs that may not be appropriate for them. Online self-assessment tools can give workers a realistic perspective on requirements and an effective way to demonstrate or improve certain skills such as reading and writing.

Using simple portfolio assessments

Cameron (2012) has shown the value of portfolio assessment in the workplace for recognising and leveraging learning beyond the purpose of formal credentials. Adapting definitions from different types of portfolios used in workplace learning, he presents a variety of portfolio assessments that are useful for RVA:

- Dossier portfolio Records achievement required for entry to a profession where a precise specification of levels of competence is required.
- Reflective portfolio Provides evidence of accomplishments to be brought forward for promotion to a workplace.

- Training portfolio Provides evidence of a candidate who is learning for the purposes of accessing a training programme.
- Personal development portfolio Contains reflective accounts of professional growth.

3.6 Using the Right Assessment Tools

Results from piloting the EXEMPLO Toolkit for SMEs (Fietz and Junge 2006) highlighted the usefulness of summative assessment tools such as Norway's "competence card", which employers use when recruiting employees for a specific post. Formative assessment was applied when the focus of the enterprise was competence development, meeting the future occupational requirements of an enterprise, development of business requirements and optimisation of in-company learning processes. Much attention was paid to the identification of opportunities and further development of the individual, and matching individuals with the companies' requirements.

3.7 RVA: A Translation Method for Identifying Transferable Skills

RVA in not just about recognition of learning, but the transfer of learning as well. A few studies have focused on the skills and knowledge acquired by workers to transfer their learning to new occupations or jobs. RVA strategies can provide a fruitful start to helping workers translate practice into transferable skills and can be used to collect evidence for potential formal assessment. Millar (2014) highlights challenges to RVA in relation to workplace learning, particularly for those workers in transition to other jobs or other areas of work:

- While informal learning is a reality at most workplaces; structures and processes for helping workers identify their informal learning and outcomes, competencies, or job descriptions are lacking.
- Many private and public providers spend time, money and energy on training workers. The training provision often tells workers what they should do without considering how they learned their tasks.
- Most portfolios are designed to help individuals gain credit in an academic programme. However, Millar argues the portfolio should extend beyond a focus on return to formal education; it should generate an opportunity for those workers who want to re-enter the workforce or take up different tasks (for example, greener work).
- Often, people identify themselves with their occupations and place of employment, not with the skills they take with them.

Millar (2014) also highlights the importance of "portfolio workshops" to teach workers how to reflect on their experiences and make career and education decisions (through exercises, activities and the inter-personal relationships made while they complete the portfolio). Such workshops also include informational interviews with different employees in a company to find out more information about an enterprise, the work and workplace culture. RVA for workers in transition focuses on the incorporation of life events, experiential learning, formal and informal education, volunteer activities and hobbies. Previous work should emphasise how these activities resulted in the development of employment skills (ibid.).

Millar found that portfolio workshops not only increased worker self-confidence by helping them realise their skill set was much more extensive than they had originally thought, but they also identified new skills. In creating their own personal chart of experience, workers were encouraged to think about their experiences and draw out the associated skills and competences, before the job, during the job and after the job. Employers, case managers and human resource development managers should therefore guide workers to see how their work experience could translate into new employment opportunities.

3.8 Summary of Tools and Procedures

To sum up this section on methods and procedures, Box 3.1 highlights strategies for the effective implementation of RVA by industry and in enterprises.

Box 3.1 Strategies for the effective implementation of RVA by industry and in enterprises

- Have a clear purpose for implementing an RVA system.
- Team up with a compatible registered non-formal or formal training organisation to design and apply an RVA process specific to the enterprise; remembering RPL can be done before training starts and throughout the process.
- Actively encourage RVA as part of career progression pathways.
- Ensure processes are implemented, understood and accepted by the major stakeholders.
- Liaise with accredited non-formal training providers to ensure business and industry needs are met.
- Ensure implementation is fair yet cost effective.
- Plan and negotiate fair and equitable post-assessment processes.
- Support services to enterprises and non-formal training providers; this should include information (print-based, online, information sessions and workshops) for employees; checklists and strategies for the conduct of the

processes; and provision of guidelines for the types of evidence required and collection and storing of information.
- Understand the time and support required by trainers and assessors.
- Be flexible to give access to less traditional learners.

Source: Author, based on Hargreaves 2006

In addition, it is important in the Asian context to undertake RVA to understand a workforce's characteristics. Assessment of workers should include the workers' levels of education, literacy and aspirations, and the challenges presented by gender or social standing and geographical breakdown. Understanding the challenges faced by each group would help ensure appropriate guidance and counselling, progression and upskilling pathways. Identification of competences and learning should include current perceptions regarding the value attached to training and certification, the current course and certification, as well as the level of buy-in from the workforce. Understanding whether entry-level green jobs in an industry and in a specific geographical local area are desirable to the workforce are first steps in the RVA process. RVA systems need to be able to access the hard-to-reach low-qualified workers in the informal sector.

3.9 Benefits of RVA: A Win–Win Situation for Employers and Employees

The process of determining skills within enterprises is commonly portrayed in the literature as being highly beneficial to the productivity and human resource development of enterprises and the empowerment of employees as well as the development of environmentally green societies (Maclean et al. 2018). Report findings from interviews with human resource managers, team leaders and union representatives in Sweden found that skills assessments are only successful when they are presented as a win–win situation, not only for the employee but also for the employers, which can be used when marketing the enterprise's products and the services of its staff (Berglund and Andersson 2012). For the employer, it is a matter of developing human resources to optimise economic opportunities in the green sector; for individuals, it is a question of the value of their full range of competences; for society, it is a question of fully using knowledge, skills and existing talents to create an environmentally friendly society. In the labour market, RVA of competences can result in improved opportunities for enterprises.

RVA has been shown to make employees more competent, confident, reflective and analytical, improving their performance as team members and their communication skills. Employees experience onsite, work-relevant learning and show higher motivation, resulting in gains in overall productivity. For example, RVA of existing

competences in New Zealand has been shown to lead to an increased willingness among employees to take part in workplace training or teaching (Keller 2013).

RVA can also help to identify the overall stock of competences and qualifications—including green competences and qualifications—in an organisation, thus making it easier for organisations to invest in the training of their employees. Training becomes a more profitable investment for an organisation when it is expressed in terms of national qualifications or industry sector standards which employers and employees regard as relevant in the changing world of work. Furthermore, RVA provides valuable feedback to educational providers on the content and methods of both formal and non-formal/informal learning, including providers of green content. Private- and public-sector institutions are offering more and more flexible and customised training courses by using RVA to gauge the existing skills levels of individuals.

RVA in an enterprise can also result in the recognition of skills outside a subject's occupation, such as family skills (Geezer-Sass 2005). RVA procedures may motivate individuals to look upon learning not only in a lifelong sense, but also as a life-wide opportunity, often encouraging an individual to start new learning experiences (Keller 2013).

In Norway, emphasis is placed on the importance of RVA in contributing to greater flexibility in working life, enabling employees to move more easily from one position or profession to another. RVA facilitates access to higher education and can lead to an improved standing in the job market. It can lead not only to more interesting tasks and better wages, but also to improved social integration through better access to the labour market for those previously excluded (Christensen 2013). In addition, in the case of people who become redundant, RVA can help in finding jobs better suited to their current competences.

Enterprise-based RVA can also be directed to social-justice-related policies addressing inequality and promoting decent work. RVA benefits individuals by improving career and employment prospects and creating pathways to further learning and qualification opportunities. Beyond the bounds of these external dimensions, enterprise-based RVA contributes to improved self-esteem, confidence and motivation, greater awareness, improving personal reflection, increased confidence and self-directed learning management.

3.10 Recognition in the Asian Context: The Potential for Including Green Skills in RVA

Interest in enterprise-based or workplace RVA in developing countries and emerging economies has been limited. In addition, there has been no research into the question of the potential for Asian countries, to include green skills in their RVA mechanisms. Thus, the study presented in this book provides a unique opportunity to highlight

trends and challenges that the seven countries and one territory participating are facing.

In this section below, we look at the potential for recognising green skills in the Asian context, highlighting some factors enabling RVA in the countries/territory participating in the study.

3.10.1 Creating a Space for RVA: Identifying, Assessing and Formalising New Green Jobs

RVA mechanisms can be useful in "assessing" and "recognising" the labour force that could be participating in the green economy. Recognition can assist enterprises in assessing their specific capabilities to minimise the environmental impact of their production processes. In this context, the formalisation of "green jobs" in national qualifications, occupational and professional standards in a growing number of Asian countries adds a formidable context for providing opportunities in taking up green jobs within enterprises. New tools such as NQFs, which include industry standards, commit to supporting and developing training pathways by providing the recognition of prior and emergent learning including work and life experience.

Kazakhstan has established descriptors of qualification levels, sectoral qualifications and occupational standards that serve as the main reference point for skills recognition and development of educational programmes. It considers these established level descriptors as one of the most effective mechanisms for the inclusion of green skills into recognition systems of qualifications. The descriptors are also expected to be a stimulus for SMEs to develop their own methods for competence assessment of employees. Until now, however, only large enterprises in Kazakhstan have their own methods for competence assessment of employees.

Given the growth of new green economic activities, Nepal also acknowledges the need for the formalisation of new green occupations, new skill profiles, qualifications and training frameworks. It further argues that many existing occupations and industries experiencing "greening" will require adjustments to the current training and qualification frameworks.

In the Philippines, the Technical Education and Skills Development Authority (TESDA) expressed environmental concerns in the development and amendments of competency standards and training regulations dealing with production and services across all industries, not just in the green sectors. TESDA has developed qualifications related to refrigeration and air-conditioning. The training regulations consider safety parameters regarding workers, customers, tools/equipment and, most importantly, environment.

In Bangladesh, the term "green collar occupation" is used to refer to carbon trading, solar energy engineers and technicians, and mechanical engineers and technical persons in charge of compressed natural gas (CNG) conversion.

In India, the Skill Council for Green Jobs (SCGJ) has a mandate to address environmental challenges in the following sectors: renewable energy, green transportation, green construction and waste management (solid, water and e-waste co-generation). SCGJ believes that these sectors cut across all other industries including catering, automotive and PVC manufacturing.

Kaye (2012) argues that, in the future, it will not be enough to list existing jobs and categorise some as green; rather, an important aspect in the recognition, assessment and formalisation of new green jobs will be their direct or indirect impact on reducing greenhouse emissions and in finding and applying mitigation strategies to address either direct or indirect impacts of climate change.

3.10.2 Recognising Everyday Work Practices and Skills at the Enterprise Level

We consider the assessment of the everyday practices of the labour force and their capabilities in relation to the green economy through RVA mechanisms. However, green standards cannot remain at the level of qualifications standards; this is highlighted by Baumgarten and Kunz (2016), who point out that, despite the introduction of numerous new standards and initiatives through global trade and industry, the accumulated knowledge around climate change, and the development of green qualifications and green TVET, the challenges in moving towards cleaner production at the level of enterprises remain. MSMEs still struggle to fit national occupational standards into their current operational model. They highlight the importance of closing the industry–market divide to make the transition to green industry and a green economy. According to Baumgarten and Kunz (ibid.), even small changes in everyday work practice for all employees in a company, or on a farm, will cumulatively build towards a whole new core of sustainability practices, not only in individual business, but also in the supply chains fed by these workers and producers through their labour.

It is in this context of identifying, documenting and assessing everyday work practice that the inclusion of green skills into RVA mechanisms is proposed as an important factor in promoting environmental friendliness in workplaces. By taking stock of everyday work practices and making skills visible, RVA can play a role in encouraging workers and employers to participate in waste minimisation and management, and environmental friendliness, in the workplace.

3.10.3 Green Skills Recognition as a Means to Create Opportunities for the Disadvantaged and Under-Qualified

Given that most people working in the present and future market economies of Asia are either unskilled, semi-skilled or under-qualified labour, predominantly represented in the hard labour market or in micro enterprises of informal sectors, the exercise of identifying and formalising green jobs, as well as the development of processes for assessing everyday work practice and skills, will be critical in building an alternative economy that includes jobs for the disadvantaged. For Bangladesh and India, skills recognition could play an important role in helping informal sector workers involved in waste collection, street catering and automotive services to progress to fill green jobs across different skills levels.

It is often argued that if higher levels of an enterprise hierarchy are reformed, the lower levels will automatically conform to their practices. However, recognition processes within MSMEs require a differentiated understanding and consideration. Usually, most employers can shape their own qualifications: they "invest" in their own education and training and take advantage of learning opportunities that they consider useful to their enterprise. So-called "low-skilled" employees acquire much of their occupational expertise informally on the job; however, they are less able to profit from it in terms of their career development. Recognition systems that identify, document, assess and certify their current and prior green skills and competences offer a great opportunity, especially for those who have no or low formal qualifications. These employees require proper RVA mechanisms and support structures, such as guidance and counselling and self-assessment portfolios, that empower them in their career management competences. One of the goals of skills recognition in enterprises and industrial settings should be to help these so-called low-qualified employees to gain qualifications and competences that endorse and support green behaviour. If effective structures are not in place, RVA mechanisms will only benefit those who already possess qualifications: employers and managers.

3.10.4 Recognition as a Means of Making Workers Aware of Emergent Skills

While prior learning requires learners to prove their knowledge with evidence such as test scores, portfolios and other written documentation, and is undoubtedly beneficial, workers must also be helped to build on their newly acquired skills and emerging competences developed through workplace learning. According to Sax Mahoney (2014), an assessment model that recognises emergent and workplace learning is vitally needed. She argues that the recognition of prior learning (RPL) offered by institutions of higher education has focused on learning that occurred before a student entered college, and this practice does not engage employers in efforts to build on the

skills and competences developed through workplace learning. Emergent learning requires not only life skills, problem solving and critical thinking that informs and changes our actions, but also respect for, and recognition of, non-formal and informal learning.

She points out that recognition of skills must follow practice. It is useful to engage employers in validating attainment of competences demonstrated through workplace activities. Unfortunately, this is not a common practice, even though today's employers may base important decisions about training, hiring, promotional advancement and organisational direction on their knowledge of workplace learning and competences. While it is mostly large corporations that have put learning management systems, online learning and digital badges to assess emergent learning into operation, it is also useful for SMEs to validate attainment of competences demonstrated through workplace practices. Employers need to link the benefits of RPL assessment and certification to their enterprise. This could be achieved by linking the productivity of an individual to the productivity of the enterprise.

According to Millar (2014), RVA is an important tool to translate workplace practices into skills. While workers thoroughly understand their jobs and how to do them, she says, they need support to deconstruct that work to delineate the sub-skills of their jobs:

> …workers in the pulp and paper environment and the NUMMI [auto] plant regularly read a manifest, which was a document similar to work orders, and needed to see how this skill translated into reading and deciphering complex information. These skills can be used in many other settings that would require navigating documents, such as manuals, specifications, etc., or academic materials. Additionally, once people learn the language of transferable skills, they can make links from their own learning to learning needed in new settings (Millar 2014, p. 10).

3.10.5 Bringing Workplace and Industry Partnerships Together in a Meaningful Way

An article in the Economist (2017) highlights the brokering role that specialised institutes need to play in enabling workplaces to identify the competences necessary for green industries and linking them with qualifications standards and curriculum. In Hong Kong SAR, PRC, for example, Industry Training Advisory Committees (ITACs) are tasked to develop, maintain and update the Specifications of Competency Standards (SCSs) according to the latest labour force requirements. The SCS accommodates both small and large companies to meet the full range of an industry's education and training needs. Training providers can then develop programmes according to SCSs. The Hong Kong Council for Accreditation of Academic and Vocational Qualifications (HKCAAVQ) recognises such programmes and related qualifications under its qualifications framework.

In Kazakhstan, stakeholders involved in sectoral qualifications frameworks (SQF) are responsible for integrating technological changes, regional and local market demand, as well as characteristics of the labour market and green skills. In Malaysia,

industries in collaboration with the skills training sector are responsible for RVA under the Malaysian skills certification system, which is a five-tiered qualification system grounded on industry-based national occupational skills standards. In Nepal, the National Skills Training Board (NSTB) under the Council for Technical and Vocational Training (CTVET) develops Occupational Skills Standards. Although most of the already-developed test standards include technical or core skills, it is also planned to incorporate green skills.

3.10.6 Recognition: A Starting Point for Continuous Education and Training for Workers

RVA complemented by workplace training might focus on new routines that have a positive effect on the livelihood of workers and, on the larger scale, contribute to a green economy and sustainable development. In many countries and territories, the recognition of informal and non-formal learning is supplemented by continuous vocational training opportunities. For example, RVA in Hong Kong SAR, PRC, is seen as a stimulus for workforce development and continuous education and training of experienced practitioners in the context of increased trade with the mainland market, competition from South-East Asia and developments in technology. In Malaysia, the Human Resources Development Fund (HRDC) has a scheme for the recognition of prior experiential learning (RPEL), where employers who seek to enhance the skills of their workers can apply for financial assistance for recognising their employees' skills and experiences. Malaysia considers the utilisation of work-related competency-based approaches in education and training as highly relevant for today's green practices, and has therefore introduced competency-based training through national modular certificate programmes designed to expose participants to the world of work (Department of Community College Education, Malaysia Ministry of Higher Education 2010). Further, the Department of Skills and Development (Ministry of Human Resources) has established National Occupational Skill Standards (NOSS) to define the employment and essential competency levels to be fulfilled by employees.

3.11 Conclusions

This chapter has highlighted the crucial need for Asian MSMEs to use RVA mechanisms of non-formal and informal learning to promote greener industries and economies through the inclusion of skills in them. The lack of systematic recognition and documentation of informally acquired competences is not only an obstacle to the recognition of employees' competences and further career development, but also an obstacle for MSMEs seeking to adjust and transfer to greener forms of production

and new environmental standards. The transparency and visibility of competences and knowledge are not only critical for the development of enterprises' human capital but also for their contribution to a greener environment, society and economy.

Given that MSMEs are among the main environmental polluters in Asia, the chapter has highlighted the need for motivating enterprises to include green practices and promote green skills. Tools and mechanisms such as RVA and industry standards can assist enterprises to assess their specific capabilities to minimise the negative environmental impact of productive processes. Thus, the chapter has emphasised the need within the Asian RVA community to explore approaches to assessment that recognise the broader competences developed within the workplace.

The chapter has highlighted important enabling factors for including green skills in RVA in the country cases (Bangladesh, PRC, India, Kazakhstan, Malaysia, Nepal and the Philippines). It argues that while high-level policies, strategic plans, innovative technologies or qualification standards are significant factors contributing to greening of the economy, they will not have the impact hoped for unless workers in MSMEs have acquired the necessary green skills to turn these policies into practice. This adds to the necessity of emphasising the recognition of skills of the labour force that already is or will in the near future be participating in green industries and a green economy.

The chapter proposes a demand-oriented workforce development system that links green skills recognition to continuous education and training. It argues that RVA presents an opportunity to legitimise and promote customised non-formal on-the-job-training that is accessible to most people in Asia working and earning their livelihood in MSMEs. This focus is even more important when we observe a continued resistance in many Asian countries to making workplace learning a legitimate part of education and training systems. RVA in continuous education and training could help low-qualified workers to reflect on how they learned their tasks and enable them to translate practice into transferable skills, rather than simply learn how to use new equipment or to perform new job tasks.

Using examples from international best practice, this chapter has presented effective recognition methods and procedures that can be adopted in Asian MSMEs. For example, it is suggested that simple portfolio courses in the context of continuous education and training could help workers to become conscious of and identify their transferable green skills, separating skills from practice.

Informal learning in enterprises and companies is becoming increasingly significant for employers, employees and job seekers, as well as for sustainable development, global citizenship, for inclusive economic growth and decent work for all. Most skills are acquired informally through occupational practice on the job. However, the utility of the outcomes of informal and non-formal learning is severely limited if they are not visible beyond the narrow environment of individual learners.

In the Asian context, the recognition of informal workplace learning is not at present making the greatest use of what the area has to offer. RVA systems can prove to be an important tool for tapping into this unrecognised potential. RVA can help increase occupational mobility for individuals by providing them with the motivation to take part in further education, training and skill-upgrading programmes, and the

recognition of green skills within RVA systems could prove to be critical for the promotion of environmentally friendly practices in enterprises and their potential to contribute to the sustainable development goals.

Thus, it is important to emphasise that employability and the effectiveness of the labour market are not the only aspects that can be improved by effective recognition systems. Recognising green skills acquired within the workplace can further empower both employees and employers and give them greater agency in the push towards a greener industry and economy.

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Part II
Case Studies from Asia: Environmentally Friendly Practices and RVA Applications

Chapter 4
Case Study: Bangladesh. The Demand Side of Environmental Sustainability Through Skills Recognition

Faruque A. Haolader and Shahadat H. Khan

Abstract This country case study examines current practices and issues of skills recognition aiming to improve environmental and occupational health and safety for sustainable development in Bangladesh. More specifically, data was collected to examine environmentally friendly practices in enterprises in three service sectors: automotive, waste management, and catering, with a focus on employer and employee perspectives as an important component of the demand side of environmental sustainability. It also examines how employers and workers "recognise" green skills. Recognition here does not mean only "assessment" through testing or certification in a technical way, but also "social recognition", implying the benefits that employers and workers see in the promotion of green skills in terms of employability and decent work, lifelong learning, and personal development. Finally, the study seeks to clarify a set of enabling factors contributing to green skills and green practices in enterprises as well as the potential for their inclusion in recognition mechanisms. This study argues that an examination of real workplace roles should be the starting point for linking recognition of green skills to green skill standards. The study concludes that learning outcomes and competences within the qualifications framework do not relate to the realities of green skills and green practices in enterprises.

Keywords Skills recognition · Environmentally friendly practices in enterprises · Bangladesh · Green skills · NTVQF · Recognition of prior learning

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4.1 Introduction

Bangladesh, located in South Asia on the Bay of Bengal, bordered by India and Myanmar, is one of the most densely populated countries in the world. It has 164.6 million people (1,115 per sq km) living in an area of 147,570 sq km (BBS 2019), making it the eighth-largest country by population (UN, World Population Prospects 2019). Bangladesh, mainly a Ganges (Padma)–Brahmaputra Delta, is a low-lying plain land, naturally very fertile for agricultural activities. About 47% of the population work in agricultural activities. Agricultural produce includes rice, jute, sugarcane, tea, wheat, vegetables, tobacco, and fruits. Fish, poultry, beef, and dairy products are also a part of the agricultural sector. About 16% of the country's gross domestic product (GDP) is from agriculture. The aquaculture and poultry sectors are notable for their achievements. Apart from agriculture, mineral resources such as natural gas, petroleum, and coal enhance the economy. In the areas of natural gas use for cooking, transport (cars, auto-rickshaw), fertilisers, and power production, there appears to be a trend towards environmentally friendly practices. However, the use of coal is still prevalent in the production of power.

Major foreign exchange earnings of Bangladesh come from the export of labour, ready-made garments, tea, fish, tobacco, and betel leaves. With a per capita income of US $1,602 (Star News 2017), the World Bank rates Bangladesh as a lower middle-income country. However, the country envisages attaining an economically and environmentally sustainable middle-income economy status by 2021 by shifting from its traditional agro-based economy towards an industry-based one.

While 35% of Bangladesh's population resides in urban areas as of 2016, which is lower than the world average of about 54%, the country is well along the path of rapid urbanisation according to World Development Indicators (WB 2017). It is, therefore, reasonable to assume that the employment and economic activities will focus significantly on urban areas in the future. By taking advantage of the abundance of (relatively low-/basic-) skilled labour in light manufacturing, Bangladesh has created a great amount of wage employment, providing opportunities for rural migrants too.

Bangladesh's learning system consists of learning in three different settings—formal, non-formal, and informal. Formal education and training in Bangladesh consist of primary, secondary, and tertiary education. Formal technical and vocational education and training (TVET) programmes are mostly government-regulated and rely on a theoretically oriented traditional approach. TVET is becoming increasingly more responsive to market needs through the direct participation of industry. Formal TVET is offered in either publicly or privately run TVET institutions. Although, currently, institutions under private management make up an increasing large share of the formal TVET provisions, they are relatively weaker in terms of their employment and labour market outcomes compared to those under public or NGO management. Tertiary education in Bangladesh is ridden with similar challenges.

Non-formal education and training. In parallel to formal TVET programmes, TVET institutions and companies also provide non-formal and competency-based

training and assessment programmes. These include apprenticeship programmes, which are currently being given priority by the present government. Some non-formal programmes are directed at traditional artisans in the informal sector.

Informal learning. The majority of workers in Bangladesh pick up their skills informally through learning while doing a job and through informal apprenticeships (e.g. with a craftsman that is not organised by formal TVET). Their low levels of general education as well as lack of formal technical and vocational training presents a barrier to formal upskilling programmes in skills for the green economy.

Integrating sustainability and environmental protection issues within the education and training system is being undertaken by the government, though to a limited extent (e.g. inclusion of environmental issues in the Grade 3 to Grade 8 general school syllabus (Mondal et al. 2011)). Furthermore, the government plans to expand the knowledge base of environmental education at the higher levels. However, the mainstreaming strategy is not addressing the vast number of workers working in waste management, catering, and the automotive industry who are involved in environmentally damaging and low-paid work opportunities, predominantly in informal sectors, transporting or picking through the rubbish. While highly skilled jobs are needed to make many industrial sectors and enterprises environmentally friendly, many of these low-skilled workers are unable to access upskilling programmes because they have low general education levels, lacking formal technical or vocational education, and with their existing skills unrecognised.

The TVET Reform Project, which is run jointly by the European Union, the International Labour Organisation (ILO), and the Government of Bangladesh, established a partnership between public-sector training institutions and industrial employers to minimise the gap between skills supply and demand. It also facilitated the role of social dialogue in skills development for a greener economy. However, according to a study by the Bangladesh Development Institute (Mondal et al. 2011), the reform project, although market-driven, did not develop content in skills for green jobs. The study also points to the weak delivery mechanisms of existing education and training institutions. This, they argue, is the result of the absence of any policy agenda and support. Instead, green skills development remains limited mostly to some NGOs, compressed natural gas (CNG), and renewable energy and waste management companies, such as Infrastructure Development Company Limited (IDCOL), Rahima Renewable Energy Limited, Grameen Shakti, Navana CNG, and Waste Concern. Some of these companies deliver on-the-job training funded by NGOs with donor assistance (ibid.).

Notwithstanding these issues, Bangladesh's new National Skills Development System (NSDS 2015) seeks to address some of the challenges related to low-skilled and low-paid workers in many industry sectors such as waste management, catering, construction, and automotive. For example, pre-vocational levels of the NVQF can be used in many industry sectors as they promote the mainstreaming of low-skilled workers into targeted environmentally friendly employment. An ILO project has shown how this can be done through the involvement of industry partners and the active engagement of enterprises and employers (ILO 2013).

Bangladesh has a well-developed set of environmental policies, acts, and rules and regulations that deal with industrial pollution of water, soil, and air as well as climate change mitigation (WB 2016; Hossan 2014; Aminuzzaman 2010; Clemett 2006). However, a study conducted by the Bangladesh Institute of Development Studies points out that Bangladesh has no comprehensive policy for the development and recognition of skills for greening the economy (Mondal et al. 2011), with only isolated and ad-hoc efforts in a few sectors, with little impact. Nevertheless, to respond to climate change and commit to the UN 2030 Sustainable Development Agenda, the government has undertaken several programmes and projects. These include the following:

- Launching the National Capacity Development for Implementing Rio Conventions through Environmental Governance Project (Rio-Project).
- Developing the National Biodiversity Strategy and Action Plan (NBSAP) 2016–2021.
- Developing the Bangladesh Climate Change Strategy and Action Plan (BCCSAP).
- Implementing the project on community-based Adaptation in the Ecologically Critical Areas through Biodiversity Conservation and Social Protection Project (CBA-ECA Project).
- Launching pilot projects adopting a "3R" (reduce, reuse, and recycle) strategy for waste management at some selected areas in the cities of Dhaka and Chittagong.
- Implementing the programmatic "CDM Project using Municipal Organic Waste of 64 Districts of Bangladesh" for producing compost fertilisers.
- Implementing the programme for reducing air pollution by using low fuel-consuming and environmentally friendly modern technology in brick-manufacturing fields (Mondal 2017).
- Developing a comprehensive master plan for the wastewater management and sanitation system of Dhaka city, which has the primary goal of reducing/eliminating the pollution arising from unhygienic disposal of wastewater of industrial, commercial, and domestic origin (Das 2017).

The key concerned state agencies for Sustainable Development, Skills recognition, and Green skills are as follows: the Department of Environment, Directorate of Technical Education (DTE); Bangladesh Technical Education Board (BTEB); Bureau of Manpower, Employment, and Training (BMET); the Ministry of Education and the Ministry of Labour and Employment (MoLE); and the Ministry of Environment and Forests. They all address environmental issues. However, more collaborative actions are required to overcome the challenges that hamper green skills recognition for a transition to the green economy.

4.2 Context

The main structural shifts towards an environmentally friendly economy and labour market in Bangladesh have taken place in renewable energy, manufacturing, waste

management, construction, telecommunication, transportation, and trade. Based on these structural changes, the ILO (Mondal et al. 2011) commissioned case studies to identify skills and occupations that will or have become obsolete because of climate change as well as the new demands for greening the economy.

The term "green-collar occupation" is used sometimes to refer to carbon trading, solar energy engineers and technicians, mechanical engineers, and compressed natural gas (CNG) conversion technical persons. These occupations have emerged because of efforts to adapt to climate change. These new green-collar occupations are mainly concentrated in the energy and transport sectors and are expected to increase substantially (ibid.).

In Bangladesh, the notion of "greening existing occupations" refers to new types of competences and skills in existing occupations, which may range from automobile workshop workers, machine operators in the tannery, brickfield workers, managers, and architects or civil engineers to designers and masons in green construction. The notion also includes skill gaps required for more environmentally friendly practices in occupations (such as leather manufacturing) and emphasises that changes in employees' knowledge and practices are necessary to reduce environmental pollution. The green skills that are needed for the future of the three industry sectors (automotive, catering, and waste management) as well as other sectors more generally include life skills, problem-solving and critical thinking, and assessing and developing ideas that inform and change our actions towards a green society.

4.3 Research Objectives and Primary Data Collection

With the increasing use and depletion of land, water, and other natural resources, environmental issues have become more and more important all over the world. Rapid urbanisation, industrialisation, and the increasing use of pesticides and other chemicals are posing a huge threat to the ecosystem as well as to human health from polluted air, water, and land. Bangladesh, like many other countries in the region, has been endeavouring to reach a higher middle-income status by 2021, and as a result, enjoying higher living standards than ever before. However, it is important to remember that the economy of this country is still largely dominated by informal-sector economic activity. Therefore, the outcomes of this study are primarily intended to understand the contribution of the non-formal and informal sectors to the achievement of the country's sustainable development goals in the context of the United Nations 2030 Agenda. The objectives of this study are aligned with the aims of the overall regional study stated in Chap. 1. They are to identify environmental policies, rules, regulations, and legislation; assess the level of stakeholders' awareness, as well as environmentally friendly practices in selected service enterprises of the informal sector; and identify mechanisms in use to recognise/assess, validate, and accredit (RVA) existing competences of employees and the potential of including them in recognition mechanisms. The outcomes are intended to be useful for policy-makers, curriculum/training programme developers, employers, and employees.

In the context of this case study, the focus is on the environmental challenges of the two industry sectors described in detail below, namely automotive and waste management.

The automotive service sector

Bangladesh has no automotive plant producing vehicles, except for a few private-sector automotive assembling companies and one government-owned assembling plant. The local assemblers use mostly imported parts and components. According to the Bangladesh Road Transport Authority (BRTA 2020), Bangladesh had about 4.47 million registered vehicles as of 30 June 2020. This figure included passenger cars, buses, trucks, motorbikes, cycles, etc. These are mostly imports from all over the world and most of them are reconditioned second-hand vehicles, which require maintenance and repair services soon after they are on the road. Automobile repairing and servicing is a growing business sector in Bangladesh. It is labour intensive, employing a workforce with knowledge and skills in diagnosing, repairing, and servicing vehicles. Automotive service enterprises not only provide services but also generate employment.

Waste management

There is a growing waste management problem in Bangladesh. The city of Dhaka, with about 16 million people, is one of the most polluted cities in the world. It generates about 150 kg of waste per person per year. The public municipal authorities have the responsibility to collect waste and dispose it. However, it often outsources the work or sub-contracts private enterprise(s) or recruits daily-wage labourers for manual work such as cleaning/sweeping and transporting. Several authors have drawn attention to the fact that residential and commercial waste is usually difficult to manage (Kreith and Tchobanoglous 1994), and solid waste is the most common, dangerous, and hazardous. If not well managed, it can generate health problems or environmental pollution.

Solid-waste management refers to the process of gathering, transportation, and disposal of garbage from domestic houses to a disposal unit in a scientific way. It is pivotal to the protection of the environment. The impacts of poor waste management in Bangladesh include bad smells along roadsides or residential areas; blockages of the drainage system resulting in wastewater overflow; spread of various diseases such as hepatitis; and fire hazards and physical injuries to workers (Metin et al. 2003). The main purpose of waste management is to ensure that the waste products go to the right place. Starting from on-site handling and storage to collection, transportation, recycling, and ending with disposal in sites such as government dumping grounds. This stage of the waste management process is a matter of great concern for Bangladesh (Matter et al. 2013). In urban areas, waste workers (usually daily-wage labours) sort the waste manually into plastic or metal bins; in rural areas, they sort it into concrete bins or rubbish pits.

The study uses a convenience sample in which 13 enterprises in the formal sector and 17 in the informal sector—covering all the three sectors mentioned—were included in the survey. In this descriptive type of study, we gathered both qualitative

and quantitative data, interviewing stakeholders by using a questionnaire consisting of 44 items in eight sections including general information about the participating company, environmental policies and regulations, respondents' conception about green skills and their demand, RPL, and inclusion of green skills in RPL and workplace learning and training programmes. Thirty companies in automotive, catering, and waste management service sectors that participated in this study were located in Dhaka and nearby cities. In the automotive sector, six enterprises were from the formal sector and seven from the informal sector. In the catering sector, five were in the formal sector and ten were informal enterprises. In the waste management sector, two formal enterprises were operated by the city municipal corporation.

4.4 Results and Discussion

The study has shown that while many of the employees working at operation levels have no formal qualifications, they have the technical expertise and they make up a vital part of the workforce. While governmental environmental policies, regulations, and legislations in these service sectors are in place, much of the workforce is not aware of them. "Caring for the environment" is not as important for employees in the informal sector as for the employees in the formal sector, particularly at higher management levels.

The study found that the majority of employees working at operator levels have no formal qualifications, but make up the vital part of the workforce. They have technical skills and work expertise in their respective service sectors, which they acquire informally at their workplaces or technical workshops. The following sub-sections present findings concerning employees' educational level; level of awareness about environmental policies; regulations; the role of (local) authorities; how much importance the employees/employers put on green skills; and the potential of including green skills RPL mechanisms.

Educational levels of employees

As Table 4.1 shows, of 176 employees in the automotive service sector, 33 (18.8%) had higher education, 17 (9.7%) had technical/vocational qualifications, 30 (17%) had general secondary (Grade 10 or International Standard Classification of Education [ISCED] Level 2) education, and 96 (54.5%) had below-secondary or no schooling. The number of higher educated employees is extremely low in the waste management sector (0.8%, respectively) compared to the automotive sector.

Relating educational levels to awareness about environmental policy and regulation

The interviewees (mainly the top- or mid-level management of each enterprise) were asked if they (both employers and employees) were aware of environmental policies and regulations for their industry/service sector. Although the management of enterprises and some of the employees with higher qualifications, about 25% of the total respondents, were aware of the environmental policies and regulations,

Table 4.1 Sector-wise educational level of employees

	Higher education (university degree)	Technical vocational education	Secondary education (Grade 10)	Below secondary education (below Grade 10)	Total number of employees
Automotive					
Formal	33 (25.4%)	16 (12.3%)	26 (20%)	55 (42.30%)	130
Informal	0 (0%)	1 (2.1%)	4 (8.7%)	41 (89.2%)	46
Total	33 (18.8%)	17 (9.7%)	30 (17%)	96 (54.5%)	176
Catering					
Formal	6 (5.6%)	7 (6.5%)	37 (34.6%)	57 (53.3%)	107
Informal	0 (0%)	5 (6.7%)	25 (33.7%)	44 (59.6%)	74
Total	6 (3.3%)	12 (6.6%)	62 (34.3%)	101 (55.8%)	181
Waste					
Formal	5 (0.8%)	3 (0.5%)	7 (1.1%)	602 (97.6%)	617
Total over three service sectors	44 (4.5%)	32 (3.3%)	99 (10.2%)	799 (82.0%)	974

Source Authors

the majority (above 75%) of employees, particularly the skilled workers/employees with education levels below secondary education, as well as those who received no formal skills training but were involved in performing actual occupational tasks in the enterprises, were not aware of them. Almost none of them could state or name any of the relevant policies and/or regulations that their company follows. The respondents who were aware of environmental policies and regulations were all registered in enterprises in the formal sector.

Role of local authorities in assessing environmental impact

There are several governmental directorates or agents under respective ministries' bodies responsible for monitoring the environmental impact of enterprises in Bangladesh. However, the survey results showed that supervision was extremely poor or in some cases absent. In the automotive service sector, for example, engine oil (mobil) is often reused. The leftover oil is then sold to street vendors who ultimately sell it to the brick manufacturers who use it as fuel, generating and emitting carbon dioxide (CO2). Through interviews with automobile service centres, the study found that leftover oil is also often simply thrown onto the ground and/or into the nearby city-roadside drain, where it mixes and directly flows with household wastewater into canals and rivers, without treatment. Low-skilled workers with low levels of education usually do not have any knowledge of the consequences of this kind of air and water pollution. The food waste from catering services (hotel restaurants) and other types of waste, such as from road cleaning, households, and medical waste, are in most cases not transported or disposed of in an environmentally friendly way.

Solid (and mixed) waste is often burned inefficiently, thereby generating methane (CH4) gas, which is a far more potent greenhouse gas than CO2.

In Bangladesh, the automotive service enterprises provide general vehicle servicing, including engine overhauling, denting, welding, washing, and reconditioning. Study results show that, during their activities, workers do not strictly follow workplace procedures to minimise environmental impacts. In many cases, however, they do follow the "3R" principle. In addition, interviewees said that, due to huge traffic jams in the city, the average fuel consumption per kilometre was much higher than in other places where traffic jams were fewer and less obstructive.

Box 4.1 Case study of a Dhaka-based automotive company

Speed Track, a Dhaka-based company regulated by labour law (formal sector), provides automotive/vehicle repair and maintenance services and sells motor/engine spare parts and garage equipment. The company has 52 employees, of whom 13 have a university degree in engineering and in other business-related fields. Four have upper-secondary non-tertiary level vocational education and training, and the rest have secondary and below-secondary education.

The company's chief executive officer (CEO) mentioned that although the company management is mainly responsible for implementing policies and regulations regarding environmentally friendly production practices, most of the employees are not aware of these policies and regulations. The DoE, Water Supply Authority (WaSA), and the Electric Supply Authority are responsible for assessing compliance, but they do not supervise the company's activities regularly.

The company has installed an Effluent Treatment Plant (ETP) and it encourages other service workshops to do the same by promoting and selling ETPs. However, due to a lack of supervision by the proper authority and/or lack of environmental awareness, service providers, particularly those who operate in the informal sector, are reluctant to use them.

When the company recruits low-level workers, it places importance on a candidate's competences rather than on the certificate he or she brings. But in the case of managerial or complex engineering positions, a formal qualification is required. The company has no in-house training or a registered assessment centre, but it puts value on staff development where novice workers learn from experienced technicians/engineers. Nevertheless, the company provides no certificates nor maintains any job cards for their employees.

Enterprises in the waste management sector have not taken up any initiatives to introduce the concept of green skills. The participants (mainly employees) said that they did not pay specific attention to green skills, but that the industry as a whole is implementing a few measures to deposit solid waste in a conventional

(not using modern technology) way. The survey revealed that enterprises in waste management services do not follow specific practices to minimise negative impacts on the environment or human health. However, observations provided as part of the survey and throughout the study showed, for example, that some enterprises supplied polythene bags or circulated notices at animal slaughtering sites during a recent Eid festival to keep solid waste in a specific place. And yet very few people followed the notice due to the absence of awareness about the importance of these green practices.

The survey also indicated that the waste management industries did not introduce any training to improve this situation, to introduce skills in general, nor more specifically to introduce green skills.

Box 4.2 Case study in the waste management sector

Bangladesh has not employed appropriate and coordinated procedures for storing and managing waste. As a result, health problems and environmental pollution are rampant. This case study presents a comparison between the different stages of the waste management sector in Bangladesh and other developed countries in the world. In Dhaka, waste is manually disposed. In districts other than Dhaka—for instance, Tangail or Gazipur—there are no manual techniques to dispose of waste: the public authority carries the waste directly to the disposal site, where it is kept for a long time and then dumped.

The processes and steps of collecting, storing, and dumping household wastes in Bangladesh do not follow a specific strategy for separating different kinds of waste. For example, recyclable paper is not separated from the non-recyclable paper or separated from other types of waste. These different forms of waste are all collected, transported, and dumped together (see above). In developed countries like Australia or Germany, by comparison, a machine-based scientific method is used for dumping waste, and in many cases (for specific waste), waste is recycled to minimise harm to the environment.

In interviews on the importance of green skills and environmentally friendly practices, enterprises participating in this study responded on a ten-point Likert-type scale, where 1 implies "this issue is ignored" and 10 implies "close attention is paid to green skills and environmentally friendly practices, and work practices are adjusted accordingly". The responses were between 1 and 3 for informal enterprises and between 3 and 9 for formal enterprises.

A set of skills/competences (interpreted in a broad sense, Pavlova 2015, 2018) which may be required to sustain environmentally friendly practices (see Box 4.3) were presented to the enterprises participating in this research. Almost all the participants in all three sectors agreed on the importance of these competences.

Box 4.3 Skill requirements to sustain environmentally friendly practices

Cognitive competencies

- Environmental awareness and a willingness to learn about sustainable development.
- Systems and risk-analysis skills to assess, interpret, and understand both the need for change and the measures required.
- Innovation skills to identify opportunities and create new strategies to respond to green challenges.

Interpersonal skills and technological skills

- Strategic and leadership skills to enable policy-makers and business executives to set the right incentives and create conditions conducive to cleaner production, cleaner transportation, and so on.
- Coordination, management, and business skills to facilitate holistic and interdisciplinary approaches that encompass economic, social, and ecological objectives.
- Communication and negotiation skills for dealing with conflicting interests in complex contexts.
- Marketing skills to promote greener products and services.
- Networking, IT, and language skills to enable participation in global markets; consulting skills to advise consumers about green solutions and to spread the use of green technologies.

Intrapersonal competencies

- Adaptability and transferable skills to enable workers to learn and apply the new technologies and processes required to green their jobs.
- Entrepreneurial skills to seize the opportunities of low-carbon technologies.
- Specific skills such as the use of specific equipment, following specific practices, applying new technology, and mastering the processes required for the new task.

- Attitudes (e.g. adaptability; environmental, social, and cultural sensitivity; and enthusiasm).
- Behaviour (e.g. participating in projects and tasks, working with others, and taking part in courses).

Authors, based on the study questionnaire (Pavlova 2015, 2018, for more details, see Chap. 1).

4.5 Conclusions and Recommendations

Although Bangladesh has developed the National Technical and Vocational Qualification Framework (NTVQF) based on learning outcomes, the competences and learning outcomes related to green skills are only visible in the generic unit of competency referred to as "occupational safety and health" (OSH). Hence, there is still a great deal of work that needs to be done in identifying green tasks in enterprises, translating them into NTVQF units of competency, and classifying these units of competency under different certification levels in the NTVQF.

Bangladesh has a well-developed system of RVA linked to its NTVQF; however, currently, it is being implemented only in some selected priority sectors such as transport, electrical wiring, agricultural food processing and catering, garments, and IT. RVA takes place through competence tests undertaken at registered RPL assessment centres, which are often attached to VET institutions rather than to industries or enterprises. The qualifications obtained through RVA are awarded by the Bangladesh Technical Education Board (BTEB). None of the enterprises participating in this study have their own competence-testing centres; however, they recognise and accept qualifications obtained through RVA. They recruit workers/operators mainly by testing or proving through demonstration the competences, skills, and knowledge workers have. Employers do not provide any certificate, nor have they developed any job card system. It is different for employees at higher levels: they usually must have their occupational/professional qualifications recognised. The study reveals that the existing recognition standards do not explicitly include industry or sector-specific green skills, but a generic unit of competency standards—occupational health and safety (OHS)—which is obligatory to acquire a NTVQF qualification at any NTVQF level.

Together with the vocational competences acquired through formal TVET and/or through informal/non-formal learning at workplaces, a learner at any level of education and training should be provided with opportunities to acquire the knowledge and skills needed to promote sustainable development, including environmental and OSH, as well as to establish a culture of practising it in their occupations and in society.

With the development of national qualification frameworks in several countries worldwide, there is a growing trend to subsume recognition, validation, and accreditation of outcomes from non-formal and informal learning in workplaces under NQFs. Informal/non-formal learning at workplaces in many countries, including Bangladesh, is now certified through a process of recognition, validation, and accreditation (RVA), also called recognition of prior learning (RPL). However, the study revealed that RVA/RPL standards exist only for a very limited number of occupations in Bangladesh, and they do not explicitly include industry or service sector-specific green skills but a generic unit of competency standard covering OSH issues.

This study examined the current green practices and the potential of including green skills in RPL. The study found that the majority of the employees/operators from both formal and informal MSMEs working at operation levels—the core workforce in the sectors we investigated—have no formal qualifications (ranging from 42 to 97%). They do have technical skills and work expertise in their respective service sectors, which they mainly acquire informally at their workplaces or technical workshops. Therefore, it is understandable that although Bangladesh has strong environmental and natural resource management policies, acts, and regulations, there is a huge deficit in the level of awareness, and hence a tendency not to practise or follow them. There are several governmental agencies, including the Directorate of Environment, who are responsible for assessing and monitoring the environmental impact of the economic activities of the enterprises in Bangladesh. Nevertheless, the survey results show that supervision is extremely poor, and in some cases entirely absent.

Regarding the importance of green skills, the responses of the enterprises in the informal sector were between "the issue is completely ignored" and "little attention is paid", whereas the enterprises in the formal sector paid greater attention to green skills.

Based on the findings of this study, the authors recommend the following:

- Green skills should be included explicitly in every education and training course/curriculum as well as in every certification process through RVA.
- Enterprises should regularly organise green skills training for their employees and disseminate existing policies, acts, and regulations related to environmental safety and health.
- Special attention should be paid to the employees and employers of micro, small, and medium enterprises (MSMEs) by the government and international development partners, since the majority of the workforce do not bring formal qualifications but rather learn at their workplaces (informal learning).
- Environmental institutions, i.e. the DoE, should closely monitor industries/enterprises and transparently assess the environmental impact of their economic activities, especially to respond to Bangladesh's rapid urbanisation, industrialisation, and growing pollution.

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Chapter 5
Case Study: People's Republic of China. Utilising Workers' Skills for Improving Green Competitiveness to Address the Challenges of Greening of Industries

Zheng Gangqiang

Abstract This chapter presents the results of a study that examined environmentally friendly practices at the micro, small and medium enterprises (MSMEs). Although nearly 80% of the People's Republic of China's employment is found in MSMEs (Yi, 2018), very often MSMEs are characterised as entities that waste resources and do not use environmentally friendly production processes. For this reason, advocating an environment-friendly upgrade, or green development, of industries and enterprises is of great importance. Another area of exploration for the reported study is the use of recognition, validation and accreditation (RVA) mechanism by MSMEs. RVAs of competencies and work experience in all learning settings—formal, non-formal and informal—are not a well-known concept in PRC. However, its importance in educational reforms has grown, especially in the field of adult and vocational education. PRC generally uses recognition practices to motivate adult learners to continue learning by factoring in their previous education, thus reducing the costs incurred by learners. Thus, this study examined the extent to which enterprises involved in the study know, or use, RVA and what RVA requirements they have for job applicants. Application of RVA at the enterprise level is important, as the lack of systematic use of RVA means that workers' talents are not made sufficiently visible or optimally used for improving production and promoting 'green competitiveness'. To develop a systematic understanding of the above two areas, this chapter reports on a PRC case study that follows the overall methodology for the study by analysing issues at the macro-, meso- and micro-levels. This chapter recommends a combination of policies, rules and regulations, as well as a design of an RVA model that can closely match the needs of enterprises to facilitate their development of green competitiveness.

Keywords Recognition mechanisms in enterprises · Environmental challenges · Green competitiveness · Green practices · Skill requirements · People's Republic of China

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The green development of enterprises has been an objective and requirement for the People's Republic of China's social and economic development since the 17th National Congress of the Communist Party of China (CPC) (Xinhua News Agency 2007) proposed a transition towards a resource-saving and environment-friendly society. The 18th National Congress of the CPC (China News 2012) presented proposals for a transition towards a more ecological society and the Third Plenary Session of the 18th Central Committee further emphasised and expanded its reform for an ecological society and accelerated the establishment of a systemic mechanism for the implementation of the reform.

The 13th *Five-year Plan for Economic and Social Development of China* (2016–2020) (Xinhua News Agency 2016) integrates the concept of 'greening' into the 'idea of development', to boost the green transformation of traditional manufacturing industries, the establishment of green and low-carbon circular development industry systems and the renovation of technological equipment for enterprises. Green development, as the new pattern of the economic development, may advance the continuous, effective upgrade of the economy. PRC is acting in line with the international community's commitment to push for a restructuring and greening of the economy. The theme of the UN Conference on Sustainable Development, held in June 2012, was 'Green Economy'. In terms of the importance of this subject for the Chinese government, this study examines the development of green enterprises in four industrial sectors and analyses how enterprises respond to environmental issues.

Although nearly 80% of PRC's employment is found at the micro, small and medium enterprises (MSMEs) (Yi 2018), very often MSMEs are characterised as entities that waste resources and do not use environmentally friendly production processes. For this reason, advocating an environment-friendly upgrade or green development of industries and enterprises is of great importance.

Another area of exploration for the reported study is the use of recognition, validation and accreditation (RVA) mechanism by MSMEs. RVAs of competencies and work experience in all learning settings—formal, non-formal and informal—is not a well-known concept in PRC. However, its importance in educational reforms has grown, especially in the field of adult and vocational education. PRC generally uses recognition practices to motivate adult learners to continue learning by factoring in their previous education, thus reducing the costs incurred by learners. Thus, this study examined the extent to which enterprises involved in the study know, or use, RVA and what RVA requirements they have for job applicants. Application of RVA at the enterprise level is important, as the lack of systematic use of RVA means that workers' talents are not made sufficiently visible or optimally used for improving production and promoting 'green competitiveness'.

This chapter develops a systematic understanding of the above two areas by following the overall methodology for the study that examines issues at the macro-, meso-, and micro-levels. The chapter recommends a combination of policies, rules and regulations, as well as a design of an RVA model that can closely match the needs of enterprises to facilitate their development of green competitiveness.

Socio-economic and educational context

Protecting the environment, reducing pollution and mitigating ecological degradation have become priorities for the Chinese Government. The Ministry of Environmental Protection is responsible for establishing and improving the basic system of environmental protection and coordinating and supervising the major environmental issues under the leadership of the state council. Current social and economic development targets the use of new green energy, a balance of energy between supply and demand, the promotion of sustainable development and advancement of economic transformation towards a green economy. Green occupations were identified for the first time in the *Occupational Classification Directory of the People's Republic of China 2015*, and occupations significantly characterised by green features, such as low-carbon use and emission, environmental protection and circulation were classified as being green. This was designed to create awareness of green occupations and sustainable development and in turn promoting green jobs. There are 127 occupations in PRC that fit the category of green occupation, which is roughly 8.5% of PRC's total occupations. With the gradual increase in green occupations, it is becoming increasingly urgent to cultivate talents with green skills, as well as to promote their development (Hu et al. 2017).

The establishment of a lifelong education system and learning societies in which a recognition of learning in all settings, including non-formal and informal learning in enterprises, is a core strategy for promoting lifelong learning and sustainable development. While recognition of all forms of learning is an important aim of education reforms in PRC, especially in the field of adult and vocational education, PRC still needs to promote a more systematic approach to RVA in enterprises and industry. Both the introduction of new technologies that need to be actively implemented by all enterprises to support national and economic development (Wang 2012) and environmental education should be reflected in the way RVA is developed and utilised at MSMEs. Environmental education needs initiatives, such as the Environmental Educator's Initiatives (EEI) and the national construction of a 'green school' that emphasises the penetration of a kind of sustainable development concept, that is, a change of teachers' teaching methods and students' learning methods (Yu 2011, p. 73).

Environmental challenges in the People's Republic of China

The elimination of poverty and economic development remains top priorities in the People's Republic of China. With growing economic development and improvement in living standards, the demand for energy could increase dramatically, alongside emissions of carbon dioxide and other greenhouse gases. Natural disasters, land desertification, successive droughts and climate change will render these problems even more acute and will in turn initiate new problems. Therefore, it is a matter of urgency that a sustainable economic development model, with low pollution and low resource consumption, is created. Environmental challenges caused by four industries under examination and presented for the Asia–Pacific region in Chap. 2 are very relevant to PRC. And the government is taking measures to address these issues.

Box 5.1 Environmental challenges facing Chinese industries

- The **automotive industry** continues to pour leftover oil and throws repair materials into the sewage/water-distribution channels causing serious water pollution.
- In the **catering sector**, enterprises do not follow environmental protection rules. The garbage is dumped and plastic lunchboxes that are thrown away without proper disposal inflict heavy blows on the green environment. They also cause air pollution through smoke from barbecues.
- **Polyvinyl chloride (PVC)** is one of the five general plastics widely used in industries (such as agriculture, national defence, chemical-building materials, etc.), and waste resulting from the production of PVC is a huge challenge for environmental protection.
- In the **waste-management sector**, enterprises lack an understanding of the importance of environmental protection and the need for unified planning and financial support. Furthermore, the Environmental Management Department has drawn attention to the lack of sufficiently trained personnel, material resources and time devoted to comprehensive quality management. All of these factors are leading enterprises in the waste-management sector to follow hazardous waste-disposal practices and neglect environmental protection rules.

Source Author

The national response to environmental challenges

During the past three decades, PRC has introduced several laws and regulations to promote sustainable development, and these relate to environmental protection, energy conservation, development of new and renewable energy, reforestation and soil and water conservation. The country has set up a legal system that focuses on environmental protection, as well as the recycling and reuse of resources. Since the implementation of the 11th *Five-Year Plan* (2006–2010) for economic and social development, PRC has enacted the following:

- Circular Economy Promotion Law and its revision (The National People's Congress of the People's Republic of China 2018).
- Food Safety Law (Xinhua News Agency 2015a, b).
- Cleaner Production Promotion Law (The National People's Congress of the People's Republic of China 2012).
- Environmental Protection Law (Xinhua News Agency 2014).
- Criminal Procedure Law for serious environmental damage (The Procuratorate Daily 2016).
- Prevention and Control of Atmospheric Pollution law and its revision (Xinhua News Agency 2015a, b).

In addition, PRC has strengthened its social supervision of, and publicity and information about, environmental protection.

The State Council of China and relevant ministries have launched several activities to reduce emissions and save energy, including the 12th *Five-Year Plan* (2011–2015) for Energy Conservation and Emission Reduction (State Council, 2012). In March 2014, the council convened to discuss energy conservation, emission reduction and responses to climate change. It passed an *Action Plan for Energy Conservation and Emission Reduction from 2014 to 2015* (State Council, 2014). The council's other efforts to instigate stronger environmental protections are summarised in Box 5.2.

Box 5.2 Laws and regulations in automotive, catering, PVC manufacturing and waste management

- The **automotive industry** is now expected to have knowledge of emissions and to ensure that pollutant emissions are controlled. Proper methods are to be used to measure the emissions caused by light vehicles with spark-ignition engine exhausts (Zeng, 2008).
- It is mandatory for **catering enterprises** be knowledgeable about relevant laws related to food safety, clean production and food hygiene, for public eateries. They must also know how to deal with emergencies in public health incidents and be aware that the state council is strengthening food product safety supervision and the management of special provisions.
- **PVC enterprises** are expected be familiar with PRC's laws on environmental protection, prevention and control of air pollution and cleaner production, environment impact assessments, pollution census regulations and renewable energy laws.
- Enterprises in the **waste management sector** are regulated by the *Law on the Prevention and Control of Pollution by Solid Waste* (Xinhua News Agency, 2004). This law comprises detailed rules on waste disposal methods, and the responsibilities of waste practitioners at all levels of government, as well as rules on waste management and supervision.

Source Author

5.1 Terminology and Definitions

Conceptualisation of green skills

The use of the term 'green competency' in this study derives from the concept of enterprise competitiveness, based on the reality of enterprises' requirements for environmental protection and sustainable development. Green competency refers to the

ability of enterprises to gain competitive advantages in market access, trade and value creation by combining sustainable development strategies (based on environmental protection with enterprise requirements and interests) to provide more attractive green products and services. By paying more attention to environmental protection, green competency becomes a major factor in an enterprise's competitiveness. Chinese enterprises now face challenges in relation to tackling increasing penalties for not meeting green requirements as well as trade restrictions in international markets.

Green skills include those needed to produce environmentally friendly products and ensure good environmental practices in enterprises. The notion of green skills therefore includes professional and technical skills, as well as communication and negotiation skills that support environmentally friendly and sustainable business practices. Technical and non-technical skills are job-specific as well as generalised and should facilitate the change needed to move organisations towards the implementation of green policy (see definition adopted by this study, Chap. 1).

In 2007, the International Labour Organization (ILO) and the United Nations Environment Programme (UNEP) proposed the Green Jobs Initiative and defined green jobs as referring to decent work created in economic sectors and economic activities, which could reduce negative environmental impacts and ultimately achieve environmental, economic and social sustainable development.

In 2008, ILO and UNEP jointly published *Green Jobs: Towards Decent Work in a Sustainable, Low-Carbon World* (UNEP&ILO 2008), which defined green jobs as work in agriculture, manufacturing, research and development (R&D), administration and service activities that contribute(s) substantially to preserving or restoring environmental quality. Meanwhile, PRC's revised dictionary of occupations defines green jobs to include:

- production activities, including monitoring, protection and management and beautification of the environment.
- development of new energies such as solar, wind and biomass energy.
- those that guarantee efficient handling of increased traffic.
- recycling and reusing of waste.
- services dealing with research, technology development, design and planning.

This definition of green jobs draws on developed countries' experience in ecological balancing and the sustainable development of human production and life, as well as career development. It promotes the harmonious development of PRC's economy and society while pushing for environmental protection, low-carbon emissions, recycling and sustainable development, and entails a continuous adjustment of the industrial structure and human resources, as well as planning to promote the training of workers and green employment.

The status of recognition, validation and accreditation (RVA) in relation to the People's Republic of China

The People's Republic of China's *National Plan for Medium and Long-term Education Reform and Development* (2010–2020) (Xinhua News Agency, 2010) aims: to

establish a system of credit accumulation and transformation in continuing education to achieve mutual recognition and a connection between different kinds of learning outcomes. It also includes a policy to establish a system of learning outcomes certification and a credit bank system.

The 13th *Five-year Plan for Education* has put forward the clear ambition of 'accelerating the development of continuing education to establish the certification, accumulation and transformation system for learning outcomes, [and] the national school credit bank'. Compared with the national education plan in 2010, this ambition gives a clearer and concrete expression to relevant tasks and measures and echoes the structural adjustment and institutional innovation highlighted in the plan.

The groundwork for the development of a lifelong learning system, educational bridges for talent development, certification and an accumulation and transformation system for learning outcomes are key factors that promote enthusiasm for lifelong learning, a diversity of courses as well as support for student mobility, education quality and fairness.

PRC began a practical exploration of related fields long before 2010 and has accelerated the development in recent years. The Self-Examination System of Higher Education, initiated in 1981, is such a system—it accumulates and certifies the self-study outcome of citizens by examination. At the same time, some adult colleges and higher vocational colleges in PRC have provisions in place to certify off-campus learning experience and learning outcomes among students to replace relevant courses in the campus.

In response to the National Programme for Medium- and Long-Term Educational Reform and Development, numerous universities and enterprises carried out practical explorations about credit recognition and mutual recognition, and some regions like Shanghai, Shaanxi, Jiangsu and Guangdong established a regional school credit bank. In addition, citizen school credit banks were built in the Xicheng District of Beijing, Cixi City of Zhejiang and other areas. The Open University of PRC also effectively improved the standing of school credit banks (Song, 2012) by taking into account students' previous credits during the admissions process and exempting students from taking some courses or examinations. Those who have the CET-4 (College English Test 4) or above can be exempted from the public English examination.

5.2 Methodology of Primary Data Collection

The study adopts the overall methodology developed by the project and used the developed instruments such as survey/interview questions, the observation list and the list of generic green skills to collect data (see Chap. 1). At the micro-level, in order to understand how small, micro and medium enterprises undertake green practices and promote the development and recognition of green skills, interviews were conducted in 32 enterprises in four different sectors (automotive, catering, PVC production and waste management—eight in each industry) using a semi-open-ended

questionnaire. In each sector, four formal sector SMEs and four micro-enterprises in the informal sector were interviewed. In all, 75 of 80 questionnaires were completed.

The enterprises were located in different regions of PRC: the automotive enterprises were in Hangzhou, Jinhua and Suzhou; the catering enterprises were in the Xihu district and Xiasha Higher Education Zone of Hangzhou, the capital of the Zhejiang province; SMEs involved in PVC production and manufacturing sales were located in Guangdong, Jiangsu, Zhejiang and Shanghai.

The catering enterprises provided seafood, snacks and buffets. Catering SMEs were mainly cafe owners, managers and head chefs. The respondents of micro-catering enterprises were self-employed entrepreneurs and owners of enterprises. Micro-catering enterprises mainly prepared noodles and hot pots. The PVC SMEs were engaged in manufacturing and sales of all sizes of PVC building, water-supply and drainage pipes, PVC environmentally friendly rubber sponge products, PVC flexible pipes and plastic injection moulds. They made up the middle and backend of PVC production. The four informal micro-enterprises were self-employed owners of workshops. They were engaged in making individualised custom-made small kitchenware moulds. The workshops received orders and then sub-contracted factories who then undertook the small-batch production. The PVC industry is generally based in mainland PRC. The research was carried out with the four SMEs in PVC industrial production. In the waste management sector, in which the state environmental protection departments of the government in PRC play a major role at all levels, the respondents were selected from local government environmental management departments, as well as from the waste management departments of production enterprises. The automotive SMEs were small car wash shops that needed a lot of water every day. The respondents were self-employed entrepreneurs and owners.

The average size of automotive SMEs is small, so usually there are 10–20 workers in each. Micro-automotive enterprises have only 10–15 staff. The four PVC SMEs employed between 80 and 200 employees. The catering SMEs had between 10 and 40 staff. Two of the four SMEs catering enterprises had 40 employees and the other two had 15 and 30 staff, respectively. There are usually fewer than ten people in micro-catering enterprises. Two of the four micro-catering enterprises had four staff and the other two had three and six staff. And the waste management SMEs have 20 workers on average while micros have less than 10 staff.

Most owners of automotive SMEs have received secondary vocational education or higher vocational education, but all respondents from the micro-automotive enterprises had received technical school education. Most of the staff in the four SMEs in the catering sector had secondary school education or vocational training. The educational levels in the micro-enterprises of the catering sector—middle and high school—were lower than in the studied SMEs. The number of employers and employees in PVC SMEs with specialised vocational training and higher education was higher than enterprises in the other studied industry sectors. The enterprises in Guangdong and Shanghai, with 75% in Kang Cheng and with 70%, stand out among the eight investigated enterprises. Zhejiang Jirui had 60%, while Jiangsu Dengyue had 58% of employees with specialised vocational training or higher education. The respondents from the waste management sector had all only received secondary or middle school education.

5.3 Results and Discussion

Results in relation to green skills

The preceding section outlined key priorities for green enterprise development from the macro-level perspective of policy and legislation. It also briefly considered the status of recognition of prior learning in PRC. While the starting point was to understand the enabling environment, the study expands to the analysis of local needs, specifically from the perspective of those working in the enterprises—the employers, trainers and workers in SME and micro-enterprises. Their potentially differing needs for green practices and skills, as well as recognition mechanisms, are analysed and compared. The study also considers how green practices in enterprises interact with macro policy, regulations and meso institutional standards.

Awareness of policy and regulations

The research found that all four SMEs in the catering sector knew about environmental protection laws and regulations relevant to their industry. However, only one micro-catering enterprise demonstrated knowledge of some elements of the environmental regulations. Their awareness of environmental law was limited to platoon lampblack, domestic sewage, use of clean oil and plastic products. Their knowledge, acquired mainly through the process of administrative law enforcement, was narrow. Catering enterprises are chiefly concerned with survival and profit, and the motivation for implementing environmental protection stems mainly from government enforcement measures rather than from their own awareness about environmental degradation and the stress that should be placed on environmental protection. The study demonstrated high awareness of environmental measures among owners of SMEs (all four displayed awareness) versus a very low awareness among owners of micro-enterprises in the informal sector—only one owner displayed awareness. Of all eight enterprises in the catering sector, six enterprises had formulated regulations and rules for front desk attendants, bakers and cooks, while two of the micro-enterprises had formulated regulations and rules but only for cooks and shopkeepers. SMEs were more likely to follow green practices than micro-enterprises.

In the PVC sector, four SMEs showed a high level of awareness of policies and regulations. Except for Zhejiang Jirui, three of the four enterprises studied had established a full-time environmental quality assurance department to supervise the implementation of green policies.

In the waste management sector, both four SMEs and micro-enterprises showed low levels of awareness of the policies and regulations. Four automotive SMEs had a better understanding of policies and regulations, while four micro-automotive enterprises were uncommitted.

Importance attributed to green practices

Green practices in the automotive industry

Out of the eight automotive enterprises (four SMEs and four micro-enterprises), only two stressed the importance of green skills and engaged in green practices. The remaining four automotive enterprises, which were mostly informal roadside car-repair firms, possessed no green skills or green environmental protection requirements and measures. Unlike the micro-enterprises in the catering sector, the automotive SMEs placed a higher level of importance on green skills and environmental protection measures.

Green practices in PVC enterprises

The question of the importance of green skills for PVC enterprises was posed as a sliding 1–10 Likert scale, with 1 representing low consideration for environmental pollution and 10 representing high consideration for environmental pollution. Guangdong Kangcheng and Shanghai Feili rated their enterprises as having placed a high importance on green skills (7–8), followed by Zhejiang Jirui (6) and Jiangsu Dengyue (4).

Green practices in catering enterprises

Table 5.2 shows that in the main it is the SMEs, rather than the micro-catering enterprises, that had adopted specific green practices such as brochures, incentives, courses and marketing strategies for promoting environmental practices. One of the findings was that enterprises generally concentrated more on green practices that saved costs, such as saving water and energy. There was very little motivation to introduce measures that would increase the cost of running the enterprise.

Green practices in the waste management industry

None of the respondents in the waste management sector had any awareness of green practices. They considered it a waste of money.

Skill requirements in the enterprises

In relation to which skills/competencies are required to sustain environmentally friendly practices, more SMEs than micro-enterprises identified green skill requirements.

Box 5.3 Skill requirements in the enterprises

Waste management

Respondents in micro-enterprises pay more attention to basic practical skills related to their own occupations and jobs, such as collecting, storing, sorting, and recycling rather than environmentally friendly skills.

Automotive

(An example for one occupation—car maintenance).

Table 5.1 General information on enterprises participating in the study

Industry sector	SMEs					Micro-enterprises				
	Number of SMEs	Type of enterprises and products and services	Average size of SMEs	Total number of employees	Educational levels	Number of MEs	Type of enterprise	Size of the micro-enterprises	Total number of employees	Educational levels
Automotive	4	Automobile sales service	10–20	70	Secondary vocational education, higher vocational education	4	Auto Repair enterprises	5–10	35	Technical school
Catering	4	Restaurant, hotel, food management company	10–40	125	Secondary school education and vocational training	4	Cuisine restaurant, noodle shop, beef noodle shop, seafood shop	10 and less	17	Middle and high school

(continued)

Table 5.1 (continued)

Industry sector	SMEs					Micro-enterprises				
	Number of SMEs	Type of enterprises and products and services	Average size of SMEs	Total number of employees	Educational levels	Number of MEs	Type of enterprise	Size of the micro-enterprises	Total number of employees	Educational levels
PVC	4	Plastic company, sponge company, plastic company, precision mould company	Above 10 employees, in some cases between 80 and 200	490	Higher secondary and vocational training	4	Kid's Fun Hand-work enterprises, kitchen mould, cartoon and animation handicraft	8 and less	25	Middle and high school
Waste management	4	Renewable Resources Recycling Co. Ltd	10–30	100	Secondary school education	4	Waste Products Recycling Station, renewable resources recycling Station	10 and less	39	Middle and high school
Total	16		50	785		16		7–8	116	

Source Author

Table 5.2 Green practices in catering enterprises

	Number of catering SMEs	Number of micro-catering enterprises
Environmental friendly practice in the enterprise		
Follow workplace procedures to minimise environmental impacts	2/4	1/4
Minimise and dispose of waste in an environmentally responsible way	3/4	1/4
Use non-renewable resources responsibly and reuse where possible	4/4	1/4
Record data relating to environmental risks, impacts and management	2/4	0/4
Promotion of green practice and green skills		
Rules and regulations related to green skills/greening of skills	3/4	1/4
Brochures and events to disseminate environmental awareness	3/4	0/4
Incentives for learning new skills required for new green technologies and practices	3/4	1/4
Courses for developing specific green technical skills	0	0
Courses on marketing strategies to promote cleaner and carbon free products and services	0	0

Source Author

- Basic professional ethics.
- One of the following educational certificates: technical school, secondary vocational education, or higher vocational education diploma.
- One of the certificates of professional technical levels: intermediate certificate, senior certificate, technician certificate, senior technician certificate.

Catering

(Three out of four small and medium enterprises).

- Environmental awareness and a willingness to learn about sustainable development.
- Interpersonal skills and technological skills.

- Inter-personal strategic and leadership skills to enable policy-makers and business executives to set the right incentives that create conditions conducive to cleaner production and cleaner transportation.
- Inter-personal skills ranked higher than job-specific skills.
- Competency-based training.
- Innovation skills to identify opportunities and create new strategies to respond to green challenges.
- Measures that would increase benefits instead of costs.

(Two micro-enterprises).

- Marketing skills to promote greener products and services.
- Competency based training.
- Innovation skills to identify opportunities and create new strategies to respond to green challenges.
- Measures that would increase benefits instead of costs.

PVC manufacturing

(SMEs).

Guangzhou Kangcheng, Shanghai Feili and Zhejiang.

- Cognitive competencies, intra-personal, inter-personal and technological skills.

Jiangsu Dengyue.

- Environmental awareness and a willingness to learn about sustainable development.
- Systems and risk analysis skills to assess, interpret, and understand both the need for change as well as the measures required.
- Strategic and leadership skills to enable policy-makers and business executives to set the right incentives and create conditions conducive to cleaner production and cleaner transportation.
- Coordination, management, and business skills to facilitate holistic and interdisciplinary approaches that encompass economic, social, and ecological objectives.
- Adaptability and transferable skills to enable workers to learn and apply the new technologies and processes required to implement green practices.

Source Author (based on green skills categorisation by Pavlova, 2017)

Workplace learning and training programmes

Four SMEs and three micro-enterprises in the catering sector supported staff training. Only one micro-enterprise said the work was easy and therefore training was not necessary. The enterprises that supported training said it would be beneficial in

terms of improving skills, enhancing enterprise development and increasing business profits. All catering SMEs had some form of workplace training and acknowledged the importance of recognising 'green skills'. On the other hand, micro-enterprises were not inclined to recognise 'green skills' and RVA was not high on their training agenda.

None of the automotive enterprises attached importance to workplace training, in particular the four micro-enterprises, due to their high staff turnover.

Eight enterprises in the waste management sector supported their staff training, but only when staff were first hired in order to standardise work procedures and management.

All PVC small and medium enterprises were positive towards workplace learning and training. They felt it would benefit staff development and were agreeable to continue to provide as many such opportunities as possible. They also identified training objectives which, they said, should relate to new green technologies, meet the requirements of professional development set by the enterprise, fill skill gaps that they were not able to fill during recruitment, and comply with new regulations and legislation. All of these learning objectives reflected the differing demands of the enterprises, which in turn highlighted the different levels of green development among the enterprises.

There was also a difference between the four PVC enterprises in terms of what they referred to as 'the expected skills', 'the providers of the training', 'the assessment methods' and 'certification' at the conclusion of training. Staff training was internal and was usually supervised and assessed by the executive or the human resources department. Given this internal nature of enterprises' training, their personnel departments could easily issue certificates.

The PVC enterprises believed that staff training would improve the performance of employees and the quality of production, promote the long-term development of their enterprise and improve standards for a greener PVC industry in PRC.

The PVC enterprises responded positively towards workplace learning/training programmes in the context of RVA. Employers said they understood RVA to refer to the identification and assessment of previous skills and education among employees, or potential employees, before recruiting the candidate into a training programme.

Embedding RVA mechanisms in green skills workplace learning

Regarding RVA, all automotive SMEs affirmed they had some informal mechanisms to identify, document, assess, recognise and certify the achievements of employees acquired in the workplace, community, artistic or other life activities, as well as through non-formal workshops, conferences and training programmes. However, they but did not offer RVA for employees. They evaluated employees' competencies through interviews. There were no responses from micro-enterprises on the issue of RVA.

Three catering SMEs said they recognised non-formal and informal learning of their employees; however, they did not apply formal methods and were not interested in certifying their employees—they were more interested in how the employees were able to apply their practical skills. One catering SME demonstrated interest in

an employee's virtue and skills. In addition, one catering enterprise maintained an archive system for recording employees' skills, their virtues and application skills. Overall, micro-catering enterprises had no formal system for recognising skills. They stressed more importance on an employee's practical skills than their previous educational certificates. When recruiting new staff, most catering SMEs said that they adopted interview, display of skills and test methods. Recruiting through a friend's introduction was another way they recruited staff. Most catering SMEs and micro-enterprises had no RVA system related to green skills certification. RVA was not used to recognise previous learning certification with the intention of strengthening future green skills. Most companies thought green skills simply benefitted individuals and the country, rather than being of specific benefit to the enterprise itself.

In PVC enterprises, employees' skills were assessed during the interview process and, based on the results of the interview, supplementary training was offered. During recruitment, the PVC SMEs checked qualification certificates and evaluated and recognised the professional knowledge mentioned in certificates or resumés. Guangdong Kangcheng and Shanghai Feili asked only for certificates, and candidates were not expected to go through an interview in order to prove their competencies. None of the four enterprises had records of certificates that listed previous learning abilities.

It was the task of the human resource department to decide the assessment standard, record and publish the results, as well as to assign qualifying personnel to appropriate tasks. Skills assessment was not derived from certificates; rather it was internally validated by the enterprise.

The PVC SMEs lamented the lack of a PVC certification authority for awarding certification through the RVA process and highlighted the gap between PRC and countries in Europe and North America in the implementation of RVA for professional development in workplaces. However, they displayed a high interest in RVA when asked if they were willing to hire employees by conducting RVA, saying it would greatly reduce human resource costs and training time and would improve the enterprise's operation and efficiency.

No data on RVA were obtained from the waste management sector. This was because of the low emphasis placed on RVA in this sector in PRC.

Enterprises' vision for the future: Inclusion of green skills in RVA

All catering SMEs that participated in the study were willing to promote environmental protection measures. The SMEs said they were open to formulating a company vision about green skills, to include green skills into RVA certification and to learn more. By contrast, there was a mixed response from the catering micro businesses: one was interested in RVA, two wanted to strengthen green skills by using RVA and one said it had no such vision for the future.

The SMEs in the PVC sector indicated that they attached high importance to the principle of clean production and were interested in maintaining and improving clean production. As for achievements in the field of 'helping to improve environmental friendly practices' and 'recognising and reporting potential environment threats' in

the PVC industry, Zhejiang Jirui and Jiangsu Dengyue could be rated at the intermediate level, while Guangdong Kangcheng and Shanghai Feili could be rated at the level of high achievement.

Regards to automotive enterprises, only one enterprise, called Zhejiang Hecheng Quantong Automobile Service Company, had a clear requirement for green skills, and the others responded positively (although they do not keep any records in that regard).

Enterprises in the waste management sector all expressed a strong desire to strengthen green skills and improve their environmental protection practices through certification of previously learnt skills, which they believed reflects their professional attitude and dedication.

5.4 Conclusions and Recommendations

Compared to micro-enterprises, SMEs are largely more environmentally friendly. However, there are still some limitations, considering that many green practices are not fully implemented and insufficient attention is paid to regulating standards.

Regarding the practice of RVA across the four investigated industries, enterprises in the catering and automotive industries were found to have some mechanisms to recognise previous learning, certificates, skills and work experience and prior competencies, but in general, RVA has not been broadly promoted in PRC, and the country lags behind Western countries when it comes to enterprise-based RVA.

In countries with a well-established RVA system, recognition processes are being used in varying situations and for different purposes, such as ensuring access to further education and training, integration into the labour market and personal and professional career development. An increasing number of countries are using RVA to highlight the competencies of workers in enterprises. This helps them to establish existing skill gaps and overcome them through work-based training that is good increase company's competitiveness. This exploratory study has produced some significant information with respect to the importance of establishing an enterprise-based RVA system and enabling enterprises to improve their green competitiveness.

Recommendations for addressing greening skills challenges

Recommendations are listed below for the purposes of addressing the challenges associated with greening skills in PRC:

- Set up a dialogue between government, employers and employees to discuss the transformation of the education and training sector, emphasising shared responsibility among stakeholders for investment in education.
- Ensure that changes to the education system are driven, and led by, the State. National qualification standards for all green collar occupations are required, and

levels of government investment in vocational education and training need to be increased.

- Through the process of consultation with industry, facilitate employers and trade unions to develop a green curriculum that meets the needs of industry. Teachers and trainers should generally be industry experts, as well as academics (with dual qualifications). Flexible learning delivery methods will make green training more accessible to workers and will encourage participation across sub-sections of the community.
- Build awareness of specific measures that businesses can take to reduce the environmental impact of their activities and improve their compliance with relevant state and national legislation. Where sustainability remains a relatively low priority for businesses that are not large emitters, the government will need to provide incentives through investment in green skills training.
- Raise the profile of employment opportunities in green and sustainability sectors through communications related to career advice, training and the creation of employment pathways.
- Conduct further research on professional qualification standards for green jobs and skills.
- Build a bridge between enterprises, training organisations, vocational schools and government to recognise previous learning outcomes.

Significance

Strengthening the training of workers and improving their green skills is an important part of promoting a smooth transition towards a green economy and industry in PRC. The inclusion of green skills in RVA could provide a significant push in this direction. In emerging industries, the demand for professional knowledge and high technical ability requires the state, enterprise, and society to strengthen the training among high-quality personnel. Practical and effective measures should be taken to protect labour rights and interests, improve labour conditions, enhance workers' abilities and quality through training and gradually improve the employment level, i.e. people's access and ability to secure a job or promotion.

In the process of transforming the Chinese economy, it will be necessary to adapt not only to the needs of the domestic economy but also to international economic developments. The development of green economies should improve enterprises by creating green employment opportunities, which should improve the quality of jobs as well as create decent work. From the experience of established green economies, the country will incur high start-up costs in the initial stages of the green transition. It is also important to note that this transformation carries great risk for enterprises.

Enterprises need to strategically respond to significant national policies. However, at the same time, they must respond to market competition and social environment requirements. All three—state, market and society—must work together and support one another. Of course, all parties need to face the short-term pain of transformation; they need to work together to share resources to create a more suitable environment for green development and survive.

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Chapter 6
Case Study: Hong Kong Special Administrative Region, People's Republic of China. Realities of MSME: What Green Skills Are Included in the RVAs?

Margarita Pavlova

Abstract This chapter presents and analyses the results of a Hong Kong SAR, PRC, study. Sixteen micro, small and medium enterprises (MSMEs) were interviewed in Hong Kong SAR, PRC: four in automotive, four in waste management and eight in the catering sectors. Data collection on PVC manufacturing was not feasible due to the inactivity of that industry in Hong Kong SAR, PRC. The automotive and waste management industries are regulated by the government, so all results were obtained from the formal sector. Regarding the catering industry, both formal and informal companies were interviewed and visited for observations. Results revealed that some green practices have been applied by MSME, and employers stated that the successful implementation of environmentally friendly operations greatly depends on the attitudes and behaviour of staff, in many cases even more than on particular skills. Across three sectors the majority of owner/managers had not heard about recognition, validation and accreditation (RVA) mechanism. They believed that adding RVA processes could be somewhat unhelpful, particularly for the automotive industry, as an apprenticeship scheme was in place and was used to certify obtained skills. MSME believe that the inclusion of green skills in RVA might negatively affect the hiring processes in the industry. The findings demonstrate that inclusion of green skills in RVA mechanism in Hong Kong SAR, PRC, requires a strong political push from the government. An awareness campaign for industries and the private sector is vital to clarify the benefits of RVA and greening. Key performance indicators, clearly defined targets and available support for MSME are essential. Education has a clear role to play in developing green mind-sets.

Keywords RVA mechanism · MSME · Green skills · Environmental practices catering · Automotive and waste management industries · Hong Kong SAR · PRC

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Abbreviations

MSMEs	Micro, small and medium enterprises
PVC	Polyvinyl chloride
RVA	Recognition, validation and accreditation mechanism
UNESCO	United Nations Educational, Scientific and Cultural Organization
Hong Kong SAR	Hong Kong Special Administrative Region
MSW	Municipal solid waste
HKTDC	Hong Kong Trade Development Council
SMEs	Small and medium enterprises
GDP	Gross domestic product
HKPC	Hong Kong Productivity Council
QRMS	Quality Restaurant Environment Management Scheme
EPD	Environmental Protection Department
FRT	First registration tax
STF	Sludge Treatment Facility
OWTFs	Organic Waste Treatment Facilities
IWMF	Integrated Waste Management Facilities
NCVER	National Council for Vocational Education Research
PRC	People's Republic of China
RPL	Recognition of prior learning
QF	Qualifications framework
SCSs	Specification of Competency Standards
ITAC	Industry Training Advisory Committee
UoC	Units of clustered competencies
LPG	Liquefied petroleum gas
EMSD	Electrical Mechanical Services Department
LED	Light-emitting diode
VOC	Volatile organic compound
VTC	Vocational Training Council
HKVRMA	Hong Kong Vehicle Repair Merchants Association Limited
EVRA	Environmental Vehicle Repairers Association Limited
KPI	Key performance indicator

6.1 Introduction

Human resources are one of the greatest assets in any country or territory. Skills, knowledge and competencies of employees should be viewed as key for economic development as well as the realisation of environmental sustainability. Imparting knowledge and facilitating the inclusion of green skills in learning for all occupations can achieve this. In addition to formal learning, work experience obtained

in non-formal and informal settings is of particular importance for the greening of industries, as greener operations and greener technologies can very often be learned best within the workplace. To recognise and value the hidden competencies attained by individuals in various settings, many countries use recognition, validation and accreditation (RVA) mechanisms that have been identified by UNESCO as a key strategy to promote lifelong learning. Although RVA exists in many places it is not clear how it is perceived by micro, small and medium enterprises (MSME) in Hong Kong SAR, PRC, and to what extent competencies that are related to environmental protection are visible in existing units of competencies. It is also not clear what environmentally friendly practices exist in Hong Kong SAR's MSME or what skills are required to support/improve them. These green skills should be possessed by the workforce in a variety of sectors as they are important for achieving the environmental goals established by the Hong Kong SAR government.

Socio-economic and educational context

In the eyes of many, Hong Kong remains 'Asia's world city' after the transition from Britain to a Special Administrative Region (SAR) within the People's Republic of China. Ever since the handover of sovereign rule back to PRC, Hong Kong SAR has experienced major socio-economic changes. Economic integration between the two regions has broken down communication barriers and increased interaction between mainlanders and Hong Kongers. 'The front shop back factory model' describes economic restructuring in Hong Kong SAR, PRC, after 1997, referring to this socio-economic integration, where manufacturing production has relocated to PRC's provinces and Hong Kong SAR has specialised in commercial and financial services, marketing and design (Chiu and Lui 2009).

During the British colonial era, higher education was limited to elite students until rapid industrialisation and greater prosperity demanded an increase in the number of knowledgeable individuals. In the 1970s, technical training and education became important, so the Hong Kong Polytechnic was established. Later, from the 1980s to the present day, formal higher education became central to the knowledge-based economy, first under British rule and then as an SAR, with the purpose of nurturing innovation leaders, entrepreneurs, engineers and business management elites. After two waves of higher education massification (Cheng 2009), access to post-secondary education has surged from 30% in the 2000s to nearly 70% in the 2010s (University Grants Committee 2010). The educational reform of secondary education undertook five guiding principles: student-focused, 'no-loser,' quality, 'life-wide' learning and society-wide mobilisation. The fifth principle, 'society-wide mobilisation' suggests learning beyond the classroom, with contributions from all sectors of society as well as an appreciation of lifelong learning by learners (Cheng 2009). Importantly, both lifelong learning and life-wide learning emphasise autonomous learning in both formal and non-formal settings. Thus, the recognition of this type of learning should be one of the priorities.

Environmental challenges in industry

Environmental challenges raise serious concerns for our world and make the shift towards green economies inevitable. Policies on environmental protection, energy, education and training are driven by the challenges of environmental degradation and have become a critical, ethical matter for sustainable development, including decent work conditions. Likewise, government, enterprises and organisations in Hong Kong SAR, PRC, are also dealing with complex and ever-changing environmental issues. The three industries under examination (automotive, catering and waste management) in Hong Kong SAR, PRC, have encountered various environmental challenges in recent years.

Catering

Statistics of the catering industry demonstrate an increase in the number of people employed in the sector as well as the number of restaurants over recent years. There was a total of 237,333 persons engaged in food and beverage services in 2013, a 0.9% increase compared with 2012 (Census and Statistics Department 2015a). The number of food business licences issued in Hong Kong SAR, PRC, by the Food and Environmental Hygiene Department has increased steadily and reached 8,926 in 2013, representing an increase of 6.4% from 2010 (ibid.). For the same period, light refreshment restaurant licences issued increased from 3,053 to 3,155, representing an increase of 3.2% (ibid.). The number of liquor licences issued has also increased, reaching a total of 5,975 in 2013 compared to 5,291 in 2010 (Ibid.). There were 449 club liquor licenses in 2013 compared to 491 in 2010 (Ibid.).

Food waste is one of the major environmental challenges that this industry faces due to festive binge eating and drinking in Hong Kong SAR, PRC (Ng 2015). Around 3,600 tonnes of food waste is produced daily, which equals to a combined weight of 300 double-decker buses (Environmental Protection Department 2017). The amount produced ends up in landfill where space is limited and therefore imposes a severe burden on the local environment.

Waste management industry

The waste management sector in Hong Kong SAR, PRC, commonly deals with municipal solid wastes from domestic premises, commercial sources and public facilities. 3,012 individuals are engaged in waste collection, treatment and disposal, together with materials recovery in 2013, which is 30% more than in 2012. In 2012, the industry grouping of sewerage, waste management and remediation activities achieved a gross surplus of HK$553 million (Census and Statistics Department 2014). Taking 2008 as reference, with a value of 100, the index of industrial production for sewerage, waste management and remediation activities increased sharply and reached 121 in 2014 (Census and Statistics Department 2015b).

Currently, around 15,332 tonnes of municipal solid waste are produced daily in Hong Kong SAR, PRC (Environmental Protection Department 2017). In 2013, 2.01 million tonnes of municipal solid waste were recovered, yet only 7% was recycled locally. The rest of the municipal solid waste was exported to the mainland and other

countries for recycling (Environmental Protection Department 2015a) or end up in landfills (Fig. 6.1).

Until recently, recycle and landfill of waste were the two main waste management approaches in Hong Kong SAR, PRC (Fig. 6.2).

Compared to other international cities and territories, Hong Kong SAR's recovery rate for municipal solid waste (MSW) after running source separation and recycling initiatives is acceptable. Eighty-three percent of the population in Hong Kong SAR, PRC, have waste separation bins in their residential buildings (Environmental Protection Department 2013). Approximately 4,500 sets of separation bins can also be found in public spaces and 2,400 sets in commercial, industrial and institutional locations (ibid.). This measure results in 48% of the MSW recovery in 2011 (ibid.). However,

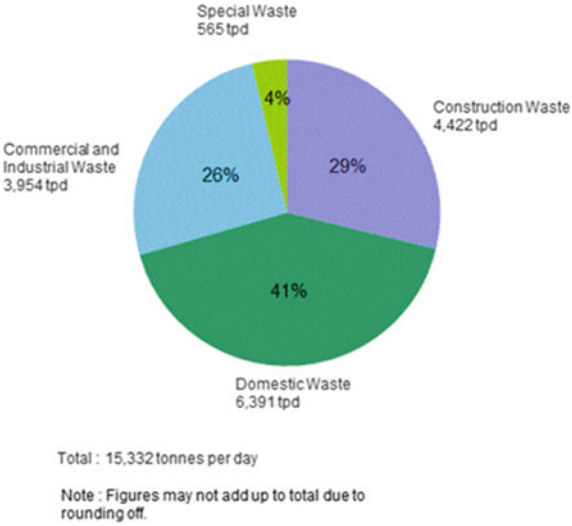

Fig. 6.1 Types of solid waste disposed of at landfills in 2016. *Source* Environmental Protection Department (2017)

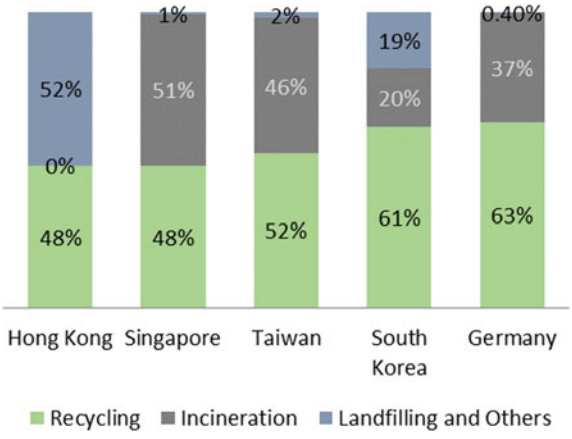

Fig. 6.2 Municipal solid waste management comparison: recycling, incineration and landfilling and other. *Source* Environmental Protection Department (2013)

the generation and disposal rates are higher than other cities such as London, Tokyo, Seoul (Environmental Protection Department 2013), making this the most critical area to be addressed in waste management.

Growing waste loads due to an increase in population and limited space for landfill sites are serious challenges for this industry. Three existing soon-to-be-saturated landfill sites are under tremendous pressure.

Automotive sector

There was a sharp drop in the total number of persons engaged in the assembly of motor vehicles and the manufacture of other transport equipment: from 1,661 in 2012 to 1,028 in 2013.

However, the number of vehicles on the streets of Hong Kong SAR, PRC, has not decreased. Vehicle emissions are a major source of street pollution and the problem has intensified in urban districts due to congested traffic. Emissions from diesel commercial vehicles including trucks, buses and public light buses produce large amounts of particulates and nitrogen oxide. Worsening congestion is contributing to poor roadside air quality (Table 6.1).

With vehicle speeds decreasing, and the number of vehicles on the road increasing, Hong Kong SAR, PRC, is running into a vicious cycle—even as cleaner vehicles are being deployed, emissions per kilometre tend to rise due to slower average road speeds, especially in city centres with high populations and, as a consequence, high exposure risk (Environment Bureau 2013a).

Hong Kong SAR government response to environmental challenges

The Hong Kong SAR government has been promoting a 'green economy' since 2009, designed to achieve a balance between economic development and environmental protection. The green economy was emphasised in the Budget Speech 2009–2010

Table 6.1 Types of registered vehicles

Types of registered vehicles	Numbers	PM 10 emissions profile (tonnes)	Nitrogen oxide emissions profile (tonnes)
Franchised buses	5,743	70	6,390
Non-franchised buses	7,613	120	2,100
Heavy goods vehicles	119,883	660	10,100
Light goods vehicles		230	4,250
Private cars	494,646	20	890
Motorcycles	57,368	10	180
Taxis (LPG)	18,138	–	7,600
Public light buses (66% LPG 34% Diesel)	4,350	70	1,040
Private light buses (24% LPG 76% Diesel)	**2,463**	**10**	**110**

Source Census and Statistics Department (2014)

(Financial Services and the Treasury Bureau 2009). To align with the 2009–2010 policy address, the Chief Executive selected the environmental industry, alongside five other industries, to enjoy clear advantages in development (Government Logistics Department 2010). In recent years, the government has been taking the lead in strengthening new environmental protection initiatives among government departments and encouraging the private sector to support environmental industries through financial incentives. Over the years, electric vehicles, new energy technology, green specifications and green products to enhance energy efficiency have been introduced.

In Hong Kong SAR, PRC, the environmental industry focuses on six business areas: water conservation and pollution control, air and odour pollution control, energy conservation, waste treatment, disposal and recycling, noise control and mitigation and environmental consulting services (HKTDC 2017). Most enterprises in these environmental industries are SMEs (89%), with less than 100 staff and they specialise in water conservation and pollution control, air and odour pollution control, waste recycling or recovery, noise control and energy conservation (Innovation and Technology Commission 2015). Currently, there are approximately around 300 such establishments in Hong Kong SAR, PRC (HKTDC 2017). This industry has been enjoying clear advantages with much governmental support. The value of environmental industries grew by 5.2% to $7.1 billion in 2013 (or 0.3% of GDP). Employment by the industry amounted to 43,750 persons in 2017, accounting for 1.2% of total employment in Hong Kong SAR, PRC (HKTDC 2017).

The government has launched different programmes and initiatives with respect to the catering, automotive and waste management sectors.

The CarbonSmart Programme launched by the Hong Kong Productivity Council (HKPC) and various industry partners, with support from the Environment and Conservation Fund, encourages local enterprises to reduce carbon emissions. The programme provides suggestions for the catering sector, including the installation of super gas steamer series appliances by Towngas for saving electricity and water in steaming, recycling of used cooking oil and the introduction of low-carbon dishes (Hong Kong Productivity Council 2015).

'The Quality Restaurant Environment Management Scheme' was developed in cooperation with the Hong Kong Federation of Restaurants & Related Trades and the Hong Kong Productivity Council. The scheme provides guidance to catering industries about how to implement environmental management. The whole scheme is divided into seven areas: energy efficiency, water efficiency, waste management, wastewater management, air pollution control, noise pollution control and overall environment management (QREMS Accrediting Body Secretariat 2014). Detailed suggestions on each of the seven areas are provided. 'The Food Waste Recycling Partnership Scheme', launched by the Environmental Protection Department in 2009, aims to recover food waste from the 1,000 tonnes in 2011 to the 30,000-plus tonnes in 2013 that accounts for 1.5% of the total recovered municipal solid waste (EPD & Green Council 2017). Keeping a control on food wastage not only saves business costs in the purchase, preparation, cooking and serving processes; it also helps to preserve the environment.

In the automotive sector, the Hong Kong Productivity Council has developed several new technologies for manufacturing different automotive parts with higher cost effectiveness, including the development of an over-moulding tandem injection moulding machine, the application of nano-technology on coating and the use of light metal on the manufacture of automotive parts (Hong Kong Productivity Council 2017).

The introduction of electric vehicles was a part of Hong Kong SAR's strategy to promote a green economy. From 1994 to March 2017, the government had provided first registration tax (FRT) concessions for all electric vehicles to encourage buyers. Electric vehicles are considered 'green' cars as they cause zero roadside emissions and have lower overall emissions of carbon dioxide. Electric vehicles are quieter, more economical and energy-efficient. However, in the Government Budget 2017–18, the above concessions were replaced by the waiving of FRT for electric private cars up to HK$97,500 (Environmental Bureau, 2017). According to the *South China Morning* Post (2018), this policy led to a decrease in sales of electric cars from 2,078 (April to December 2016) to 99 (April to December 2017). Therefore, in the latest 2018–2019 Budget, in addition to the waiving of $97,500 in tax, the government has set up the new 'One-for-One Replacement' Scheme, which will run for three years and can increase the FRT concession to HK$250,000 (ENB 2018). With this new scheme, the FRT for electric private vehicles which cost less than HK$375,500 will be zero.

In the waste management sector, the Hong Kong SAR, PRC and Guangdong governments are exploring cross-boundary cooperation in recycling so that recyclables generated in Hong Kong SAR, PRC, are transported to the mainland for further reuse. This can help the development of waste recycling industries (Advisory Council on the Environment 2010).

Recently, Hong Kong SAR, PRC, has started to introduce a variety of new waste-related technologies that generate energy. STF (Sludge Treatment Facility), OWTFs (Organic Waste Treatment Facilities) and IWMF (Integrated Waste Management Facilities) have been designed to produce considerable quantities of renewable energy that can be used in the city. Landfill gas captured by Towngas can be used as fuel for trucks or for household and business use. These opportunities will not only enable Hong Kong SAR's greenhouse gas emissions to be reduced, they will also add to Hong Kong SAR's overall competence in technology and waste management (Environment Bureau 2013b).

6.2 Terminology and Definitions

Conceptualisation of green skills

Green skills are commonly defined as skills required for reducing the negative environmental impact of enterprises and economic sectors. This study adopted the definition from the National Council for Vocational Education Research (NCVER) that

green skills are 'technical skills, knowledge, values, and attitudes needed in the workforce to develop and support sustainable social, economic and environmental outcomes in business, industry and the community' (NCVER 2013).

The concept of green skills is not very well known in Hong Kong SAR, PRC, and so it is not referred to by industries. Previous studies conducted by Pavlova (2015, 2016, and 2017) demonstrate that there are attempts in the education sector to develop skills within the context of greening, however, this concept is not well known to industry, even to those companies that implement green practices. To meet this challenge, comprehensive lifelong learning strategies are required to integrate sustainable development issues into training programmes, both through formal education and work-based learning, to ensure that the labour force has the right skills to deal with energy efficiency, waste and water management and other environmentally friendly practices.

The status of recognition, validation and accreditation

At present, informal and non-formal learning in Hong Kong SAR, PRC, especially work experience, is recognised through the established recognition of prior learning (RPL) mechanism under the qualifications framework (QF) launched in 2008. Ten industries, including Chinese catering and automotive, had been included in RPL by 2014 with expansion planned. RPL recognises previous knowledge, experience and skills of practitioners with various backgrounds in a formal manner. To ensure its credibility, RVA mechanisms are based on the Specification of Competency Standards (SCSs) formulated by individual industries. Each of the participating industries forms its own Industry Training Advisory Committee (ITAC) to develop, maintain and update the Specification of Competency Standards that form the basis for RPL mechanisms. By 2015, 20 ITACs for 21 industries/sectors covering over 50% of the total labour force had been set up.

Over the five years of the transitional period that ended in May 2017, practitioners applied for recognition of competencies at QF levels 1 to 3 by producing documentary proof of their years of relevant working experience, without the need to take any formal assessment tests. This scheme was set up to encourage greater participation among those who had worked their way up from junior positions and also to allow sufficient time for industries to adapt and accept the mechanism. The application fees have been also mainly waived. Currently, all applicants seeking recognition of qualifications at QF levels 1 to 4 are subject to assessment tests (in addition to the supply of required documentation) (Hong Kong Information Services Department 2012). This is to enhance the credibility and acceptance of qualifications recognised under RVA mechanisms.

Based on the SCS, formulated by the automotive industry and catering industry, competencies are assessed based on units of clustered competencies (UoC). For the automotive industry, for example, there are 50 clusters spread across four levels of qualifications. Some UoC include elements of environmental protection (e.g. monitoring and managing environmental protection operations; formulating management procedures for dangerous chemicals, pollutants and waste). Applicants can decide which level and which UoC they wish to apply for recognition at, based on their prior relevant working experience.

6.3 Methodology of Primary Data Collection

This study follows the methodology presented in Chap. 1. Secondary data on environmental regulations and challenges selected industries facing is presented in Sect. 6.1 above. Primary data was collected from sixteen companies in Hong Kong SAR, PRC: four in automotive, four in waste management and eight in the catering sectors. Data collection on PVC manufacturing was not feasible due to the inactivity of that industry in Hong Kong SAR, PRC. The automotive and waste management industries are regulated by the government, so all results were obtained from the formal sector. Regarding the catering industry, both formal and informal companies were interviewed and visited for observations.

The majority of the MSME involved in the study were located at Kowloon City, an old district in Hong Kong SAR, PRC, where many small industrial companies and restaurants are located. All interviewed automotive companies and the majority of waste management companies and restaurants were found there. One waste management company that was subsidised by the government was visited in Wong Tai Sin, and two restaurants interviewed were found in the Prince Edward area.

6.4 Results and Discussion

6.4.1 General Information on Enterprises in Different Sectors

Automotive Industry

A total of four companies were interviewed in the automotive industry, including one car washing company, one car repair and maintenance company, one motorcycle retail and maintenance company and one motor ‘beauty’ company. The number of employees in general was small, with mostly two to five staff, and the majority of the staff had reached an educational level lower than higher education. They provided

Table 6.2 General information on enterprises in the automotive sector

	Car Washing Company A	Car Maintenance Company B	Motorcycle Company C	Car Repair and 'beauty' Company D
Number of employees	5	2	15	3
Educational level	Secondary	Primary	Higher education, secondary and primary (one from VTC)	Higher education, secondary and primary
Products and service provided	Car washing, waxing	Car repair and maintenance, including engine checking and tyre changing	Retail and rental service for bike gears. Also routine maintenances, to complete engine overhaul, to racing bike tuning	Car coating and washing, blow dry, wax, tyre shining, dust vacuuming, dashboard, window and carpet cleaning

Source Author

a range of services, from car washing and waxing, car coating and vacuuming to complete engine overhaul and repairing (see Table 6.2).

Box 6.1 Case study of an enterprise in the automotive industry

Located in Kowloon City, Company B is a micro-sized car maintenance company with only two employees, including the manager of the company. The company does car repair and maintenance, including engine checking and tyre changing. They also provide consultation services in relation to damaged cars. The company is typical of Hong Kong SAR, PRC: the employer and employees had not progressed to higher education and the company is very small.

The Environmental Protection Department (EPD) made regular visits to update the company on vehicle emission regulations and perform exhaust emission tests on the cars they were maintaining to ensure the company's maintenance practices complied with emission standards. Emission control regulations for petrol and liquefied petroleum gas (LPG) vehicles were sent to the company via mail and Company B made adjustments to their engine checks in order to keep up with the latest required practice in Hong Kong SAR, PRC. Aside from random checks on the compliance of car maintenance practices from EPD, the company was also invited to join the Electrical Mechanical Services Department (EMSD)'s voluntary registration scheme for vehicle mechanics. The owner of Company B said he would recommend his employee

join the vehicle maintenance workshops conducted by the Vehicle Maintenance Registration Unit.

The owner of the company is not aware of possible environmentally friendly practices for his business, but his attitude towards greening of the industry is positive. However, he believed small enterprises like his only played a small part in car maintenance services, and a stronger push is needed from the government to green this industry. Furthermore, he said resources were limited for car companies to introduce environmentally friendly practices, and that government tended to neglect their industry since it was a 'light' industry in a sense that it is no longer a major industry sector in Hong Kong SAR, PRC, compared to the business and commercial sector. This, he believed, was a typical concern of automotive companies when it comes to greening skills.

Source: Author

Waste management enterprises

In Hong Kong SAR, PRC, waste management companies are issued a licence from the government to collect waste. The industry collects:

- Paper, cardboard, magazines, newspaper, paper wrapping;
- Five metals: aluminium, iron, steel, gold, copper;
- Glass;
- Electronic waste;
- Wood;
- Plastic.

While most of the waste is sold to mainland PRC and Southeast Asia, a small part is recycled locally at the Kowloon Bay Material Transfer Centre and Eco-park in Tuen Mun.

The interviewed companies were micro-sized, with working staff having only primary to secondary education. They provided door-to-door waste collection, and mainly collected waste from the industrial sector. Two of the companies had their own heavy trucks to collect construction waste from their clients, many of which were construction companies (see Table 6.3).

Box 6.2 Case study of a company in the waste management industry

Company D operates in a different manner from the waste management companies commonly found in Hong Kong SAR, PRC—both full-time staff had completed university education, it also recycles glass bottles and collects waste from residential buildings which big environmental companies refuse to service. Unlike other recycling and collecting companies, its community recycling centre does not function in a commercial manner: it receives financial

Table 6.3 General information on waste management enterprises

	Waste Management Company A	Waste Management Company B	Waste Management Company C	Waste Management Company D
Number of employees	3	2	5	2 full time 7 part time
Educational level	Primary	Secondary	Primary	Higher education (full time), primary/secondary (part time)
Products and service provided	Collect waste papers, aluminium, iron, steel, and provide demolition services for wasted products/furniture; export to recycle	Collect waste gold, silver, copper, iron, steel, old magazine/newspaper/paper wrapping, cardboard, furniture, CDs, aluminium cans, wood; export to recycle	Collect waste gold, silver, copper, iron, steel, old magazines/newspapers/paper wrapping, cardboard; export to recycle	Collect plastics, glass bottles, waste electrical and electronic equipment. Some transferred to the Kowloon Bay Material Transfer Centre or the EcoPark in Tuen Mun for local recycling

Source Author

support from the government Environment and Conservation Fund to support its operation.

While over 80% of Hong Kong SAR's population is covered by the Source Separation of Waste Programme, this centre, along with another 17, fills a gap by providing recycling outlets to those residents living in buildings not served with waste recycling facilities. Company D not only collects waste plastics, glass bottles and small waste electrical and electronic equipment, it also educates the public on waste recovery and encourages public participation. The centre also introduced waste reduction ambassadors to promote green practices. They rated themselves at 8 out of 10 on the scale in paying attention to environmentally friendly practices. They did not maintain any record on environmental risk but they did have management procedures and meetings to that effect. For example, they found that many collected plastic bottles were contaminated and not cleaned, in particular plastic bottles containing milk or soya milk, so they had brochures/talks to educate residents to wash plastic bottles before putting them into the bins.

To further encourage citizens to bring waste to the collection points, they had a scheme in which citizens could exchange recycling products brought to the centre for toilet paper, stationery or rice.

Source: Author

Catering industry

Interviews for the study were conducted in formal and informal settings in the catering industry. Both formal and informal restaurants were subject to regulations by the government, yet the difference was that informal restaurants were often family-run and labour law is not applicable to practices in these restaurants. In general, informal catering restaurants have much smaller scales of operation. As for the formal catering setting, three of the interviewed restaurants belong to one of the several chain restaurants in Hong Kong SAR, PRC, owned by local or international companies. The majority of employees in the catering industry have attained only primary to secondary education (Tables 6.4 and 6.5).

Box 6.3 Case study of a formal catering company

Restaurant C is a formal large catering provider that is one among eight restaurants in this chain in Hong Kong SAR, PRC. It also provides banquet services, such as celebration dinners and wedding dinner packages.

Restaurant C did not have specific regulations and policies on the environment. The general practice was for senior staff to remind employees from time to time to use less detergent as well as not to let water keep running from the taps, yet there were no specific regulations or code for those practices.

Table 6.4 General information on catering enterprises (formal sector)

	Restaurant A	Restaurant B	Restaurant C	Restaurant D
Number of employees	70	80	85	40
Educational level	Secondary and primary	Secondary (many from the mainland)	Primary	Secondary
Products and service provided	Providing food and support services to clients and customers in locations such as offices, factories, schools, hospitals, etc.	Restaurants with banquet services	Restaurants with banquet services	A Japanese restaurant which provides an 'all–you–can–eat' menu, banquet and party service

Source Author

Table 6.5 General information on catering enterprises (informal sector)

	Small restaurant A	Small restaurant B	Small restaurant C	Small restaurant D
Number of employees	2	1	3–4	8
Educational level	Higher and secondary	Primary	Secondary	Secondary
Products and service provided	Selling Chinese soup and herbal jelly	Selling Yunnan food	Selling dumplings, fish ball, beef ball noodle soup	Selling Western cuisine

Source Author

The operations management director and senior level management staff at the office were responsible for setting these regulations and policies and having them implemented throughout the chain of restaurants, while managers were responsible for monitoring at the restaurants. The restaurant does not find it necessary to carry out waste separation, so kitchen waste will be dumped with other municipal waste. The manager believed it would be very hard to separate different types of waste.

With regard to environmentally friendly practices, Restaurant C installed kitchen appliances fuelled by town gas to save electricity and switched to LED lighting. The waiters proactively advised consumers to try vegetarian options; however, the concern was more on health than the environment.

There were no practices and protocol with regard to promoting the skills required for implementing environmentally friendly practices, nor were there jobs or positions specifically assigned with the task of dealing with green practices.

Source: Author

Box 6.4 Case study of an informal catering company

Small restaurant C is an eatery located in Prince Edward, selling dumpling, fish ball and beef ball noodle soup. It can be viewed as a typical food store found on the streets of Hong Kong SAR, PRC. It employs three to four staff, all of whom were educated to high school graduation level.

Small restaurant C pays attention to environmental regulations and follows the guidelines stated in 'Grease Traps for Restaurants and Food Processors'. Occasionally, Environmental Protection Department (EPD) pay visits to the company to ensure greasy materials are removed from kitchen wastewater before it is discharging into the sewer systems.

Like the formal catering company, they did not have specific jobs or positions that dealt with green practice enforcement in the restaurants or for promoting the skills required to implement environmentally friendly practices.

Source: Author

6.4.2 Companies' Interest and Involvement in Greening, and Skills Required to Support These Practices

Automotive companies

The interviewed companies saw no specific standards or guidelines in terms of environmental protection being enforced in the automotive industry with the exception of exhaust compliance. Two companies reported that the government checked their water records and compliance of car maintenance practices occasionally. Other than that, self-initiated environmental friendly regulations were seldom practised within companies. The term 'green skills' was unfamiliar to interviewees; however, those

who support improvements in environmentally friendly practice at their enterprises believe they would help to build a greener environment for a younger generation and that the promotion of cleaner service could be used as a marketing strategy to their clients to gain additional business. In other words, companies in the automotive industry believe green skills can increase competitiveness and the cost effectiveness of their enterprises, but they will not improve workers' employability and usability at the labour market. For one car washing company, the reason for not supporting environmentally friendly practices was mainly because car washing inevitably consumes large amounts of water and that is unavoidable.

One environmental risk that was commonly referred to during the interviews at the automotive companies is the issue of untreated dirty water that is poured into rainwater drainage. These companies have thought of connecting the dirty water to the sewerage system so that it will not pollute the rainwater system, however such action requires an overhaul of their water pipe system. In addition, the process requires three years because they need to apply and get approval, from the Environmental Protection Department. Thus, the whole process of connecting dirty water to the sewerage system would be time-consuming for the business.

Box 6.5 Environmentally friendly practices introduced in interviewed automotive companies

- Recycle paper and boxes;
- Call supplier to collect old and worn tyres;
- Follow closely the repair guidelines issued by government and international motorbike association;
- Employ eco-practice and technology (less VOC and aerosol emission) in vehicle repairs;
- Switch from fluorescent lights to LED;
- Turn off the light when the room is unattended.

Source: Author

The companies identified skills presented in Box 6.6 as crucial in promoting greener products and services.

Box 6.6 Skills requirements identified in automotive enterprises

- Cognitive competencies (environmental awareness and a willingness to learn about sustainable development);
- System and risk analysis skills to assess, interpret and understand both the need for change and the measure required;

- Marketing skills;
- Communication and negotiation skills;
- Adaptability and transferable skills.

Source: Author

Overall, all the interviewed enterprises did not have any practices and protocol with regard to promoting skills required for implementing environmental friendly practices. Given their limited resources, these enterprises are not able to progress further on environmentally friendly practices.

Waste management enterprises

Enterprises participating in the study could not recognise any environmental regulations for them to follow. Furthermore, there are no self-implementation and monitoring policies within the companies regarding environmental protection. Despite the lack of environmental regulations for waste management companies, the Hong Kong SAR Government has sent officials to waste collectors and recycling companies to notify them about the latest plastic and electronic waste recycling opportunities as well as exporting options. The government visited one of the interviewed companies on this matter. According to current practice in Hong Kong SAR, PRC, those two specific products will need to be exported to PRC for further processing and recycling. Environmentally friendly practices introduced on their own initiative were few. See Box 6.7.

Box 6.7 Environmentally friendly practices introduced in the interviewed waste management companies

- Separation of waste into categories to maximise recycling efficiency;
- A huge company banner to promote collection of waste;
- Brochure/talks to educate residents*
- Product exchange to boost recyclables*

*Run by a company under Environment and Conservation Fund by EPD.

Source: Author

In 2005, the programme on Source Separation of Domestic Waste was launched territory-wide to encourage waste separation in housing estates in Hong Kong SAR, PRC. Now the programme covers over 80% of the population. With the aim of filling the gap for the remaining housing estates that are not served with waste recycling facilities, community recycling centres were set up in all 18 districts in Hong Kong SAR, PRC, to raise public awareness of recycling and to encourage public participation in waste recovery. In this study, we interviewed one of the companies

that received funding from the government to collect and recycle materials with low commercial value, i.e. recycle glasses, and recruit waste reduction ambassadors to promote green practices. The set-up of these community recycling centres reduced the recyclables dumped into landfills, and generally served buildings in older districts that are not served by big environmental service companies, do not have a property management company to oversee a recycling programme nor have space for waste management facilities to enable recycling.

This industry is often deemed to be 'straightforward'. Waste with high commercial value is collected and recycled and there are no environmental laws and regulations for the workers to refer to. Companies had not heard about the concept of green skills. Believing that the nature of their job is very green, they are not thinking about greening their practices.

Box 6.8 Skills requirements identified in the waste management industry

- Cognitive competencies.
- Strong adaptability and positive attitudes in social, environmental aspects.

Source: Author

The industry identified cognitive competencies to be important among workers so they understood how to distinguish recyclable plastic from non-recyclable plastic (see Box 6.8). It was pointed out that such skills rely heavily on experience. The successful implementation of green skills or environmentally friendly practices depends a great deal on the attitudes and behaviour of people.

Catering enterprises

Formal and informal settings in the catering industry were interviewed in the study. Formal restaurants followed strategic management plans, and often had their own environmentally friendly practices for their staff. One restaurant implemented the 5S rules from Japan (structure, systematise, sanitise, standardise, self-discipline), which cover environmentally friendly practices within their daily operation. For example, they checked the consumption of detergent used and water records and forbid unused running water. The manager at the restaurants was responsible for monitoring this. As can be seen from Box 6.9, both formal and informal restaurants use energy-saving kitchen appliances and practise the separation of waste. In the formal catering setting, the restaurants have more resources for printing flyers and brochures to promote 'green' meatless meals and can collaborate with green organisations to implement environmental management measures. Interviewed restaurants in a formal setting had been visited occasionally by the Food and Environmental Hygiene Department for checks on the kitchen staff's food hygiene qualification certificates and to teach staff how to clean the kitchen. The department also asked the restaurant to offer in-house

training for staff to avoid massive food loss before they launched their 'all-you-can-eat' menu. Meanwhile, interviewed restaurants also received guidelines from the Environmental Protection Department (EPD) on the proper cleaning of grease traps for restaurants and food processors.

Box 6.9 Environmentally friendly practices introduced in the interviewed catering enterprises

Formal sector enterprises

- Collaboration with green organisations to support a meatless diet to reduce carbon footprint;
- Food waste recycling campaign;
- Collection and separation of kitchen waste;
- Adoption of disposal policy to minimise waste disposal and encourage recycling;
- Use of non-renewable resources and reuse where possible;
- Marketing strategies to promote clean and carbon-free meals through advertisements;
- Use diluted detergent for washing;
- Avoid giving out fresh plates during banquets to reduce washing frequency;
- Friendly reminders from managers to save electricity and water;
- Turn off lights during resting hours;
- Use energy-saving kitchen appliances (saving up to 60% of energy);
- Record the number of food portions cooked daily;
- Record electricity and water consumption;
- Print a brochure to discourage food waste for all-you-can-eat meals;
- Charge for plastic boxes with take-away orders.

Informal sector enterprises

- Use eco detergent, and very little, to wash the floor;
- Free herbal tea for customers who bring their own bottles/containers;
- Charge $1 for a take-away plastic box;
- Stock coke in glass bottles rather than aluminium cans, so they can be sent back to producers for a fee;
- Separate different kinds of waste and aluminium cans for collectors;
- Dispose of plastic in a plastic-recycling bin;
- Use energy-saving kitchen appliances.

Source: Author

Box 6.10 Cognitive skills requirements identified in the catering industry

- Interpersonal skills;
- Good marketing skills.

Source: Author

Five out of eight interviewed restaurants did not see a strong need for special skills in order to sustain environmentally friendly practices. They believe attitude and behaviour change are much more important to promote such practices in Hong Kong SAR, PRC. For those seeing a need for greening of skills in the industry, the cognitive competencies identified as important for promoting greener products and services were interpersonal skills and good marketing skills (see Box 6.10).

Greening across sectors

The study revealed that some green practices have been applied by MSME, and employers stated that the successful implementation of these practices greatly depends on the attitudes and behaviour of people, in many cases even more than on particular skills. During interviews, both executives/owners and employees were in favour of being involved in greening of their industry. Most of the enterprises demonstrated a positive attitude towards environmentally friendly workplace practices. Interviewees noted the benefits of greening skills at the individual and societal level in terms of the reduction of negative impacts to the environment. They also showed their willingness to do well to the environment for the sake of the younger generation, and they believed the concept of green skills could serve as an 'ideology change' to influence decisions in a daily life.

However, their positive attitude towards greening has had only a partial influence on working practices due to the lack of understanding of what is required. Not all companies even knew about environmental regulations (Fig. 6.3). In general, the automotive industry pays most attention to environmental regulations (75% of the interviewees were aware of these regulations). This can be explained by the need for the companies to have a good understanding of the environmental regulations in order to obtain a licence to operate. The Hong Kong SAR government, usually the Environmental Protection Department, set up stricter guidelines and formulated more regulations to protect the environment for the automotive industry due to increasing concerns about roadside emissions.

Companies in the waste management and informal catering industries are not well aware of the environmental regulations. Catering companies in the formal sector receive some guidelines from the Environmental Protection Department and training from Food and Environmental Hygiene Department on up-to-date hygiene practices.

During company visits observation lists were used that included the following four areas of practice: following environmental workplace practices, contributing to improved work practices, recognising and reporting on a potential environmental

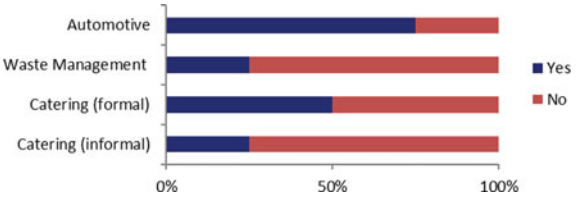

Fig. 6.3 Awareness of environmental regulations in the automotive, waste management and catering industries in Hong Kong SAR, PRC. *Source* Author, based on interview responses

Fig. 6.4 Industries' performance aggregated by sector. *Source* Author, based on observations

threat and maintaining environmental records. Aggregated results are presented in Fig. 6.4.

This confirms interview findings and supports the conclusion that the MSMEs in three industries in Hong Kong SAR, PRC, did not pay special attention to environmentally friendly practices. Overall in less than 50% of cases have respondent companies been involved in remedying or proactively prevented processes that can be harmful to environment. All industries are generally weak in recognising and reporting environmental threats and do not keep and maintain environmental records.

Interviewees noted the benefits of greening of skills at the individual and societal level and they believed the concept of green skills can serve as an 'ideology change' to influence daily life-decisions.

Enterprises' interest and involvement in RVA

Across three sectors the majority of owner/managers had not heard about recognition, validation and accreditation (RVA) mechanisms. The only exception was formal catering; companies in this sector had heard about RVA. Although they did not use RVA mechanism at the workplace, they believe that RVA could be useful in helping to recognise and credit prior skills and experience, therefore saving resources on training. At the moment, these companies have a strong preference for hiring people who have graduated from VTC, where they have gained a certificate in Chinese

cuisine. During the recruitment process, 'formal' restaurants checked for the Basic Food Hygiene Certificate for Hygiene Managers issued either by government or educational or private institutes as well as the certificate in Chinese cuisine issued by VTC.

Although they demonstrated a positive attitude towards inclusion of green skills in RVA, a general concern across formal catering is that implementation of environmental protection practices would be likely to increase their operational cost. Therefore, they can only support inclusion of green skills in RVA if it helps to save money while doing good to the environment. They were worried about the type of skills included in RVA.

In the waste management sector, companies were concerned about the entry point to employment. Currently, the educational level of employees is relatively low (secondary or even primary education), therefore if an RVA certificate is a requirement, this could strongly affect the willingness of people to enter the field. Employers in this industry did not see the necessity to include green skills in RVA although they supported environmental friendly behaviour. They also worried about an increase in operational costs and requirements for additional human resources. They did not believe the use of RVA would improve productivity or strengthen confidence and boost motivation of workers. If no economic value can be gained from it, the industries would not be in favour of green skills inclusion.

Most of the interviewees in the automotive industry have not heard of the RVA mechanism although automotive is one of the industries where RVA has been introduced by the government. In addition, some companies believed that adding RVA processes could be somewhat unhelpful for the automotive industry as an apprenticeship scheme is in place and is used to certify obtained skills. Although in the current situation they cannot support the inclusion of green skills in the RVA, a few interviewees believe that through increased attention from the government to their industry, green skills can be included in RVA. In particular, automotive enterprises suggested several measures that could facilitate green skills inclusion in RVA:

- Hong Kong SAR, PRC, must take the lead in pushing greening of skills;
- The government must provide industry with free green training courses;
- The public sector should take the initiative in promoting environmentally friendly practices in industries and the private sector and NGOs should play a supporting role;
- Education is key in advocating the concept of green skills to the public that will result in positive attitudes and behaviour towards environmental issues. For example, developing habits of recycling, separating of waste, etc.;
- Public attitudes towards greening should become more positive.

A few interviewees in the automotive and waste management industries complained about inadequate support from the government for the 'light industries' (such as waste management). They would welcome more incentives and an increase in resources allocated to 'light industries' by the government.

Therefore, to sum up, MSME believe that the inclusion of green skills in RVA might negatively affect the hiring processes in their industries and might increase

operational costs. The findings demonstrate that inclusion of green skills in the RVA mechanism in Hong Kong SAR, PRC, requires a strong political push from the government. An awareness campaign for industries and the private sector is required to clarify the benefits of RVA and greening. Key performance indicators, clearly defined targets and more support for MSME are required. Education has a clear role to play in developing green mind-sets.

6.5 Conclusions and Recommendations

Greening practices in MSMEs greatly depend on government regulations, monitoring and training provided by government departments. Greening of MSMEs on their own initiative is limited and mainly related to gaining additional profit, thus some bigger companies have their own operational guidelines on saving water, energy and waste separation. Although the attitude towards greening is positive, many companies do not aware of environmental regulations for their industry. Some companies, particularly the bigger ones and the one funded by the government have organised awareness campaigns for the general public and their customers.

Green practices in micro, small and medium enterprises (MSMEs) are mainly related to:

- Operations (e.g. use a diluted detergent for washing; turn off lights during rest hours; switched from florescent light to LED);
- Following regulations (e.g. follow closely repairing guidelines for the motorbikes issued by the government);
- Using greener technology (e.g. energy-saving kitchen appliances);
- Advocacy (distribution of brochures/talks to educate residents; marketing of carbon-free meals; providing free tea for customers who come equipped with their own containers);
- Monitoring (e.g. recording electricity and water consumption; recording the number of food portions cooked daily);
- Recycling (e.g. disposing plastic to a plastic-recycling bin; separating different kinds of waste and aluminium cans for collection; recycling paper and paper boxes);
- In terms of skills, attitudes are very important at the workers' level, so people can follow simple practices such as switching off water/electricity. In addition, some skills that are related to the operation of green technologies and some specific content knowledge on how things can be done (e.g. what can be recycled) are needed.

Thus, the skills that were identified as important by the MSME include:

- Cognitive competencies (environmental awareness and a willingness to learn about sustainable development);
- Strong adaptability and positive attitudes to social and environmental aspects;

- System and risk analysis skills to assess, interpret and understand both the need for change and the measures required;
- Good marketing skills;
- Communication and negotiation skills;
- Interpersonal skills;
- Adaptability and transferable skills.

The RVA mechanism is not well known in MSMEs, and as a result not valued. Thus, for majority of interviewees it was difficult to comment on inclusion of green skills into RVA. They could only see a benefit from this if there was some monetary value for individuals and enterprises. Inclusion of knowledge about environmental regulations as a part of RVA competencies and support from the government to promote RVA usefulness are required.

In addition, advocacy for existing schemes should be more efficient in reaching MSMEs. This can help to improve take-up of current initiatives to support green practices, to provide required training and to identify green skills through the RVA mechanisms. Two examples are provided below.

Catering: Since 2011 the Quality Restaurant Environmental Management Scheme has offered good green skills practices and standards in the catering industry that can be included in the RVA framework. This scheme offers quality standards and best practice for catering operators on environmental management, ranging from energy efficiency to water usage, waste management, waste water management, air pollution and noise management (Hong Kong Productivity Council 2011). QREMS covers five types of catering operators, namely Chinese Restaurants, Non-Chinese Restaurants, Fast Food Shops, Other Eating and Drinking Places and Food Manufacturing or Processing Factories (Hong Kong Productivity Council 2011). It is a voluntary scheme funded by the Environment and Conservation Fund (ECF) of Hong Kong SAR, PRC. No interviewees in this study mentioned this scheme.

Automotive: The automotive industry has been carrying out workshops to promote environmentally friendly practices in Hong Kong SAR, PRC. In 2000, the Environmental Protection Department embarked on the 'Partnership Programme' for the motor vehicle repair trade to promote environmental awareness and share green practices among trade practitioners in the automotive industry (Environmental Protection Department 2015b). The Hong Kong Vehicle Repair Merchants Association Limited (HKVRMA) and the Environmental Vehicle Repairers Association Limited (EVRA) are the participating trade association. They have organised workshops and nominated enthusiastic members to become environmental ambassadors to move their staff towards meeting the requirements of the environment-protection legislation. EPD also issued a 'Guide to Environmental Protection for the Vehicle Repair Trade' for distribution to motor vehicle repair trade practitioners. Some of the green practices listed in the guides include the use of an activated carbon adsorption system to reduce air pollution, environmentally friendly paint-spraying technologies and water-soluble paints. Again, no interviewees in this study mentioned this scheme.

The data collected demonstrates that Hong Kong SAR, PRC, can make a bigger leap in green skills development, but that the need for stronger political will from the

government is greater than ever in terms of setting out stricter environmental regulations, monitoring their implementation and promoting the concept of greening skills that can be picked up by different industries. Key performance indicators (KPIs), clearly defined targets can be set up by the government so that different industries can work towards such collective goals. There is also room for improvement in promotion of the RVA scheme among these industries to inform them as to the benefits of continuing education and lifelong learning. In particular, public education should be called on to influence mind-set, and such education of children should be a key area of effort to make green skills inclusion work in Hong Kong SAR, PRC.

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Chapter 7
Case Study: India. The Role of the Skill Council for Green Jobs (SCGJ) in Recognising Green Skills and Upskilling Workers in Micro, Small and Medium Enterprises

Tanmay Bishnoi and Deepak Kumar Rai

Abstract This chapter focuses on the recognition of green skills and upskilling of employees in micro, small and medium enterprises (MSMEs) dealing with waste management and renewable energy. In case of India, government pays a special attention to establishing and supporting a renewable energy (RE) sector, thus to contextualise this case study, RE is included in the analysis. It argues that recycling and reduction of waste, reuse of waste water, as well as the reduction of the negative impacts of climate change through renewable energy and energy-efficient devices, are key to all sectors—including catering, automotive and PVC manufacturing. India is one of the youngest nations in the world with more than 62% of its population in the working age group (15–59 years), therefore, to benefit from this demographic dividend, India needs to equip its workforce with employable skills and knowledge for sustainable growth. For the micro-level analysis, the study reported in this chapter was carried out with 47 enterprises. The results demonstrate a potential for recognizing 'green skills' that employees acquire non-formally and informally. The reported study was carried out by the Skill Council for Green Jobs (SCGJ), an autonomous body under the National Skill Development Corporation (NSDC), Ministry of Skill Development and Entrepreneurship (MSDE). SCGJ acts as a bridge between the Government of India and industry sectors in the implementation of skills development programmes considering industry needs and standards and relating them to the National Skill Qualification Framework (NSQF) levels.

Keywords National Skills Qualifications Framework (NSQF) · Skill Council for Green Jobs (SCGJ) · Green skills · Renewable energy · Solar energy · Waste management

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7.1 Introduction

This chapter focuses on the recognition of green skills and knowledge of employees in micro, small and medium enterprises (MSMEs) dealing with waste management and renewable energy. It reports the results of the study that analyzed actions at the macro and meso levels that are related to green policies, setting targets and establishing institutions. For the micro-level analysis, it addresses the questions as to whether jobs in MSMEs provide a basis for engagement with green skills, the existing motivation to learn about green skills along with the barriers for engagement with green skills at the workplace. In addition, it explores the extent to which skills recognition and training opportunities are seen as a career path into new green jobs and a possible way of 'greening' existing occupations, and to what extent green skills recognition can build on the existing skills and knowledge of employees acquired in MSMEs in the sectors under examination. In case of India, government pays a special attention to establishing and supporting a renewable energy (RE) sector, thus to contextualise this case study, RE is included in the analysis. It argues that recycling and reduction of waste, reuse of waste water, as well as the reduction of the negative impacts of climate change through renewable energy and energy-efficient devices, are key to all sectors—including catering, automotive and PVC manufacturing. In 2015, Government of India has launched "Skill India Mission" with the target to provide market relevant skill training in various sectors including sustainable development to about 400 million people by 2022. The National Institute of Science, Technology and Development Studies in India (NISTDS 2010) has highlighted the growing awareness about environmental pollution among enterprises in the informal sector. However, there are skill gaps in this sector that need to be addressed. NISTDS also pointed out that green jobs are important for promoting decent work and appropriate wage-skill levels in enterprises. The notion of recognizing green skills can thus prove important for social equity, economic efficiency and environmental sustainability. Promoting green skills requires a trans-disciplinary knowledge base as well as a holistic and integrated understanding of skills in terms of their influence on environment, society, economy and culture.

Building on the results of the NISTDS study, the basic premise of this study is to look at the potential for including green skills in recognition mechanisms. Recognition, validation and accreditation (RVA) is a tool for identifying and documenting employee's prior and current learning, skills and work experience in relation to expected green job requirements and learning outcome-based qualifications standards in India's National Skills Development Framework (NSQF).

Environmental challenges and national policy responses

The nineteenth session of the conference of parties (COP) of the United Nations framework convention on climate change (UNFCCC) held in Warsaw in November 2013 invited all parties to initiate domestic preparations for their Intended Nationally Determined Contribution (INDC) towards achieving the objective of the Convention. The concept of 'nationally determined contributions' reflects the principles of

equity as common but differentiated responsibilities of the participating countries (UNFCCC 2013). India submitted its INDC to the UNFCCC in October 2015 with a strong focus on key aspects like sustainable lifestyles, cleaner economic development, climate change mitigation, adaptation, mobilizing finances, technology transfer and capacity building (UNFCCC 2015), One of the key objectives of the Indian INDC is to reduce the emissions intensity of GDP by 33–35% over 2005 levels by 2030. Indian INDC acknowledged that renewable energy sources are of strategic national value as it contributes to better air quality, reduce reliance on fossil fuels, curb global warming, add jobs to the economy and protect environmental values. Therefore, INDC pays significant attention to skills required for harnessing renewables, aiming to put India on the path to a cleaner environment, energy independence and a stronger economy.

A second objective of India's INDC is to achieve about 40% of electric power installed capacity to be generated from non-fossil energy resources by 2030 with the help of technological developments and international funding, including from the Green Climate Fund (GCF). Keeping in view of India's commitment for a healthy planet with less carbon intensive economy, in 2015 Government of India made an ambitious target of achieving 175 GW of renewable energy capacity by the year 2022. This includes 100 GW of solar, 60 GW of wind, 10 GW of biomass and 5 GW of small hydropower. In 2019, India increased its RE target to 450 GW by 2030, over five times India's current installed renewables capacity and more than India's current total installed capacity. As of Sep 2020, India has over 90 GW of RE installed capacity rising steadily towards meeting its 175 GW by 2022 target (MNRE 2020).

India's INDC also aims to create an additional carbon sink of 2.5 to 3 billion tonnes of CO2 equivalent through additional forest and tree cover by 2030. India is one of the few countries where forest and tree cover has increased in recent years, and total forest and tree cover amounts to 80.73 million Ha which is equivalent to 24.56% of the geographical area of the country (ISFR 2019). Over the past two decades, progressive national forestry legislations and policies of India have transformed India's forests into net absorbers of CO_2. Launched in 2008, India's National Action Plan on Climate Change (NAPCC) aims to chart a low-carbon development path for the country. It has eight sub missions, focusing on solar, energy efficiency, sustainable habitat, water, Himalayan ecosystem, forest cover, sustainable agriculture and climate research & capacity building. The NAPCC outlines India's strategic mission to promote sustainable economic development while encouraging private sector action on climate mitigation and adaptation. NAPCC also lays a foundation for achieving India's INDCs while balancing national economic and developmental priorities. Skilling is the primary future challenge for the country to meet its NDC as India requires 170,000 high and semi-skilled workers and another approximately 180,000 lower skilled technicians in the solar sector by the year 2030 (Cobenefits 2020).

Greening of jobs

All industry sectors can significantly contribute to the reduction of greenhouse gas emissions, in particular with the adoption of waste management and energy efficiency, use of renewable energy across all sectors, including in sectors such as catering, automotive services and PVC manufacturing.

Catering

The concept of greening the catering business as a single sector has still to take shape in India. Rather, the focus within catering taken by street food vendors, catering organisations and the hotel industry is to follow waste management practices. The catering business, broadly speaking, is a mix of formal and informal sectors characterised by many small business owners who operate locally. On a larger scale is hotel catering, where waste disposal and cleanliness takes on greater significance. Energy is another area of importance for the hotel industry, where greater attention is paid to the use of renewable energy sources, better energy efficiency practices, rainwater harvesting and use of low-carbon technology.

PVC manufacturing

PVC is used in many sectoral applications, including water supply, sewage, supply of electric power, transportation and housing. PVC products contribute significantly to energy efficiency through the material's low thermal conductivity. Among green skills requirements in PVC are recycling and reduction of waste, recycling and reuse of waste water, and as components used in renewable energy and energy-efficient devices.

Automotive

The main ingredients for 'greening' the automotive sector are through adoption of renewable energy and energy efficiency measures, waste water management and waste management including disposal of waste. If water is recycled and reused in automotive sector processes, then significant costs can be saved through inculcating green skills in executing the job. Green jobs and skills impart further advantages when solar energy is exploited.

Green MSMEs should deliver goods and services for sustainable livelihoods so that billions of people can work their way out of poverty and contribute to a greener planet. Mechanisms for the recognition, validation and accreditation (RVA) of non-formal and informal learning outcomes are crucial to the valorisation of skills acquired in the workplace, promoting a holistic understanding of green skills as well as assessing behavioural changes.

The socio-economic context and the challenges

Most of Indian youth still find themselves in low-skilled, low-paid employment in the informal sector, where over 80% of all workers in India are employed. The government of India is seeking to reverse this trend through a national policy on skill development (NPSD) adopted in February 2009 and amended in 2016 by the current Ministry

of Skill Development and Entrepreneurship (MSDE) (MSDE 2016). The growth rate of the urban informal sector is higher than that of the formal sector workers. Although the proportion of informal sector workers in the agriculture sector has declined over recent years, the proportion has increased in industrial and services sectors. There is a positive, significant correlation between informal sector employment and the incidence of poverty.

Providing skills training to such a huge population is a challenge, as four out of five new candidates to the workforce have never had the opportunity of taking part in skills training. Developing skills is essential for raising productive levels and helping workers secure decent work. India has 487 million workers, but more than two-thirds of Indian employers' report that they struggle to find workers with the right skills. MSME sector is India's largest employer after agriculture, representing 40% of the national workforce. Substantial proportion of the workforce is also informal, with 5–10 million new workers added annually. The discrepancy in finding skilled workforce for the industry points to a clear potential, while posing serious questions as to how India can best provide possibilities for people through education and training and skills recognition programmes.

Informal sector enterprises are prominent in fields such as solar energy, waste water treatment and waste management. With creating employable workforce, informal sector enterprises can make a crucial contribution to more efficient resource management in these fields, and promote green jobs and decent work. Informal sector actors are closely linked to their local communities, providing valuable networks that can be channeled for purposes of resource management, renewable energy adoption along with climate-change mitigation.

The informal and formal economies are part of a continuum; raw materials, equipment, finance and consumer goods flow between formal and informal sector enterprises, and there are numerous linkages when large domestic companies or government agencies sub-contract production to informal sector enterprises or buy their products directly. Therefore, to make the green transition a fair one, the role of the informal sector needs to be taken into consideration. Actors that have commonly been powerless and voiceless, particularly women, have found empowerment in opportunities provided by the informal sector, which can, therefore, be key to eradicating extreme poverty and hunger as well as promoting gender equality.

Given the sheer size of the informal economy, its rapid growth potential and its ability to provide livelihoods for the poor, a structured skills development and skills recognition system is essential.

Mapping the potential of green skills recognition in India

The waste water management sector

Waste management sector in India has over 195 combined effluent treatment plants (CETPs) and several thousands of effluent treatments plants (ETPs) in industries to deal with industrial waste water. The operators of CETPs and ETPs play an important role in ensuring proper operation of these treatment plants to treat waste water according to required standards and to minimize risks to the environment.

In today's scenario of water scarcity, ETPs and CETPs are not merely waste water treatment plants but also a source of water to various secondary applications like landscaping, washing and condensation activity in cooling towers, etc. These plants are responsible for achieving a reusable quality of treated water. In most cases, workers deployed for CETP operations are not adequately competent to operate the plant. The operators are a much-neglected workforce in terms of skills development and they seldom get training to help them perform their functions effectively. Considering this, skills development for operators in waste water treatment plants has become a priority area for the government of India.

Besides skills development, awareness and commitment are also required in waste water management. However, ETPs lack dedicated workers and at the industry level often are defunct or non-existent. This is due to a lack of commitment to ETP operations in industries and a lack of awareness of the consequences. The National Productivity Council (NPC) and the German agency Cooperation for International Development (GIZ) along with SCGJ have conducted stakeholder consultations in waste water management (NPC 2016). Some of the concerns expressed are as follows:

- Many MSMEs in India do not have qualified supervisors. It is difficult to encourage a supervisor who lacks proper qualifications to hire qualified staff for their ETP.
- In large and well-organised industries, ETP staff are more qualified and competent.
- Skilling of staff in the waste water treatment plant at helper/worker level seems to be a novel concept to ETPs and CETPs, and therefore raising awareness about its importance is vital. Regional awareness workshops need to be conducted across the country (4–5 workshops in different regions of India).
- Based on initial feedback, future requirements for workers in ETP and CEPT will be middle- to higher-level staff. However, the availability of lower-level staff such as helpers/workers, etc. is taken for granted;
- Considering that, in many cases, helpers/workers have not even had primary school education, and come from the informal sector, putting in place RPL mechanisms to recognise their skills and building upskilling pathways in relation to the national occupational standards (NOS) developed by SCGJ will be useful.
- The operation and maintenance of the waste water treatment plant is usually outsourced to a third party on contract basis. The workers contracted by the contractor are mostly locally available casual contract workers, who are not on the direct payroll of the unit. Given that the contractor and operating team may change with the renewal of the contract, waste water treatment plants often do not consider it necessary to offer contract workers the opportunity to upgrade their skills and proficiency levels.
- Contract workers often lack professional qualifications and training required for their job role. They learn their job over the years through hands-on experience. In addition, they face challenges due to their educational background, poor working conditions and lack of avenues for career development. In Indian society, a job in waste water and waste disposal is considered of low status and low image, and the very last option. Over the years, the water industry has experienced restructuring involving the introduction of sustainable practices, energy resource efficiency,

new green technologies, recycling of treated water, etc. These are all changes that require upgrading significant skills.

However, even a properly designed plant often fails to meet required results because unskilled operators are allowed to run high-technology treatment plants, resulting in total loss of investment. Water-treatment plants are responsible for disposing of treated water with a minimum impact on the environment. It is imperative therefore, that only skilled operators carry out their operation.

The National Productivity Council (NPC) has conducted several studies in consultation with SCGJ. In 2016, NPC carried out a survey (NPC 2016) of operating staff employed in MSMEs at ETPs and CETPs in 21 different industrial sectors. The total cumulative treatment capacity of ETPs and CETPs based on 66 responses is approximately 274 MLD and the total workforce in treatment plants was 711 personnel across various levels. Based on this survey a future estimate of workforce requirement was projected.

The study concluded that helpers and operators make up more than 65% of the manpower deployed in waste water treatment plants in India, whereas supervisors make up 12%, and technicians and managers make up 6% and 8%, respectively. The study also noted that proactive training is being provided by only a very few ETPs and CETPs. In fact, while the focus is primarily on providing training to a small number of operators and technicians and other senior officials, the need for specialized training exists across all unit operations and at all levels in ETPs and CETPs.

The solid waste management sector

Today, managing waste (urban and rural), its collection, transportation, processing and disposal, requires a workforce that must be fully trained. India, currently the world's second-most populous nation, has witnessed a recent rapid increase in the rate of urbanization and industrialization. The growth in the economy has also brought about a corresponding increase in the demands of its citizens, due to a rise in purchasing power and exposure to many more goods and commodities. Consequently, the quantities of solid waste generated from various cities has significantly risen due to which the Management of Solid Waste has posed a tough challenge to Municipal Authorities and Policy Makers at different levels in Government. Recent initiatives in India, such as the 'Smart Cities Mission' and 'Swachh Bharat Abhiyan' (Clean India), provide an opportunity for citizens to brainstorm, display, and develop best practices in the domain of solid waste management.

Solid Waste Management is a state subject in India which means it is the primary responsibility of State Governments to ensure that appropriate solid waste management practices are introduced in all the cities and towns in the state. The role of Government of India is broadly to formulate policy guidelines and provide technical assistance to the states/cities whenever needed. It also assists the State Governments

and urban local bodies in human resource development and acts as an intermediary in mobilizing external assistance for implementation of solid waste management projects. Municipalities and the urban local bodies in the country are, therefore, responsible and required to plan, design, operate and maintain the solid waste management system in their respective cities/towns.

So, in municipalities, the primary jobs include sweepers, sanitary supervisors, sanitary sub-inspectors, sanitary inspectors, sanitary officers, chief sanitary inspector, public health, environmental engineers/civil engineers are deployed as executive engineer, superintending engineer, chief engineer and head of SWM department. Private sector jobs include work in waste processing units, NGOs entrepreneurs, maintenance engineers, supervisors, technicians, chemists, education and awareness managers.

Informal sector workers are often working in small recycling units or as rag pickers, etc. According to a GIZ report of 2010–11 (Gerdes and Gunsilius 2010), it is estimated that about 1% of the Indian urban population, about 3.583 million people, are involved in the informal recycling sector. The estimated number of jobs generated will rise at an annual rate of 7–8% as GDP, and consequent solid waste, grows.

Increasingly, emphasis is placed on the importance of job roles across the value chain of the solid waste management sector. In the urban sector, whereas coordinators and education managers in NGOs and community-based organisers create awareness among people about urban waste management, promoting source segregation and recycling, informal sector waste collectors, sweepers and volunteers play a role in sorting, segregating and recycling. Environmental experts are involved in product development in producers/multi-national companies to ensure compliance with regulations that impose extended producer responsibility, whereas MSMEs play a critical role in designing and manufacturing environmentally friendly products such as innovative dustbins. Others, such as municipal workers and private contractors, undertake door-to-door collection and segregation.

Several new job roles in the rural waste management sector have also been identified. Large quantities of agriculture residues are generated in farms from cultivation of grains, sugarcane, cotton, oilseeds and pulses. A portion of these agricultural residues is used as animal feed, albeit as inferior-quality fodder. With a focus on optimal productivity from dairy farms, there is an increasing shift towards high-yielding forage crops, which is resulting in increasing volumes of agriculture residues. According to the estimates released by the Department of Agriculture, Cooperation and Farmers Welfare the total food grain production in the country for financial year 2019–2020 is estimated at record 295.67 million tonnes (Ministry of Agriculture & Farmers Welfare 2020). With such a scale of annual food production, over the years Indian Agriculture has evolved significantly and the field is not just about the traditional roles related to farming and crops anymore. Important job roles for all the above activities include entrepreneurs, procurement managers, supply chain executive loaders, helpers, logistics supervisors, warehouse managers/supervisors, storage assistants, accountants, sales & marketing executives, information and technology

Table 7.1 Manpower requirements until 2030 in solar energy

Industrial sector	Manpower requirement until 2030
Solar PV—EPC	424,055
Solar PV—O&M	643,773
Solar off grid	399,854
Solar thermal applications	65,490

Source SCGJ 2016

support executives, and quality and testing executives. Activities for the management of animal waste include the construction of biogas plants, supply of feedstock and manure management. Important job roles here include masons, operators and helpers.

The renewable energy sector

One of India's major advantages today and going forward is that its renewable energy (RE) potential is vast and largely untapped. Recent estimates show that India's solar potential is greater than 750 GW and its announced wind potential is 302 GW (actual could be higher than 1000 GW) (NITI Aayog 2015). In addition, there is significant potential for decentralised distributed applications to meet for residential, commercial and industrial sectors through solar energy and for meeting energy needs in the rural areas (see Table 7.1).

A lot of manpower is required from the informal sector, such as solar project helpers to achieve the capacity targets as per the National Solar mission and close the industry's skills gap. These informal workers would be recognised for their skills under the RPL mechanism and work has already started, as a later section will elaborate.

Meso level

This section focuses on one important development supported by the Indian government—the establishment of The Skill Council for Green Jobs (SCGJ). It has a mandate to address skills recognition in the following sectors: renewable energy, green transportation, green construction and waste management (solid, water and e-waste).

Skill Council for Green Jobs and green skills recognition

Employing a skilled workforce at all levels is one of the key measures to ensure better quality of implementation and thus SCGJ plays a vital role in providing skilled workers commensurate with national targets and sustainability of installed projects (Table 7.2).

The formation of SCGJ in 2015 in the run up to COP 21 to catalyze growth in green business through skilling and entrepreneurship development, is a big step for India in the direction of creating skills across the domain of energy, environment and climate change. SCGJ is one of the most important initiatives by the Government of India which directly handles the Green Skill Development Programs of India.

Table 7.2 Scope of SCGJ in all green industry sectors

Renewable energy	Solar photovoltaic
	Solar thermal
	Wind
	Small hydro
	Biomass power/Biogas/Cogen/CHP Energy storage Biofuels
	All renewables (cross-cutting/ enabling activities)
Green transportation	Electric vehicles Bio fuel vehicles Bio-CNG vehicles
Green construction	Green buildings
	Energy efficiency Green campuses
Waste management	Municipal Agricultural
Water management	Sewage treatment & reuse Industrial effluent treatment Rain water harvesting and micro-irrigation
Cogeneration	Cogeneration
Other green jobs	Carbon sinks Environmental compliance and sustainability planning
	Other green jobs

Source SCGJ 2017

Promoted by the Ministry of New and Renewable Energy (MNRE), Government of India and Confederation of Indian Industry (CII), SCGJ strives to identify the skilling needs of service users as well as of manufacturers and service providers within the green businesses sector, and implement nationwide, industry led, collaborative skills development and entrepreneur development initiatives to meet the skilling requirements of the Green business sector in the country. Figure 7.1 explains the role of Skill Council for Green Jobs and the key activities. SCGJ's activities in these areas aim to directly contribute to human resource development in the renewable energy sector to achieve non-fossil fuel-based energy resources as well as contribute to capacity building for jobs in green businesses.

Preparing national occupational standards and qualifications packs across green sector

SCGJ is working with renewable energy and waste management industries as well as other industries in different green sectors. SCGJ undertook an exercise to develop occupational maps in each sub-sector and a skill gap analysis, which showed a

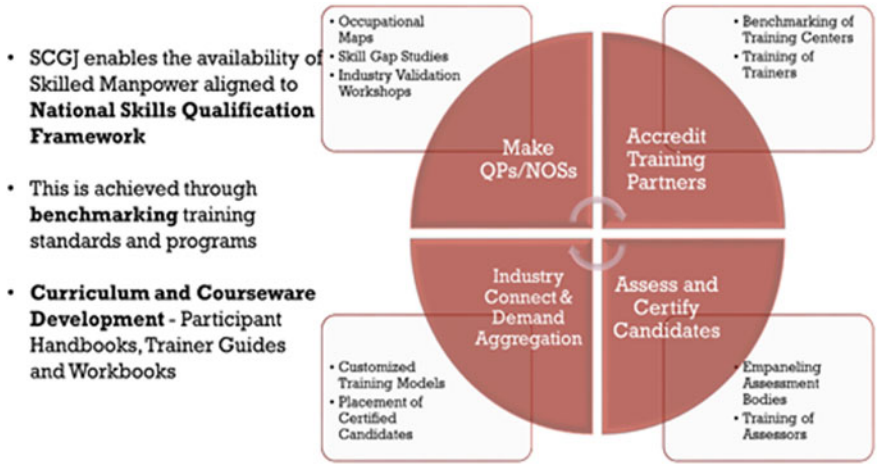

Fig. 7.1 The role of the Skill Council for Green Jobs. *Source* SCGJ

huge potential for green skills recognition in India. For example, consultations have been undertaken with over 400 industries in different green sectors to understand their current requirement and future business plans. Based on these consultations SCGJs prepared national occupational standards and qualifications packs (QPs) for systematic training on green skills for various green jobs identified. Competency-based curriculum packages consisting of syllabus, student manuals, trainers' guides, training manuals, trainer qualifications, assessment and testing guidelines as well as multimedia packages and e-material have been developed for each NSQF level. NSQF curricula are modular, allowing for skill accumulation and facilitating exit and entry. Curriculum design is aligned to a credit framework that reflects credits earned and competences acquired. Training of trainers would also be aligned to the NSQF.

7.2 Terminology and Definitions

In the Indian context 'green skills' means skills for executing green tasks and activities. India sees green skills as integrated into broader training and skills development policy. Green skills are a part of day-to-day life, which can help save the environment and be climate friendly. Green skills are integrated into NSQF level descriptors comprising learning outcomes in five domains:

- **Professional knowledge**. What a learner should know and understand with reference to the subject. It is defined in terms of depth, breadth, kinds of knowledge and complexity, as follows:

  - depth of knowledge can be general or specialised;
  - breadth of knowledge can range from a single topic to a multi-disciplinary area of knowledge;
  - kinds of knowledge range from concrete to abstract, from segmented to cumulative;
  - complexity of knowledge refers to the combination of kinds, depth and breadth of knowledge.

- **Professional skills**. What a learner should be able to do. This is described in terms of the kinds and complexity of skills, and includes:
  - cognitive and creative skills involving the use of intuitive, logical and critical thinking;
  - communication skills involving written, oral, literacy and numeracy skills
  - inter-personal skills and generic skills.

- **Core skills**. Basic skills involving dexterity and the use of methods, materials, tools and instruments used for performing the job, including IT skills needed for that level.
- **Responsibility**. The nature of working relationships, level of responsibility towards oneself and others, managing change and accountability for actions.
- **Process**. A summary of the other four domains.

Green qualifications in the renewable and waste management sectors

National Occupational Standards (NOS) specify the standard of performance an individual must achieve when carrying out a function in the workplace, together with the knowledge and understanding, required to meet the standards consistently. A set of NOSs comprises of a Qualification Pack (QPs), which is the starting document for preparing the Model Curriculum and Training Delivery Plan for successful implementation of the skill development programmes (see Table 7.3) (Fig. 7.2).

Implementing skills recognition

RPL is a very important associated function of the NSQF, especially in the Indian context where the majority of the workforce has not received formal training. By introducing RPL through the NSQF, RPL is expected to gain momentum and allow learners to benefit on a larger scale. The National Skills Qualifications Committee (NSQC) will approve the RPL processes for any given job role against the relevant level descriptors and notify the same to skills training providers/vocational training providers and certificate awarding bodies for use in assessment and certification. RPL scheme plans to achieve 2.5 million certifications over four years (2016–2020). Four institutions support the implementation of skills training and skills recognition: the National Skill Development Agency (NSDA), the National Skill Development Corporation (NSDC), and Directorate General of Training (DGT) and the Sector Skill Councils (SSCs). Sector Skill Councils (SSCs) help link the requirements of industry with appropriately trained manpower. SSCs perform the following functions:

Table 7.3 National standards developed by the Skill Council for Green Jobs for green skills recognition and certification

Sl. No.	Qualification pack title	QP code	NSQF level
1	Solar PV Installer (Suryamitra)	SGJ/Q0101	4
2	Solar PV Installer—Electrical	SGJ/Q0102	4
3	Solar PV Installer—Civil	SGJ/Q0103	4
4	Rooftop Solar Photovoltaic Entrepreneur	SGJ/Q0104	6
5	Solar Proposal Evaluation Specialist	SGJ/Q0105	7
6	Rooftop Solar Grid Engineer	SGJ/Q0106	5
7	Solar PV Business Development Executive	SGJ/Q0107	5
8	Solar PV Site Surveyor	SGJ/Q0108	6
9	Solar PV Structural Design Engineer	SGJ/Q0109	5
10	Solar PV Designer	SGJ/Q0110	7
11	Solar PV Project Helper	SGJ/Q0111	2
12	Solar PV Engineer (Option: Water pumping system)	SGJ/Q0112	5
13	Solar Site In-charge	SGJ/Q0113	6
14	Solar PV Project Manager (E&C)	SGJ/Q0114	7
15	Solar PV Maintenance Technician—Electrical (Ground Mount)	SGJ/Q 0115	4
16	Solar PV Maintenance Technician—Civil (Ground Mount) (proposed to be excluded as per the recommendation of NOS Committee on Solar)	SGJ/Q0116	4
17	Solar PV O&M Engineer	SGJ/Q0117	5
18	Solar Off Grid Entrepreneur	SGJ/Q0118	5
19	Solar Lighting Technician (Options: Home lighting system/Street lights)	SGJ/Q0201	4
20	Solar PV Manufacturing Technician	SGJ/Q0119	4
21	Solar Domestic Water Heater Technician	SGJ/Q0601	4
22	Solar Thermal Plant Installation & Maintenance Technician	SGJ/Q0602	4
23	Solar Thermal Engineer—Industrial Process Heat (Option: Consultant)	SGJ/Q0603	5
24	Improved Cookstove Installer	SGJ/Q2101	4
25	Portable Improved Cookstove Assembler	SGJ/Q2102	3
26	Portable Improved Cookstove Sales and Maintenance Executive	SGJ/Q2104	4
27	Portable Improved Cookstove Distributor	SGJ/Q2105	6
28	Recyclable Waste Collector and Segregator	SGJ/Q6101	4
29	Safai Karamchari (Options: Wet Cleaning/Mechanised Cleaning)	SGJ/Q6102	3

(continued)

Table 7.3 (continued)

Sl. No.	Qualification pack title	QP code	NSQF level
30	Waste Picker	SGJ/Q6103	3
31	Wastewater treatment plant technician	SGJ/Q6601	4
32	Wastewater treatment plant Helper	SGJ/Q6602	3
33	Assistant Planning Engineer—Wind Power Plant	SGJ/Q1201	4
34	Site Surveyor Wind Power Plant	SGJ/Q1202	6
35	Construction Technician (Civil)—Wind Power Plant	SGJ/Q1402	4
36	Construction Technician (Mechanical)—Wind Power Plant	SGJ/Q1401	4
37	Construction Technician (Electrical)—Wind Power Plant	SGJ/Q1403	4
38	CMS Engineer—Wind Power Plant	SGJ/Q1501	4
39	O&M Mechanical Technician—Wind Power Plant	SGJ/Q1502	4
40	O&M Electrical & Instrumentation Technician—Wind Power Plant	SGJ/Q1503	4
41	Animal Waste Manure Aggregator (Option: Biogas Plant Operator/Compost Plant Operator)	SGJ/Q6302	4
42	Agri-residue Aggregator	SGJ/Q6201	4
43	Biomass Depot Operator	SGJ/Q6207	4
44	Manager-Waste Management (Elective: Biomass Depot/Compost Yard/Dry Waste Center)	SGJ/Q6501	6
45	Septic Tank Technician	SGJ/Q6402	4
46	Desludging Operator	SGJ/Q6403	4
47	Feacal Sludge Treatment Plant O&M Technician	SGJ/Q6404	4
48	Technician-Paper Bag Manufacturing	SGJ/Q8701	3
49	Paper Bag Maker	SGJ/Q8702	5
50	E-Waste Recycling Entrepreneur	SGJ/Q0202	6
51	Solar Pump Technician	SGJ/AGR/Q6701	4
52	Social Media Executive	SGJ/MES/Q0702	4

Source SCGJ 2020

- Identification of skills development needs includes a catalogue of types of skills, range and depth of skills and the organising of a sector skill development plan and skill inventory.
- Assessment and certification of individuals with prior learning experience or skills takes place under the mechanism of Recognition of prior learning (RPL), which aims to align the competences of workers in industry, enterprises and the informal sector in the country to the National Skills Qualifications Framework (NSQF).
- Project implementing agencies (PIAs), such as Sector Skill Councils (SSCs) or any other agencies designated by Ministry of Skills Development and

Sector-wise Job Roles	NSFQ Job Levels						QPs developed
	Level 2	Level 3	Level 4	Level 5	Level 6	Level 7	
Solar Photovoltaic	1	0	7	6	3	3	20
Solar Thermal	0	0	2	1	0	0	3
Biomass Energy	0	0	3	0	1	0	4
Waste Management	0	3	4	0	1	0	8
Waste Water Treatment	0	1	3	0	0	0	4
Clean Cooking	0	1	2	0	1	0	4
Wind Energy	0	0	6	1	1	0	8
Total	1	5	27	8	7	3	51

Fig. 7.2 Snapshot of QPs developed by SCGJ across Green business sector. *Source* SCGJ 2020

Entrepreneurship (MSDE) and the National Skills Development Corporation (NSDC), implement RPL projects in any of three ways:

- Industry sector-based RPL;
- Employer-based RPL;
- RPL of scattered workers in the informal sector.

In the case of industry sector-based RPL:

- Workers of an industry sector e.g. a specific set of workers in the automotive or the construction industry or the waste management sector are targeted;
- RPL takes place at a so called RPL 'camp' set up by the PIA or training providers;
- The PIA or training providers identify jobs roles against which RPL can be conducted;
- The training provider decides the eligibility of the potential candidates;
- PIA then chooses a prominent locality and mobilises potential candidates to the camps by involving NGOS and training partners;
- Municipal officials take part in the start of the RPL process.

In the case of employer-based RPL, all steps mentioned above take place at the employer's premises.

- The employer can be in private or public-sector organisation;
- The PIAs tie up with employers and identify job roles that are carried out within the employers' enterprise;
- Employers mobilise their employees to participate in RPL.

In the case of RPL for scattered unrecognised skilled workers of the informal sector (such as hairstylists, cobblers, vendors):

- RPL is carried out in RPL centres;

- Scattered workers are mobilised:
- PIAs or training providers identify jobs roles and mobilise candidates together with NGOs and community-based organisations;
- The designated training centre must in a locality close to the informal sector businesses.

Workers' training in the project location

SCGJ caters to workers' training in the project areas. The following stages are carried out in order:

1. Identification of project location, manpower requirement and skill gaps;
2. Memorandum of agreement with industry to provide skilled manpower on a cost sharing;
3. Identification of suitable training institutions in the project vicinity;
4. Enrolment of suitable candidates;
5. Training delivery as per qualification packages and project specific requirements;
6. Placement of successful candidates in industry;
7. Candidates that are not selected are retrained.

Two case studies of RPL of green skills

Box 7.1 Case study of skills recognition and training needs in the waste management sector in India

Skill Sector Council for Green Jobs has been involved in an RPL project for informal sector cleaning workers (*safai karamcharis*), who are employed by the municipal corporation of Delhi. Most of these people have acquired skills, knowledge and experience through working and learning in the informal sector but have not been certified in any way. They work in the collection and transportation of waste (both wet and dry waste) and its safe disposal. The RPL process entails:

- Mapping competences of cleaning workers, and aligning them to the standards in the NSQF;
- Identifying skill gaps;
- Designing training programmes based on the skill gaps.

For the cleaning workers the following green *skill deficits* were identified. These dealt with the ability to:

- Use new equipment and techniques in waste management;
- Adhere to safety standards, which are often overlooked despite rules and regulations communicated by employers;
- Collaborate in the completion of group tasks;

- Communicate professionally with peers, supervisors and the public in the completion of group tasks;
- View the waste management sector as an area of work that offered career and entrepreneurship opportunities.

Resulting from these findings, the sector council for green jobs was able to identify training needs and design the following *training objectives* for enterprises in the waste management sector:

- Develop capacities to use new tools and techniques. Enterprises would be able to expand their skills and move ahead with the latest technology;
- Introduce methods for reduction and recycling of waste;
- Develop capacities of employers and employees to judge how long products could be used or be of further relevance;
- Develop capacities for better compliance with HR rules and regulation;
- Develop attitudes and values that make them actively contribute to environmentally friendly practices.

The outcomes of skills recognition and staff training were highlighted:

- Individuals' skills and competences in enterprises and industry were made visible;
- Employees were recognised for their work experience and competences;
- Employers and employees became aware and showed interest in recognising green skills versus simply the practice of green activities;
- They realised that green skills were transferable skills and were important for employability in the long-term and not just something helping them to secure short-term employment;
- They accepted that employability often involved new training and credentials, as well as transferring skills from one job to the next.

Source: SCGJ

Box 7.2 Case study of recognition of prior learning in the renewable energy sector

India has launched a national mission on solar energy. As part of this mission, Government of India has set an ambitious target of achieving 175 GW installed capacity from renewable energy by 2022. It is envisaged that out of this total target, 100 GW installed capacity will be from solar energy, including 60 GW installation of Ground Mounted Solar PV Projects and 40 GW from rooftop installations. While this target poses a huge challenge of availability of trained and skilled manpower, it is also an opportunity for youth to get jobs

by acquiring skills in the solar energy domain. Most of these jobs are covered by the following Qualification Packs developed by the Skill Council for Green Jobs:

- SGJ/Q0101—Solar PV Installer (*Suryamitra*) (level 4)
- SGJ/Q0102—Solar PV Installer—Electrical (level 4)
- SGJ/Q0103—Solar PV Installer—Civil (level 4)

The skills of the workforce are mapped and benchmarked against the NSQF levels. This helps to maintain high-quality standards during installations. If any gaps are found, they can be met through revisiting the concepts and expected performance criteria during the technical training delivery.

While the RPL candidates are aware of fundamentals of installation of solar projects through the initial training as well as through on-the-job experience, there are certain knowledge and performance gaps in the workforce, for example:

- Assessing the solar project site for feasibility;
- Using latest technology and components available in the market;
- Ensuring the use of correct material and accuracy in measuring dimensions during installation of solar project structures;
- Following safety norms and approved designs for electrical installations;
- Paying due attention to safety considerations (personal and with respect to co-workers) while working at the project site;
- Promoting collaborative working spirit with co-workers to improve efficiency and to adhere to project timelines.

The outcome of this RPL process is intended to:

- Assure employment with the service contractors;
- Provide opportunities to become regular employees;
- Open avenues for employment with other organisations carrying out installations;
- Promote a safe working culture, including personal health and safety of workers while they perform their activities.

Source: SCGJ

7.3 Methodology of Primary Data Collection

This case study follows the overall methodology for the study presented in Chap. 1 of this book that includes the guidelines on how data collection should be organised at the micro level. Addressing the issue of the importance of green practices

and green skills and their recognition and certification, information was obtained from 47 enterprises in waste management and renewable energy with the help of the questionnaire designed for employers and employees. Twenty-three respondents were from the informal sector and 24 from the formal sector. The study interviewed 25 renewable energy and 22 waste management organisations. Of the 47 respondents, 24 are employers (director/proprietor/partner/CEO) and 23 are employees. As stated above, this study focused on only the renewable energy and waste management sectors.

7.4 Results and Discussion

Awareness of environmental regulations, policies, and government initiatives

On the question of the awareness of environmental regulations, 97% of the employers and employees in the 47 enterprises, as well as stakeholders from sectoral organisations, were aware of some environmental rules, regulations and policies. While doing the survey they named several governmental policies related to environment which they were obliged to follow. They also had a good understanding of governmental missions, such as the *Swachh Bharat* (Clean India) mission, the National Solar mission, etc., which aim to promote a greener and more developed skill regime in India. The national missions that were mentioned by the workers in the enterprises were Make in India 32 (68%); Green India 26 (55.3%); Smart Cities 33 (70.2%); the National Solar mission 34 (72.3%); Clean India 38 (80.9%); Skill India 37 (78.7%), Urban mission 7 (14.9%) and Digital India 1 (2.1%).

- The Skill India mission aims to create an ecosystem of empowerment by skilling on a large scale at speed with high standards and to promote a culture of innovation-based entrepreneurship, which can generate wealth and employment to ensure sustainable livelihoods for all citizens in the country. Seventy-six per cent of enterprises are keeping up with this initiative and can be characterised as facilitators for skilling with standards within their sectors. This encourages enterprises to align with national missions and have consequent benefits:
- *Swachh Bharat Abhiyan* (Clean India) was mentioned by just over 80% of respondents. This programme aims to achieve universal sanitation coverage and promote a healthier environment. Companies inculcate values and train their employees to be aware of such missions and propagate it by both word and action. This is a way forward for large-scale inclusion of green skills as part of lifelong learning.
- The National Solar mission is a major contribution to the global effort to meet the challenges of climate change. For enterprises, it means greater involvement in working for a cleaner industry and environment.
- The Smart Cities mission was mentioned by 70% of respondents. This is an urban renewal and retrofitting programme in the context of which 100 cities all over the country will be made citizen-friendly and sustainable.

- Given that informal enterprises are an urban phenomenon, their involvement will be an important contribution to the sustainability of cities.
- Make in India mission's basic premise is to encourage enterprises to contribute to the self-reliance of an economy by manufacturing high-quality products, including environmentally friendly products in India. Sixty-eight per cent of respondents are familiar with the Make in India initiative.

Overall, the survey reflects a high degree of environmental awareness: 97.7% of the enterprises are aware of government policies. There is a high awareness, 77.7%, of government initiatives. This correlates with the enterprises' engagement with green skills.

Green practices and engagement with green skills

On the question of green practices and engagement with green skills, 93.6% have tasks relevant to the green sector (see Table 7.4). This shows that the Indian market is opening areas in the green sector where the formal sector opens to the informal workforce. It also shows the potential of green skills recognition and certification in these sectors. Green practices and green skills instead of being in conflict with businesses are in fact drivers of economic activities and production processes.

The study also highlights that while most of the enterprises had tasks related to environment and sustainable development, there is still room for improvement. The high percentage of *engagement with green skills* can be attributed to the fact that all 47 enterprises belonged to the waste management and solar energy sectors. While understanding the importance given to green skills in the enterprises, when scoring on a scale of 1 to10, respondents were not very confident. Thirty-six respondents (47.6%) rated their enterprises' green skills between 6 and 10, and 11 (23.4%) rated them between 1 and 5. This, they said, was because they did not possess a certificate which

Table 7.4 Enterprise engagement with green practices

Engagement with green practices	Number with green practices	Total respondents	Percentage (%)
Waste minimisation	22	47	46.8
Recycled and reused waste	23	47	48.9
Disposed toxic waste	9	47	19.1
Conserved water	15	47	31.9
Practiced energy efficiency	31	47	66
Reduced pollution	14	47	29.8
Introduced renewable energy	36	47	76.6
Practised green construction	1	47	2.1

Source Author

recognised their skills in relation to national standards. Overall, a high percentage of respondents said they were willing to undergo training and to achieve certification that recognised their skills against national standards.

The importance attached to certification

On the question of certification of skills of their employees, 85% of the responding enterprises said they certified the skills of their employees after RPL and training. The reason for this certification is to promote the credibility of the enterprise among customers.

Most employees (93.6%) want certification as it gives validity to their skillset and a chance for career growth in a structured manner. Four out of five, 81.7%, said they wanted a national certificate, 19.1% said that they wanted a certificate given by the training organisation. Enterprise training is conducted in two ways, either by learning from other employees, or through the involvement of an outside training provider. Depending on the financial resources and existing training capacity, enterprises take up one of the two forms of training for their employees. Three-quarters, 74.5%, carried out in-house training.

Informal and non-formal modes of acquiring skills

The prevalence of informal and non-formal acquisition of prior and emergent skills and learning was given as the main need for recognition and certification. The highest percentage of acquisition is in self-directed learning (63.8%), company training (57.4%) and short-term skills (51.1%). Working in a sector that is directed towards the betterment of a more sustainable living, individuals are self-driven and bound to achieve a high standing as they work in functions aligned to this goal. Learning is enhanced when an individual is self-motivated to learn, be it through formal or informal learning. Company training through short-term skills in green jobs, when structured and carried out in a focused trajectory will yield high levels of development in individuals.

Benefits of training programmes after RPL

On the question of the importance of staff training, respondents mentioned the benefits of training to employees, employers and to a greener society and economy. They mentioned the following benefits of training programmes after RPL:

- An increase in performance of the organisation 38 (80.9%);
- Induction to new tools and techniques 34 (72.3%);
- Employees' increased awareness of HR rules and regulations 9 (19.1%);
- Employees motivated to take an interest in environmentally friendly practices 35 (74.5%).

The survey highlighted the following benefits of training in green skills at the individual level:

- Increase in salary 6 (12.8%);
- Increase in efficiency of the employees 30 (63.8%);
- Increase in self-confidence 26 (55.3%);
- Greater motivation to save the environment 34 (72.3%);
- Improve career prospects 30 (63.8%).

7.5 Conclusions and Recommendations

Much work needs to be done in the Indian context to move from the policies and blueprints to the implementation of RPL at the enterprise level. This is important, if the recognition of prior learning of individuals engaged in the informal sector and their certification in relation to the NSQF is to give a big push to green skills. RPL can help informal sector workers to take up decent jobs in green industries and green jobs. This will improve career progression and skill training of the workers as well as facilitate the engagement of the experienced practitioners as resource persons.

If the green transition must be a just one, then we need to think about the role of the informal sector. Given the sheer size of the informal economy, its rapid growth potential and ability to provide livelihoods for the poor, it needs a structured skills development and skills recognition regime.

The requirement of recognition of green skills is well understood at the individual level, enterprise level and national level. There are, however, some barriers regarding the way green skills need to be included in RPL. While the government of India has understood the problem and has launched a special RPL system in the skill certification scheme Pradhan Mantri Kaushal Vikas Yojana (PMKVY) under the Skill India Mission (MSDE 2016), the need of the hour is to reach end-users in a coordinated manner so that they can be recognised, and their certificates can be related not only to national skill standards but also to comparable qualifications in other parts of the world.

The survey reveals that the majority of the employees and employers are aware of the various government initiatives to promote green skills and green jobs, initiatives such as the Skill India mission, the *Swachh Bharat* mission, the National Solar mission, Smart Cities mission and other initiatives to promote green sectors, all of which in turn require green skills. Almost 94% of the respondents deal with tasks related to green skills, but many of the enterprises were unaware what constitutes green skills, and almost 85% of the enterprises want recognition of the green skills through certification which their employees acquire while working.

Almost 80% of the employers with enterprises that have green jobs mentioned that upskilling employees on green practices and skills will increase the performance of the organisation. Further, around 75% of the employers feel that recognition and certification of green skills of their employees will motivate them to adopt the latest technology and techniques and environmentally friendly practices.

Since there had been very few structured training courses in India to provide green skills, majority of the employees acquired green skills through self-directed learning

and in-house company training. Only 23% of employees have acquired green skills through vocational education and training. However, with the introduction of national standards, training programmes can be structured, and recognition of green skills can be better realised. Almost 95% of employees want recognition and certification of green skills at the individual level, as they felt that way they could have a high proficiency level of green skills.

Including green skills in RVA for informal and formal sector enterprises will have a knock-on effect in other respects such as overcoming the challenges of informality preventing informal employment in formal enterprises. This in turn will inculcate a culture of regulatory compliance in terms of taxes and labour laws, helping not only to increase the tax base but also help the government to finance minimum social security cover for workers in those enterprises that still prefer not to become organised and provide formal employment.

Formalization of the informal economy through skills recognition and certification would be helped if programmes developed for workers in the formal sector could also be used as training courses for informal workers with minimal alteration to their content: for example, safety courses for solar installation and the waste and recycling industries. Integrating the teaching of literacy and life skills or supporting the provision of basic education can boost the impact and attractiveness of the training provision for some target groups. It is these links at the local level, which will define whether green transition is successful.

Going forward, there are some challenges such as lack of finance that needs to be addressed in recognizing and certifying green skills. Recognition of green skills needs to be understood as part of a quality management system of enterprises and businesses. To address these issues, it has been suggested that RPL be a part of ISO licensing of enterprises. Lastly, green skills recognition and certification as well as improving skill levels of the workforce to match the requirements of the job market and the green economy must at the same time improve the bargaining power of the workforce to achieve decent wages, social security and job security.

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Chapter 8
Case Study: Kazakhstan. Educational Challenges in Transitioning to a Green Economy

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Abstract This chapter examines the potential for including 'green skills' in the processes of recognition of learning outcomes from all learning settings—formal, non-formal and informal learning. The chapter opens with a discussion on Kazakhstan's stated objectives to realise a green economy and society and in this context challenges faced by the industry are highlighted. The chapter then examines the need for recognition of green skills as well as policy and legislation in relation to green economy and environmental protection and proceeds to clarify concepts of competence-based learning and ecological competences. The authors consider issues and challenges of green skills inclusion in the recognition of formal, non-formal and informal learning results in relation to the development of the National qualifications system, which in Kazakhstan includes four main elements: the National Qualifications Framework (NQF), Sector Qualifications Framework (SQF), Occupational Standards (OS) and a system of professional qualifications evaluation (or system of independent certification). The chapter argues that within formal education the emphasis is on developing environmental knowledge but not on its application, therefore this might have a direct implication on a lack of green practices in the industry and on the interpretation of green skills. The results of the study among 12 enterprises on the use of eco-friendly practices and recognition of green skills in the context of qualification requirements in the workplace in catering, automotive and waste management sectors are reported in the chapter. Finally, the chapter presents conclusions and recommendations on the inclusion of green skills into the system of prior learning recognition.

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Keywords Ecological competence · Green skills · Green economy · Prior learning results · Qualifications system

8.1 Introduction

In 2013, the President of the Republic of Kazakhstan approved a decree on the concept of transition to a 'green' economy. Kazakhstan subsequently took steps to operationalise the concept of the 'green economy' to initiate a transition towards an economy of improved human welfare and a higher quality of life for all citizens.

This policy was also reflected in the theme of Kazakhstan's recent EXPO-2017, entitled 'Energy of the Future', which also featured the partnership programme 'Green Bridge' to promote sustainable development in Central Asia and other regions of the world. The realisation of the so-called green economy is expected to position Kazakhstan as one of the 30 developed countries in the world. The main priorities for this transition to a 'green economy' are to:

- Increase efficient use of resources and their management (water, land, biological and others);
- Modernise existing infrastructure and to construct new infrastructure;
- Create wealth and ensure environmental improvement;
- Increase national security, including water-supply security (Republic of Kazakhstan 2013).

This chapter examines a number of aspects that are essential for implementation of this vision. It particularly focusses on the interpretation of green skills and green practices at MSMEs in catering, automotive and waste management sectors. Considering the purpose of the regional study, it further analyses the status of RVA and the ways green skills can be included in their mechanisms.

Environmental challenges in Kazakhstan industry

Environmental challenges that the country is facing are closely related to the ways industries are operating. For the three sectors examined by this study, the set of challenges are different. In the automotive industry of Kazakhstan, environmental problems are predominantly related to the poor quality of fuel, the lack of exhaust filters, 'aging' of vehicles and their poor maintenance. In addition, the number of cars in the cities is increasing. The main source of air pollution in the cities of Kazakhstan is caused by vehicle exhaust gases. In Almaty, up to 90% of harmful substances in the air originates from vehicle emissions, accounting for up to 190,000 tonnes of harmful substances in the atmosphere (Diti 2016).

In Kazakhstan, most catering companies are small enterprises, ranging from fast food outlets to elite luxurious restaurants; their services are in high demand among different consumer groups. The main problem for catering companies is the quality of food and beverages they use for cooking and providing services. Organic food is not widely available and food safety is an issue. There are no state standards for organic

or eco-food in Kazakhstan. In addition, its production requires more resources and time, which affects the price, so only a limited number of consumers are able to afford it compared to conventional products (ELIM (ИМСИ) 2016).

For the waste management sector, environmental challenges are closely related to the increasing danger associated with landfills where collected waste is dumped. Over the recent years, its volume has increased as has its emissions. Furthermore, this sector is characterised by:

- An underdeveloped waste collection system, including the separate collection of municipal solid waste (MSW);
- Lack of waste treatment before landfill dumping over almost the entire territory of the republic;
- The small volume of waste recycling and processing;
- Existing MSW disposal landfills non-compliance with health and safety regulations.

In general, the involvement of citizens in discussions of environmental issues is limited, and current legislation does not allow local administrations to make decisions that can minimise harmful impact on the environment.

Policy and legislation related to environmental protection and greening of the economy in the Republic of Kazakhstan

Development of state policy on environmental protection started from April 1996, when the President of the Republic Kazakhstan approved the 'Environmental Security Concept'. Since then a number of further major developments have occurred that have established a legislative framework for environmental protection. In 2002, for example, the 'Law on Air Protection' was adopted. Further improvements in legislation were undertaken to match environmental legislation in developed countries. The republic of Kazakhstan signed 19 international conventions and developed plans for their realisation. A system of environmental expertise, permit issuing, control and inspection was established (Republic of Kazakhstan 2003). In 2007, the Environmental Code of the Republic of Kazakhstan was put in place (Parliament of the Republic of Kazakhstan 2007).

In 2010, Kazakhstan put forward the so-called Astana initiative, 'Green Bridge', supported by participants of the sixth Asia-Pacific Ministerial Conference (Astana, 27 September–2 October 2010). At this conference, the concept of a green economy (Green Growth) was adopted as a tool for sustainable development in Kazakhstan. It was later developed into the Partner Programme Green Bridge for 2011–2020 and supported by the UN Assembly in September 2011.

In 2012, the UN Conference on Sustainable Development also known as 'Rio + 20' was held in Rio de Janeiro, Brazil. At the conference, the Minister of Environmental Protection from Kazakhstan presented Kazakhstan's Green Bridge programme as well as the Global Energy-Ecological Strategy wherein joint actions and practical mechanisms to facilitate the transition to a green economy through development of partnerships with green businesses supported by green technologies and investments were proposed. The initiative was supported by The World Summit.

In the 2013 President's address 'Kazakhstan-2050' a strategy of transition to a green way of development was defined as the national priority. The President's Decree approved the Concept of Transition of the Republic of Kazakhstan to a green economy (hereinafter the Concept) (Decree No 577 of the President of the Republic of Kazakhstan 2013).

The Concept outlines the following approaches to the transition to a green economy:

- Sustainable use of water resources;
- Sustainable development of productive agriculture;
- Increase in energy saving and energy efficiency;
- Development of electric power industry;
- Waste management systems;
- Reduction of air pollution;
- Conservation and effective management of ecosystems.

It was expected that such measures would contribute towards changes in behaviour patterns and increased use of green practices such as environmental friendly heating and cooling systems, waste utilisation and water use.

Green skills development in a formal educational setting

The Concept for Transition of the Republic of Kazakhstan to a Green Economy notes the importance of ensuring required green skills for the labour market particularly through the training of engineers, technicians and managers. These clearly defined targets require new approaches to education, so that the concept of the green economy can be operationalised.

The results of the survey conducted by the authors with first-year graduate students in a number Kazakhstan universities showed that while students demonstrated a high level of environmental knowledge, they lacked green skills or ecological competences. The primary reason for this is related to a tradition of theory-based curriculum development. The absence in Kazakhstan universities of teaching materials specifically designed for the development and promotion of green skills, in particular in the fields of study that are in demand for the development of a green economy, such as engineers, designers and scientists, also has a negative impact.

This study demonstrates that formal education in Kazakhstan tends to privilege factual knowledge among students rather than giving students opportunities to apply their knowledge. The content of Kazakh educational programmes contributes little towards the development of ecological behaviour for everyday life and work. A concern identified through this study was related to green skills development among students. The questionnaire aimed to understand what green skills are better developed in students. It was found that their ability to analyse information on ecological issues independently, to work with, classify, synthesise, transform, store and transmit this information is better developed than the ability to use this information in everyday life or analyse contemporary environmental problems in the

country. University students showed better results in analysing and storing information on ecological issues, conceiving green skills from a standpoint of searching for ecological information and making ethical and moral judgments.

The above results highlight issues in developing green skills through a formal educational setting. Therefore, the role of work-based learning for green skills development and inclusion of green skills in RVA become increasingly important. In this context, the results of the study conducted at the enterprises and presented below are of particular importance as they lead to an understanding of the potential for recognising green skills acquired via non-formal education (continuing education and training after completion of formal educational programmes) and informal education (in workplaces). Both non-formal and informal learning in Kazakhstan are of growing importance. For example, all newly recruited employees in large enterprises (in the formal economic sector) undergo a mandatory briefing on safety, which implicitly includes knowledge of environmental safety regulations. Occasionally this also applies to small enterprises, in both formal and informal economic sectors.

Environmental education and training will therefore become extremely important for the Republic of Kazakhstan's transition to a green economy. At a policy level importance attributed to the issue is reflected by the inclusion of environmental education and training in Kazakhstan's long-term development programme—Strategy 2030.

However, beyond the existing learning infrastructure, environmental education and training should simultaneously be improved in various industry sectors and enterprises to address environmental problems and challenges in Kazakhstan.

8.2 Terminology and Definitions

This study looks at green skills in terms of practices aimed at reducing energy consumption, protecting ecosystems and biodiversity and minimising emissions and waste. In that regard, well-developed green skills provide a firm basis for the development of environmental or ecological competences (alongside with environmental knowledge and social and professionally significant qualities of a person).

This definition draws on an analysis of international studies and studies undertaken in Kazakhstan related to green skills and ecological competences, allowing us to conclude that the idea of ecological competence is widely accepted and characterised by interdisciplinary and socio-cultural understanding. Environmental competences entail knowledge about environment as well as the practical skills needed to solve environmental issues. Thus, the structural components of the ecological competences include environmental knowledge, environmental skills, as well as socially and professionally significant qualities that enable individuals to be engaged in activities focussed on the harmonisation of relationships between people–society–nature.

The starting point for the definition of green skills is the concept of the green economy. UNEP defines the green economy as an economy that improves the welfare

of people and provides social justice, while significantly reducing environmental risks and environmental depletion (UNEP 2012).

Moreover, research is increasingly adopting the term green in relation to workplaces. The UN defines green workplaces as sectors that minimise emissions of pollution and waste. In international publications, the terms green workplaces and green skills are used almost interchangeably. However, their exact meaning often depends on the context of their use. The International Labour Organization (ILO), for example, defines green workplaces as any sector that has a negative environmental impact below the average rate (ILC, 2013 cited in OECD 2015).

In the reports of the European Centre for Development of Vocational Training (CEDEFOP 2012), green skills are defined as knowledge, skills, values and attitudes necessary for life, development and sustainability in terms of the effective provision of society's resources. In a more specific context, green skills can be understood as skills necessary for all economic sectors that can also allow to deal with climate change.

In Kazakhstan, the National Qualifications System (NQS) incorporates four main elements:

- National Qualifications Framework (NQF);
- Sectoral Qualifications Framework (SQF);
- Occupational Standards (OS);
- Assessment of professional qualifications.

While all four elements of Kazakhstan's NQS are inter-related, the backbone of the system is the NQF. This is designed as a unified system that links learning outcomes from different sectors—enterprises, professional qualifications and diplomas, as well as general and vocational education.

NQF includes a description of eight qualification levels, which is similar to the European Qualifications Framework (EQF). While all eight qualification levels under the NQF correspond to levels in the general and vocational education system, it is not strictly necessary to have a formal (school, college, university) education to obtain a qualification. It is possible to gain a qualification through non-formal or informal (unintended or self-directed) learning outside school, college, university or practical experience at the workplace. The form of learning known as dual education programmes (simultaneous education through formal education and at enterprise) has received a wide recognition in Kazakhstan.

Furthermore, NQF also forms the basis of the SQF that is based on occupational standards (OS). They respond to changing technologies and take into account regional and local labour market realities.

The fourth and last NQS element is directly linked to the qualifications assessment system, which means that qualifications can also be awarded through assessment processes in both the academic world and the world of work. This is possible when outcomes from formal, non-formal and informal learning are recognised through mechanisms of recognition, validation and accreditation (RVA) or prior learning assessment and recognition. One of the purposes of recognising prior learning results is the promotion of personal and career development. While many large enterprises

have their own methods for assessing employee competences, the situation is different in small and medium-sized enterprises.

In Kazakhstan, as in all the participating countries/territories in this study, the recognition of green skills is not appropriately reflected in the NQS. However, the development of sectoral qualifications is a good starting point for including green skills in descriptors of NQF qualification levels. Through such an inclusion, attention can be drawn to green skills. NQFs are also an important reference point for the development of education programmes based on sectoral occupational qualification.

In addition, occupational standards in SQF must be used to design learning outcomes based on educational programmes with the compulsory participation of employers.

NQF linked to RVA mechanisms can be one of the most effective mechanisms for the inclusion of green skills into recognition system of qualifications, regardless of the ways the learning and education are acquired.

8.3 Methodology of Primary Data Collection

This study followed the overall approach developed for the project as stated in Chap. 1 of this book. With regard to green skills recognition in MSMEs in Kazakhstan, the research was conducted in twelve enterprises with the help of Atameken, the National Chamber of Entrepreneurs. Six enterprises were from the formal sector regulated by state legislation, and six from the informal sector. Two formal and two informal enterprises were visited from each of the respective sectors studied: catering, automotive and waste management,

8.4 Results and Discussion

Across the six formal enterprises, the average number of employees was 26. Twenty per cent of employees completed their education at secondary level, 32% had technical and vocational education and 47% had higher education qualifications. The automotive service enterprises had the largest share of employees with higher education, while catering enterprises had employees who had mostly completed only secondary education and lacked vocational education and training.

A slightly different picture emerged from the six enterprises in the informal sector. Here the proportion of employees with higher education qualifications was very low, 12%.

All respondents from the 12 enterprises stated that their enterprises follow state regulatory policy in the field of environmental protection and mentioned the departments responsible for setting rules and policy regulations. However, they found it difficult to recall these rules: only 11.3% of respondents named more than ten rules; only 29.6% identified more than seven. The rules mentioned generally related to the

preparation of quarterly reports on dangerous waste, and the control of compliance with industry standards.

Respondents from all enterprises—formal and informal—understood green skills as respect for the environment, applied in various manners from personal use of natural resources to large-scale relationships between humanity and the biosphere. They saw green skills from several perspectives, such as intra-personal skills, technical skills and inter-personal skills. Their broad understanding of green skills was related to the implementation of ideas of conservation for sustainable development. Another notion that all respondents referred to when talking about green skills in enterprises was the use of environmentally safe operations. This included compliance with standards of waste management, use of safe detergents in the catering sector, use of modern technologies in the automotive sector as well as regular cleaning of premises to meet hygiene requirements.

On the question of environmentally safe operation methods at work respondents identified both knowledge of laws and regulations, occupational safety and compliance requirements to various standards and skills. The list of required skills is broader than the list of knowledge and included an ability to control dangerous situations, to apply necessary measures to both standard and non-standard situations, an ability to audit workplaces, technological procedures and operations, to operate equipment and to comply with environmental safety requirements.

Only 3% of the respondents from the waste management sector said that their enterprise had a full-time responsible person for monitoring green practices such as waste and water management, renewable energy, energy efficiency, pollution minimisation etc. However, an overwhelming majority of respondents from enterprises in the formal sector indicated that the above functions were usually assigned to deputy heads.

Categories such as attitudes and behaviour were more difficult for respondents to understand. This indicated the lack of a broader understanding of green skills among most respondents. Respondents rarely went beyond internal requirements for environmental safety at the workplace in describing green skills. They seldom referred to the aspects of environmental protection in relation to the external environment.

Table 8.1 indicates the understanding of green skills in relation to knowledge, skills and attitudes and behaviour across all enterprises.

Table 8.1 shows that green skills are understood in a narrow sense; respondents did not refer to the broader social context. Green skills are interpreted as skills required for job-specific professional occupations. This was reflected in the importance attached

Table 8.1 Understanding of green skills

	Percentage of respondents
Knowledge	75.1
Skills	100.0
Attitudes	0.1
Behaviour	4.4

Source Authors

to qualifications (education certificate and work experience relevant to position) when recruiting potential employees for the formal sector. In the informal sector, heads of enterprises interviewed candidates on general issues during the recruitment process, thus no assessments of green skills have been conducted.

For all enterprises recognition of prior learning include verifying diplomas of education, job interviews, verifying training course and seminar certificates. Green skills can be considered in the context of ecological safety. Among methods used to evaluate green skills, respondents mentioned workbooks in which safety training at the workplace was recorded.

Most employees acquired their green skills through self-learning/non-formal learning or initial vocational education and training.

All enterprises had some form of staff training, usually by the staff responsible for compliance with safety rules. The main goal of this training is to increase efficiency as well as the motivation and responsibility of employees. These elements result in real benefits for the staff in terms of bonuses, salary increases, career development, etc.

In addition to interviews, observation sheets developed for this study (see Chap. 1) were filled in and results are presented in Table 8.2, which presents a record of existing environmentally friendly practices at the enterprises, showing variations across sectors and between formal and informal sectors.

- *Recognise and report on a potential environmental threat* was the area across all sectors that was fully addressed by 25–50% of the formal enterprises (and by 25% of informal automotive enterprises).
- Environmentally friendly activities were best manifested through *Following environmental workplace practices* and *Maintaining environmental records* in the formal catering sector.
- The formal automotive sector has a better record of *Contributing to improved environmental work practices* than other sectors.
- Informal automotive enterprises performed better across the first three categories compared to all other informal sectors.
- Overall, the level of practice is lower in informal sector enterprises in almost all aspects; all informal enterprises do not undertake *Maintaining environmental records*; however, they try to *Recognise and report on a potential environmental threat* at the workplace.

8.5 Conclusions and Recommendations

At the national level, there is full commitment to the transition to a green economy. The Ministry of Environmental Protection of the Republic of Kazakhstan has announced the creation of 400,000–600,000 green workplaces in Kazakhstan by 2030, and by 2050 the country will receive an additional 3% GDP growth for growth from transition to a new model of green development. It is also proposed worker qualifications standards will take green skills into account.

Table 8.2 Analysis of the level of environmentally friendly practices at enterprises in the formal and informal sectors (in percentages)

Service trades	Catering service						Automotive						Waste management					
Intensity	Limited		Moderate		Full		Limited		Moderate		Full		Limited		Moderate		Full	
Sector*	F	Inf	F	Inf	F	Inf	F	Inf	F	Inf	F	Inf	F	Inf	F	Inf	F	Inf
Follow environmental workplace practices	16.7	50.0	83.3	50.0	0	0	50.0	66.7	16.7	33.3	33.3	0	83.3	83.3	16.7	16.7	0	0
Contribute to improved environmental work practices	62.5	100.0	37.5	0	0	0	50.0	75.0	50.0	25.0	0	0	75.0	87.5	25.0	12.5	0	0
Recognise and report on a potential environmental threat	37.5	37.5	37.5	62.5	25.0	0	25.0	25.0	25.0	50.0	50.0	25.0	50.0	50.0	25.0	50.0	25.0	0
Maintain environmental records	25.0	100.0	75.0	0	0	0	25.0	100.0	75.0	0	0	0	50.0	100.0	50.0	0	0	0

Note * F = Formal sector; Inf = Informal sector

The issue of revising technical and vocational education curricula in the context of a transition to a green economy is particularly relevant considering the criticism of Kazakhstan's slow response in addressing green professional skills through TVET system (as noted at the Asian Development Bank forum). It is particularly important to train specialists with green skills for economic sectors which play a major role in food supply (agriculture, supply of freshwater, forestry), renewable energy sources, construction and transport. It is also necessary to work on teacher training to develop green competences among students and to develop educational content that takes into account the new challenges of a green economy.

It is clear that the formal education system pays insufficient attention to questions of environmentally sound practices. In educational programmes at schools and universities, environmental education is limited to competences that students develop through the study of individual subjects; extra-curricular activities are entirely related to the enthusiasm of academic staff; and so, green skills development in formal education is fragmented and unsystematic. Notwithstanding this criticism, it needs to be acknowledged that there are some important green initiatives in formal education, such as Green Universities and the Prosperity project, which promote environmental education in the Republic of Kazakhstan.

Modern education needs to be oriented towards not only knowledge and skills but also life skills or competences with practical rather than simply theoretical orientation. Ultimately, the former will be a motivating factor for engaging in green environmental activity. Only proper systems of ecological education for students and future specialists will embody ideas and realise the goals and objectives of greening society.

At the level of enterprises, as demonstrated by the results of the study, skills recognition in relation to environmentally friendly practices only occurs during the recruitment process and only in some enterprises, with informal enterprises less engaged than formal sector enterprises such as automotive companies.

Considering that green skills are one of the most important components of environmental competence, the importance of recognising green skills in prior learning should be also taken into account. In this sense, the new National Qualifications System in the Republic of Kazakhstan can act as an effective mechanism. The National Qualifications Framework (NQF) indicates ways of achieving qualifications at all levels. These qualifications can be achieved not only through formal education but also through the recognition of outcomes from all learning settings, including workplace learning. At the level of sectoral qualifications frameworks (SQF), it will be possible to include green skills in occupational standards and level descriptors of qualifications.

Furthermore, the use of occupational standards in the development of educational programmes aims to promote:

- Certification of both graduates of educational institutions and employees in enterprises.
- The inclusion of enterprise-based green skills into occupational standards as well as use of these standards as reference points for the recognition of prior learning. To this end, every enterprise can:
  - conduct qualifying exams and in this way promote the certification of its employees;
  - get accredited independent agencies to award certificates indicating the level of green skills which employees have attained through their contribution to green practices and environmental sustainability.
- Factors contributing to the effective inclusion of green skills in prior learning include:
  - advocating the development of the green economy among not only to younger learners but to the mass of the population, including employers and employees working in both formal and informal sectors;
  - promoting environmental competitions in the Annual National Environmental Youth Forum;
  - actively promoting all UN Sustainable Development Goals (SDGs) as all 17 goals are relevant for environmental security;
  - state bodies being obliged to implement the National Qualifications System (NQS) of the Republic of Kazakhstan and link it to the recognition of skills in all learning settings.

The last of these factors is the most important, because public authorities can not only enforce policy and legislation but also support the implementation of environmental security through recognition of prior learning results and the national qualifications system.

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Chapter 9
Case Study: Malaysia. Recognising Green Skills in Non-formal Learning Settings

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Abstract This chapter analyses the results of a study on recognition, validation and accreditation (RVA) of non-formal and informal learning outcomes based on interviews with staff from five enterprises, two in the automotive sector, two in catering services and one in PVC manufacturing. Both formal and informal enterprises were interviewed. Interviews with the enterprises across three sectors showed that most employers in both formal and informal enterprises were not familiar with the term 'green skills'. However, they were aware of environmental policies and regulations related to their respective sectors, and they encouraged the implementation of certain green practices in their enterprises by creating awareness among staff, promoting attitudinal changes, monitoring compliance with rules and regulations as well as integrating green skills into staff training programmes and RVA. Findings highlighted the importance of the need for employers to have guidelines on how enterprises can affect environmental sustainability. Results of the study also showed the centrality of the role of stakeholders—including both public and private enterprises as well as NGO sectors, consumer associations and government departments—in pushing for the inclusion of green skills in staff training and RVA mechanisms.

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Keywords Green skills · Prior learning · Recognition · Validation and accreditation · RVA · TVET

Abbreviations

CCIM	Chemical Industries Council of Malaysia
CDM	Clean Development Mechanism (Malaysia)
CQI	Continuous Quality Improvement (Malaysia)
DOE	Department of Environment Malaysia (Malaysia)
GDP	Gross Domestic Product
GMP	Good Manufacturing Practice (Malaysia)
HACCP	Hazard Analysis Critical Control Point (Malaysia)
ICT	Information and Communication Technology
ILO	International Labour Organization
ISO	International Organization for Standardisation
MQA	Malaysian Quality Assurance
MQF	Malaysian Qualifications Framework
MOE	Ministry of Education (Malaysia)
MSAD	Malaysian Skills Advanced Diploma
MISC	Malaysian Skills Certificate
NGTP	The National Green Technology Policy (Malaysia)
NOSS	National Occupational Skill Standards (Malaysia)
OBE	Outcomes-Based Education (Malaysia)
OHS	Occupational Health and Safety (Malaysia)
OSHA	Occupational Safety and Health Act (Malaysia)
PVC	Polyvinyl Chloride
RVA	Recognition, Validation and Accreditation
R&D	Research & Development
SIRIM	Scientific and Industrial Research Institute of Malaysia
SME	Small and Medium Enterprises
SMI	Small Medium Industries (Malaysia)
SPC	Statistical Process Control

9.1 Introduction

The aims of this chapter are to highlight the role of the automotive, PVC manufacturing and catering sectors in greening the economy, define and reorient competences towards environmental friendly green practices, and to recognise skills through RVA mechanisms, thus making green skills sustainable.

First, the chapter looks at green skills in Malaysian socio-economic and educational contexts. Second, it examines the environmental challenges in Malaysia. At the institutional level, it analyses stakeholders' involvement in green skills conceptualisation and standardisation as well as RVA implementation and greening of TVET and curricula. This empirical study examines the engagement of enterprises with green practices and green skills and the potential of their inclusion in RVA mechanisms.

Socio-economic and educational context

While Malaysia aims to provide a decent standard of living to all Malaysian by 2030 through Shared Prosperity Vision 2030 (Prime Minister's Office of Malaysia Official Website 2019), the paradigm shift from an industry-driven economy to a knowledge economy—competitive in the global economic context—is bound to affect the environment. Malaysia has adopted a national strategy for sustainable development that intends to benefit not only environmental protection but also economic livelihoods, socio-cultural and spiritual resources.

Such an awareness has sparked a number of green practices under various ministries in Malaysia in the areas ranging from green technology, green transport to infrastructure and green industry. The Ministry of Energy, Green Technology and Water was established to promote research and development of green technologies in Malaysia. The National Green Technology Policy (NGTP) comprising energy, environment, economy and social affairs was launched with the aim of ensuring the use of green technology in production.

According to McKinsey's research, 6 million new jobs are expected to be created by 2030 (McKinsey Report 2020) that requires skilled and semi-skilled workers to be equipped with generic green skills, reflecting the growing demand for a competent workforce for a greener economy.

Green skills are essential in the workplace for sustainable development because they are based on attitudes, values and ethical behaviour, and are acquired through non-formal and informal on-the-job learning. The recognition of environmentally friendly practices and green skills in non-formal and informal economic sectors is a crucial factor in accomplishing the 2030 Sustainable Development Goals (SDG) (UNESCO 2015). Despite the existence of government policies and environmental legislation, micro, small and medium enterprises have been slow in recognising environmentally friendly practices and still lack methods for making environmentally friendly competences visible by putting an enterprise-based recognition system in place.

Skills are essential for the environmental sustainability of future generations. Thus, it is considered essential to make the importance of green skills clear to the public through the education system. However, Hanim et al. (2019) suggested environmental education in Malaysia must be reviewed to ensure knowledge and all aspects of the environment should be embedded in the new education syllabus. Arasinah et al. (2018) added, to promote awareness concerning the importance of green skills to the wider public, it is the responsibility of all parties because these skills are relevant for everyone, including people working in private enterprises of every size.

Some of the ways environmental education is promoted through education in Malaysia are listed below:

- The Ministry of Rural Development promotes environmental hygiene education through the Kemas kindergarten new curriculum. The ministry has also developed lifelong learning programmes for educating rural people on environmental protection, especially dealing with the protection of rivers, dangers of open burning and waste management including disposal of plastic waste (Aini and Laily 2010). The intended outcome is the reduction of environmental pollution by 47 per cent.
- The Ministry of Education has introduced environmental education at all levels of education from primary and low secondary to upper secondary and higher education.
- The Malaysian Quality Assurance (MQA) of the Ministry of Higher Education of Malaysia promotes green skills as a part of generic skills in both academic and vocational institutions as a continuous effort in creating awareness, educating and nurturing the Malaysian generation towards taking up the responsibility to sustain environmental quality and green ecosystem.
- Technical and vocational education and training (TVET) is being given special attention by the public and private sectors as it not only leads to the efficient use of green technologies but also improves workforce skills required to qualify people for jobs related to energy efficiency, renewable energy and waste management. A well-trained and environmentally aware workforce is believed will help in improving resource efficiency. The right training programmes for workers will help Malaysian economies redeploy the workers who find it difficult to get jobs. Increasingly, formal training is complemented through special attachment programmes such as job training, industrial training and vocational subjects (Misko 2008). Tilak (2002) highlighted the importance of non-formal on-the-job learning versus formal vocational and technical secondary school education in several East Asian countries. The aim is to expose trainees to the changing world of work.

Learning green skills is an important part of enterprises in PVC manufacturing, automotive and waste management sectors. They must comply with Occupational Health and Safety Act (OHSA). Many enterprises have also adopted the 5S Japanese working system (*seiri*, *seiton*, *seiso*, *seiketsu*, *shitsuke*[1]), for improving the job performance of workers. Besides OSHA, catering enterprises comply with the Food Act 1983 and the Food Regulations of 1985 (Ashok 2015). Many enterprises are themselves responsible for formal or informal learning of specific workplace skills. On-the-job training through apprenticeships and hands-on learning is an important part of enterprise continuing education and training.

[1] Sort, Set in Order, Shine (and Check), Standardise, Sustain.

Green skills are relevant not only for the so-called 'green industries' in the context of 'green jobs' but for all sectors and jobs. All jobs need to develop knowledge and skills related to the environment such as efficient use of energy and waste management practices. However, several studies have highlighted the challenges to capacity-building for green jobs in Malaysia (Ahmad 2015; ILO 2014a). See Box 9.1.

Box 9.1. Challenges to capacity-building for green jobs in Malaysia

Among the challenges highlighted by Ahmad (2015) are:

- Lack of human capital development policies to support green jobs;
- Lack of clear initiatives to address green job agendas at the national level;
- Lack of clear competency-based frameworks for recognising green skills and green professional or semi-professional qualifications;
- Lack of clear national definition of competences and skills for green jobs;
- Limited training in the field of green skills and practices at the enterprise level;
- Mismatch between the university graduates and industry standards;
- Lack of incentives for industry to develop a green collar workforce;
- Limited creation of green jobs;
- Little involvement of government, employers and trade unions to promote sustainable development;
- Lack of a green perspective in the implementation of development projects;
- Low awareness about green technology in the education system.

Among the challenges highlighted by ILO (2014a) are:

- Insufficient labour market information on existing green jobs in Malaysia, although some policies have been implemented by public and private organisations in promoting green jobs;
- Inadequate information on sectors that have the potential to create green jobs, e.g. provision of energy efficient lighting systems in buildings within the construction industry;
- Lack of disaggregated data on different green activities, e.g. job estimates for transport versus job estimates in warehousing and communications;
- Inadequate information on what has been implemented on the ground;
- Little information on financing modalities for climate change;
- Inadequate information on how short-term green projects could generate temporary green jobs.

Source: Authors' compilation based on studies by Ahmad (2015) and ILO (2014a).

Environmental challenges in the manufacturing sectors of Malaysia

Climate change is one of the biggest threats to society and the environment (Al-Amin and Filho 2011; Abdul Rahman 2009; UNEP 2014). A survey of urban climate change in 100 cities, including in Malaysia, by Broto and Bulkeley (2013) showed that cities are key sites where climate change is being addressed. The adoption of green skills is crucial to managing a balanced lifestyle and quality human capital (Aarts and Grotenhuis 2009).

The manufacturing sectors' expected growth in contribution to GDP from 32.7 per cent in 2012 to 41 per cent in 2020 will bring about an expected increase in employment opportunities from 59 per cent in 2010 to 62 per cent in 2020. The sectors' contribution to exports is planned to increase from 19 per cent in 2010 to 25 per cent by 2020. The sectors also provided employment and increase in sales revenue of Malaysia from RM 438,485 million in 2000 to RM 656,441 million in 2014. The service sector, particularly the catering sector, is viewed as an important area for economic growth, fulfilling the rapidly growing demand of Malaysian society. This is likely to continue considering that the unemployment rate of 2015, at 3.17 per cent, will persist until 2030. The high demand for catering services is also attributed to the projected increase of the Malaysian population from 30 million in 2015 to 36 million by 2030. Other factors contributing to the high demand for catering services in future are the availability, affordability and convenience of catering services in the market.

As environmental issues become more acute and widespread, it is necessary to consider the challenges of sustainable development in business operations and industrial sectors. In the following sections, these challenges and issues will be discussed in relation to the automotive and catering services industry as well as the PVC manufacturing sectors.

The automotive industry

Malaysia is one of the ASEAN countries with a large and highly developed automotive sector (Fujita 1998). The automotive industry has positively affected the national economic landscape. However, the increase in production and the growth of private automobile ownership has resulted not only in vehicle waste but also in traffic congestion and air pollution (Amelia et al. 2009). It is estimated that approximately 13.6 million tons of toxic gases are being emitted from vehicles each year, damaging forests, lakes and marine life (Mohamad and Kiggundu 2007).

Several studies have pointed out that the automotive sector doing little to upgrade itself, to become internationally competitive (Wad and Govindaraju 2011) or to design constructive strategies for development (Sukitsch et al. 2015). Some of the inadequacies are consequences of a lack of capabilities in applying new technologies, marketing and a low level of involvement in global value chains. The authors recommend greening the automotive industry through the introduction of green technologies, which they argue, should be linked to the industry's global market positioning and competitiveness.

The catering service industry

The catering industry is part of the vast development in Malaysia focused on domestic and international tourism. It is presented in both formal catering services (hotels, resorts, mid-to-upscale restaurants, centralised kitchens, catering services in hospitals, schools, and public institutions) and non-formal catering services (unregistered private caterers, food trucks, hawkers, food stalls). The demand for ready-to-eat and cooked food has increased (Ali and Abdullah 2012; Tan 2010). Today's consumers are more conscious about environmentally friendly practices in catering services, making this sector more competitive than before (Tan and Yeap 2012; Schubert et al. 2010; Schubert 2008).

Notwithstanding these transformations, catering services are affected by the lack of proper management of food waste (Chan and Hsu 2016). The 9th Malaysia Plan estimated that about 45 per cent of future waste would consist of food and organic waste, 24 per cent of plastic, 7 per cent of paper, and 6 per cent of iron and glass, with the balance made up of other materials (Manaf et al. 2009).

In addition to waste treatment, the threat of food-borne diseases is another issue for catering services. Soon, Singh and Baines (2011) revealed that most of the reported food-borne diseases are associated with unhygienic procedures during food preparation (see also Abdul-Mutalib et al. 2015; Ministry of Health 2014; Shahrul Amri and Sarimah 2015). Shahrul Amri and Sarimah (2015) designed a food handling course that is compulsory to pass for all food handlers in the catering sector—both formal and informal. The issue has become critical with the dependence on foreign workers, the majority of whom lack academic and work skills background related to food handling.

All these concerns suggest the need to adopt sustainable waste management and resource efficiency strategies, as well as green practices and green skills, as the preferred business model in catering services.

PVC manufacturing

PVC ranks third in both global plastic output and consumption. Over 33 million tons of PVC are produced each year and that figure is increasing annually as PVC production requires less petroleum than many other polymers (around 57 per cent of PVC's mass is chlorine) (Martins et al. 2009). The manufacturing sector actively uses PVC in manufacturing products because it is strong, resistant to oil and chemicals, sunlight, weathering and heat.

One of the high-tech initiatives in Malaysia, the Statistical Process Control (SPC), is targeting an improvement of quality production (improved reliability and quality control of product, system and management) that requires high technology (hardware, software, networking and security) (Abdul Rahman 2009).

However, the high cost of using these novel alternative practices is a major drawback. Another challenge for the PVC manufacturing industry is the recognition that PVC parts in various products are not biodegradable or degradable, which has many drawbacks for the environment. The production and incineration of PVC both produce a set of toxic and deadly substances called dioxins, which have harmful

effects on human health and animals alike (North and Halden 2013). Also, PVC manufacturing has already been affected by the commitment made by the government of Malaysia to reduce greenhouse gases (GHG) by up to 40 per cent in terms of emission intensity relative to gross domestic product (GDP) by the year 2020 compared to 2005 (ILO 2014a).

The national response to environmental challenges

Green skills have been widely introduced by the government through various policies, acts, legislations and rules based on industry sectors. As Box 9.2 illustrates, formal responses to environmental challenges have been imposed over the years on every sector by means of national policies and legislation on environmental regulation.

Box 9.2. National response to environmental challenges

- *National Green Technology Policy (NGTP)* ensures that all industry sectors in Malaysia pay attention to the importance of green technology in their respective industry sectors.
- *The Ministry of Energy, Green Technology and Water* promotes research and development of green technologies both in rural and urban areas).
- The Environmental Quality Act was promulgated in 1974.
- *The Department of Environment* was established under the Ministry of Science, Technology & Environment, Malaysia to administer and enforce, amongst other environmental laws and regulations, the Environmental Quality Act, 1974 (Amendments 1985, 1996) and Section IV of the Economic Exclusive Zone Act, 1984 (International Green Purchasing Network 2003).
- Several policies were initiated based on sustainable development goals (Hezri 2011):

  (a) The National Environmental Policy;
  (b) The National Biodiversity Policy;
  (c) The National Climate Change Policy.

- *The United Nations Development Plan country programmes for 2006*, aligned to the 9th Malaysia Plan (2006–2010), had five elements for enhancing the capacity of the economy (UNDP 2016):

  (a) Escalating economy in the value chain;
  (b) Improving knowledge and innovation;
  (c) Continuously addressing socio-economic inequalities;
  (d) Improving quality and sustainability;
  (e) Reinforcing institutional and implementation capacity.

- The Department of Environment, Ministry of Natural Resources and Environment has sponsored several new laws in 2010 dealing with environmental degradation:
  (a) Environmental Quality (Clean Air) Regulations 1978 P.U (A) 280;
  (b) Stack Gas Emission Standards from Environmental Quality (Clean Air) Regulations 1978;
  (c) Malaysian Air Quality Guidelines (Ambient Standards);
  (d) Environmental Quality (Sewage) Regulations 2009 (PU (A) 432.

Source: Author, based on Malaysian policies, legislations and programmes

How is industry addressing environmental challenges?

From a global perspective, Malaysia has made considerable headway in addressing environmental issues. Global sustainability regulations have prompted industries to develop effective and efficient supply chain management. The concept of green purchasing or green procurement was introduced to improve awareness regarding the promotion of green practices in local manufacturing and production industries, especially small- and medium-sized industries (SMIs) (International Green Purchasing Network 2003). The concept of green marketing is used to educate consumers on eco-brand, eco-label and environmental advertisement (Rahbar and Wahid 2011).

However, industry sectors have developed their own specific ways of combatting environmental problems as well as improving economic and environmental performance. Many of these methods for addressing environmental challenges are recommendations emerging from research studies.

The automotive industry

According to studies undertaken by Ogushi and Kandlikar (2005) and Amelia et al. (2009), the automotive industry should recycle and reuse automotive components such as clutches, brake shoes, engine blocks, starters, alternators, water pumps and carburettors. Reutilisation of these waste automotive components could ameliorate the disposal problem and reduce the cost of waste disposal. Studies have also suggested waste management policies for end-of-life vehicles (ELVs) (Mamet et al. 2016; Ahmed et al. 2014).

Catering services

The promotion of green skills in the catering industry is reflected in several ethical principles integrated with good food preparation practices (food hygiene and safety). The product certification programme eco-labelling scheme launched by the Standards and Industrial Research Institute of Malaysia (SIRIM) provides information to consumers and identifies environmental products and their specifications. The SIRIM QAS International further offers Management System Certification on food and consumer product manufacturing in the following areas:

- ISO 9001 Quality management system; HACCP (Hazard analysis critical control point);
- ISO 22000 Food safety management system;
- ISO 28000 Supply chain security management system;
- MS 1514 Good manufacturing practice (GMP);
- ISO 14001 Environmental management system;
- Clean development mechanism (CDM) (SIRIM QAS International).

In addition to the established Food Act 1983 and Food Regulations 1985, the Food Safety and Quality Division, the Ministry of Health Malaysia has approved several guidelines, including:

- Guidelines for food premises registration, food safety in the kitchen of the residential institution, cleanliness of restaurants and food premises;
- A handbook for food premises registration;
- A Guideline on accreditation scheme for food handlers training program;
- A manual giving the procedures of accreditation of training programmes for food handlers;
- Guidelines dealing with mass catering and inflight catering.

PVC manufacturing

One of the initiatives to complement the progressive development of PVC manufacturing is the set of industry Responsible Care programmes introduced by the Chemical Industries Council of Malaysia (CCIM). The programme aims to encourage responsible practices among industry members to protect the environment and community well-being. The Department of Environment (DOE) under the Ministry of Natural Resources and Environment (NRE) safeguards community, workplace and environment through its ISO 14001 certified green policy practices, ISO 9001 certified Good Product Quality in Manufacturing Practices, and it is ASTM International which has worldwide international standards for PVC materials and products (Lee et al. 2015).

Rationale: Identifying the need for including green skills in RVA mechanisms

The importance of the recognition of green skills in enterprises and on-the-job settings

Recognition mechanisms embedded in workplace training programmes can help to develop the knowledge and skills required for the green economy. Studies from Malaysia show that learning transfer depends on designing training in collaboration with industry (Awasthy et al. 2020; Naharuddin and Sadegi 2013). Malaysia's competency-based training through its National Modular Certificate programmes exposes potential participants to the world of work (Human Resources 2013; Abdul Rahman et al. 2015, 2016). Further, the Department of Skills and Development under the Ministry of Human Resources has established the National Occupational Skill Standards (NOSS) to define the employment and essential competency levels to be fulfilled by employees in enterprises and industries.

In formal training, the importance of recognising competences gained through experiential learning and the adaptation to the work environment (Emmerling and Boyatzis 2012) is increasingly acknowledged. As Hammond et al. (2020) note, the acquisition of competences requires more than just an accumulation of factual knowledge. Thus, recognition mechanisms need to be able to recognise a repertoire of actions, and skills recognition necessary for the greening of jobs must be done holistically and continuously.

The importance of motivation for green practices in enterprise beyond governmental enforcement

Environmental sustainability in the working environment is necessary to reduce the level of pollution and waste caused by enterprises/ industries. Among the programmes undertaken by the Malaysian government to deal with waste management are 'waste separation at source' and 'technology for the waste to energy initiatives at industry'. The Solid Waste and Public Cleanliness Management Act 2007 provides deals with issues related to public cleanliness and proper hygiene (Jereme et al. 2015). Alongside these initiatives, the government has launched a massive education and public awareness campaign to educate the public on the government's waste-segregation programmes. Only 15 per cent of Malaysians practice waste recycling. The Ministry of Urban Wellbeing, Housing and Local Government (Jereme et al. 2015) highlights the alarmingly low rate of waste recycling in Malaysia.

Several studies have been conducted to understand the current green practices related to environmental sustainability carried out in Malaysia's small and medium enterprises (SMEs). Alexander (2018) found that the adoption of green information technology (IT) among (SMEs) enables enterprises to use existing resources in a sustainable manner, both in climate protection and resource efficiency. Abdullah et al. (2015) found that SMEs, especially in the manufacturing sector, were to some extent adopting green practices, green processes, green products and green systems that were suited to their work environment. Some were also engaging in green practices that were economically beneficial for their enterprises. However, it was found that enterprises still need more motivation to adopt green practices as a supplement to consumers' demands and law enforcement by the Malaysian government (Ramakrishnan et al. 2015).

The importance of a competency-based approach in formal and non-formal TVET

According to Mulder et al. (2006), competency-based training and learning intermingled with other innovations like the introduction of self-managed learning, the validation of prior learning, and new theories of learning, such as authentic learning, social constructivism and knowledge construction, are crucial for human capital development, including green human capital. The competence-based approach to green skills is important for promoting green practices because it emphasises the importance of the actual capacities of individuals versus knowledge and skills that are merely officially required. However, several authors (Martinez and Lord 2012; Collins 2009; Selvi 2019) argue that competences must be continuously improved through competency-based training and skills development, and workers must take on

'learning-to-learn skills' that support lifelong learning; individuals must learn them; and they must be transferable, generic, aligned to job performance and measurable.

The importance of industries taking responsibility to make workers aware of ways to reduce and rectify environmental degradation

Workers must be made aware of how they can contribute to the practice of minimising the pollution caused by their industry. Papargyropoulou et al. (2014) found that waste from the food service sectors was the highest of any business sector. They made several suggestions to improve waste management practices in the industry. For instance, they encouraged workers in the workplace to segregate solid waste in the workplace and to sort the waste into the various types of recyclable forms before disposing the material into separate designated containers.

The importance of raising awareness and promoting positive attitudes towards environmental protection

The Malaysian government has implemented several national environmental campaigns and activities. To achieve better waste management, the 3R concept (reuse, reduce, recycle) has been effectively implemented in order to keep the production of waste to a level that can be absorbed by present landfill facilities. Currently, the facilities have a limited handling capacity of approximately 1,000 tons of waste per day, thus prompting effective actions to ensure a sustainable level of waste in the country (Ministry of Urban Wellbeing, Housing and Local Government, 2015). It goes to show that awareness campaigns must go hand in hand with finding practical solutions to problems of environmental protection.

9.2 Terminology and Definitions

Conceptualisation of green skills

Several studies have drawn attention to the importance of green skills. One qualitative study by Hamid et al. (2016) explored the perspectives of employers and academics about the meaning of green skills. Interviews with ten industry personnel and seven academics from a university department for TVET indicated that both groups were knowledgeable about environmental sustainability. However, they tended to understand green skills as green practice (Hamid et al. 2016). More specifically, while 'green skills' referred to the *ability* to perform activities which lead to a cleaner environment and reduced pollution, the term 'green practices' included *activities and tasks* such as recycling, reusing and reducing the environmental risks, as well as enhancing energy and resource efficiency and preventing loss of biodiversity.

Several authors understand green skills as soft skills (e.g. Buntat and Othman 2012) and green competences (see Subramanian et al. 2015) complementing green jobs and green practices.

Another interpretation of green skills is their association with green technology with the goal of reducing environmental risks and ecological scarcities, carbon emissions and pollution as well as enhancing energy and resource efficiencies and increasing biodiversity (Ramlee and Shuhada 2014). However, for green technologies to be successful, employees must have generic green skills (Hamid et al. 2016). The application of green technologies is dependent upon green skills which are practised in almost all industry sectors (formal and non-formal), although not to the same extent in all enterprises and contexts. This study follows interpretation of green skills defined in Chap. 1.

The status of RVA in relation to learning outcomes-based standards in the MQF

The process of recognition, validation and accreditation (RVA) in Malaysia is undertaken in relation to learning outcomes-based standards of the Malaysian Qualifications Framework (MQF). The MQF is an instrument that:

- Develops and classifies qualifications based on a set of criteria that is agreed nationally and at par with international standards;
- Clarifies the earned academic levels, learning outcomes of study areas and credits earned based on student academic load;
- Provides education pathways that link qualifications enabling individuals to progress into higher education through credit accumulation or transfer as well as recognition of prior learning, competences and work experience regardless of when, how and where they are acquired—through formal, non-formal or informal learning;
- Covers skills training and technical, vocational education and training (TVET) and higher education;
- Is designed as a unified system of qualifications serving as a national reference point for all educational and training institutions, including colleges, universities, vocational institutions, professional bodies and other higher education institutions in the public and private sectors, as well as workplace training and lifelong learning;
- Includes the Malaysian Skills Certification System consisting of the five-tiered skill qualifications based on the National Occupational Skills Standards.

The MQF consists of nine learning domains: knowledge, practical skills, communication skills, critical thinking and problem-solving skills, social skills and responsibility, continuous learning and information management skills, management and entrepreneurial skills, professionalism, ethics and morals, leadership and teamwork skills. Only programmes that comply with the learning outcomes approach can get accreditation from the MQA. Seen from the green skills perspective, while the first two learning outcomes can be categorised as 'job-specific green technical skills', the other nine domains could be said to be 'green generic skills'.

The human Resource Development Fund (RDF) has been specially set up to fund employees' enterprise training.

Table 9.1 Selection of the enterprise and number of employers and employees interviewed

Sector	Industry	Formal		Informal	
		Employer	Employees	Entrepreneur/ employer	Employees
Service	Catering	3	10	2	6
	Automotive	1	20	1	2
Manufacturing	PVC	1	10		

Source Authors

9.3 Methodology of Primary Data Collection

This study is about skills recognition for improving environmental and sustainable development in both formal and informal micro, small and medium enterprises (MSMEs) of the manufacturing sector (PVC manufacturing) and two service sectors (automotive and catering). It focuses on environmental policies and regulations, green practices, green skills, green skills requirements, recognition of prior learning, and workplace training in relation to green skills.

It adopted a qualitative case study approach to create an in-depth understanding of the implementation of green skills in these sectors and follows the overall methodology stated in Chap. 1. This section analyses the results based on interviews with staff from five enterprises, two in the automotive sector, two in catering services and one in PVC manufacturing. Both formal and informal enterprises were interviewed.

The selection of the study sample through purposive and convenience sampling techniques was based on their willingness to participate in the study. Due to difficulties in getting involvement from the enterprise of all industry sectors only one employer of a formal enterprise in PVC manufacturing, two employers (one from a formal enterprise and one from an informal enterprise) from the automotive service sector and five employers (three from formal enterprise and two from informal enterprise) from the catering industry were able to be interviewed to access the related data. The owner and/or manager of the enterprise determined the participants to be interviewed (see Table 9.1).

Data were collected through different sources, mainly based on interviews and supported by direct observations and documentary evidence to illustrate each sector in-depth before conclusions were drawn as to whether the phenomenon under study had been accurately measured. Data triangulation was used to merge study results from formal and non-formal enterprises in the same sector to enrich the study result before drawing conclusions.

9.4 Results and Discussion

Connecting macro-level environmentally friendly needs to local needs

Very often macro-level needs are not connected to local demands for green skills and practices at the enterprise level. The study found that while challenges and solutions are identified at the national level, no clear initiatives have yet been undertaken to address green job agendas at the enterprise level.

Linking enterprise green skills development with standard-setting institutions and agencies

Enterprises are able to operationalise green practices and green skills by linking with standard-setting agencies and institutions, many of which are operating under Malaysian ministries and departments. For example, the Malaysian Green Technology Corporation (GreenTech Malaysia) under the Ministry of Energy acts as a global hub for green technology with the aim of transforming the country into a green community by 2030. Green technologies are actively introduced in several industry sectors/ enterprises in the context of the National Green Technology Policy. The Malaysian Green Foundation and the Green Technology Financing Scheme work closely with enterprises to promote green skills. The green industry Virtual Centre under the Department of Environment Ministry of Natural Resources and Environment encourages small and medium enterprises to adopt cleaner production methods to reduce carbon footprints. Enterprises dealing with refrigeration and air conditioning in cars undertake an assessment of work experience certification of green skills particularly in the 3Rs, The national wages productivity programme promotes green practices and green workplaces. Enterprises need to familiarise with the MQF in relation to which robust assessment and certification of green skills can be undertaken. Enterprises increasingly pay attention to the Occupational Safety and Health Act (OSHA) 1994.

Addressing the issue of green skills in enterprises

Staff were asked how they addressed the issue of green practices and green skills in their enterprises. They responded by highlighting the importance of:

- Designing personalised lifelong learning programmes for employees after their recruitment;
- Promoting awareness and disseminating green skills information through media;
- Practising green skills in the execution of job tasks during working hours as well as carrying out green activities outside work;
- Encouraging employers to nurture green skills in enterprises; green skills are not necessarily obtained only from education and training system;
- All stakeholders (employer, employees, suppliers and canteen operators) shoulder the responsibility to comply with green policies and regulations;

- Conducting special programmes in workplaces to manage resource allocations more effectively and efficiently without comprising the product and service quality;
- Promoting awareness-raising campaigns, occupational hygiene and safety as well as the greening of jobs;
- Embedding green skills in training programmes for new workers during the first few weeks e.g. exposing them to green work processes, showing them ways to keep the premises clean and healthy, and encouraging them to plant trees and take up gardening as well as other cleaning activities during the weekend.

Respondents mentioned that green skills were practised in almost all industry sectors (formal and non-formal). In some sectors, such as catering, green practices and green skills were limited and inadequate. Respondents told us that this was due to the many challenges catering services faced. Most of the workers in the catering sector were not familiar with the notion of green skills. Compared to the catering enterprises, PVC manufacturing and automotive enterprises were more likely to practice green skills, keep documentation, and have some understanding about RVA frameworks.

Providing comprehensive training for workers on green practices

Account should be taken not only of training needs from a training policy perspective but also, from the perspectives of those involved in enterprises at all levels, from the technical workforce to top management through green purchasing, green processing, green production, green marketing, green packaging and green management.

While formal recognition, a process of granting official status through (awards and degrees) skills and competences, is invaluable, it is equally important to focus on social recognition, meaning the acceptance and ownership by enterprise-based stakeholders in the implementation of green skills and green practices. The social acceptance of stakeholders, their interest and stakes in green skills, their understanding of green skills and their role in greening the economy are crucial for the sustainability of green skills practices.

The importance of the value chain concept in the promotion of green practices

An interview with a senior middle-ranking officer at a leading technological plant of a Japanese company revealed that the company implements green practices widely. Such practices do not only involve employees but also suppliers and vendors. Raw material suppliers are required to turn off their vehicle engine at the loading bay while downloading or uploading goods. This mandatory rule ensures the prevention of carbon dioxide emissions from vehicle exhausts.

The growing importance of ICTs as a generic green skill

One of many ways to minimise carbon footprint at the enterprise was by setting up computers attached to printers to enable employees to check their monthly payments—the employer no longer issued a printed pay sheet to their employees. This way they saved paper. Besides promoting a clean environment, they also contributed

to making employees computer literate (one of the generic green skills in green technology industries is ICT competency).

Core skills are developed through in enterprise orientation training of new workers

An interview with a senior middle-ranking officer from a leading technological plant of a Japanese company based in Batu Pahat, Johor, revealed that new workers were given a week's orientation, where they were exposed not only to work procedures but also practices on how to keep premises clean and healthy, including rules on how to discard leftover food into the waste bin and how to clean the premises during weekends. Once in a month, the employer conducted cooperative activities whereby employees were encouraged to plant a tree and do gardening. This was in line with the International Labour Organization's position on 'core generic skills' or 'sustainability skills' such as environmental awareness and willingness to learn about sustainable development (ILO 2011). Although job-specific skills are key factors in productivity and economic growth (Watch 2010), core generic green skills complement them and are necessary to improve living standards through a healthy environment.

Green practices inculcated through job tasks within enterprises

Green skills are not acquired only through education and training; they can be developed, monitored and nurtured by employers. According to a middle-ranking officer, applicants' academic qualifications only enable them to come for an interview, it is their attitudes and values that determine whether they get the job they applied for. It reveals the emphasis placed on the importance of all stakeholders taking up roles and responsibilities to enforce compliance with environmentally green practices.

Changing negative attitudes, behaviour, skills and knowledge into environmentally friendly Green skills and green practices

The most challenging aspect in catering enterprises was the negative attitude of the staff. They generally lacked knowledge and skills in handling food. Another challenge was the lack of support of human resource development policies in enterprises to support the recognition of green jobs and green skills.

9.5 Conclusions and Recommendations

The application of green skills in enterprises requires the support of all stakeholders—the industries, the government and the community at large—as only in this way can the 'silo effects' separating government agencies, the business sector, civil society and academia be overcome (Hezri 2011).

Sustainable development requires not only skills development programmes but also demand-related mechanisms for recognising skills in both formal and informal enterprises.

While industries are in line with government action plans for greening TVET, Malaysian communities including employers and employees and workers in micro,

medium and small enterprises need more education on the conceptualisation of green skills relating to ethical principles, values and attitudes, hygiene and safety, environmental awareness as well as specific green skills related to occupational tasks.

The following recommendations for including green skills in RVA emerged from the study. Based on the local needs assessment among participating enterprises the following interventions need attention: providing incentives for green collar workers in enterprises; developing a workforce with the required skills; creating green jobs; creating awareness among companies about green technology; enforcing compliance with laws such as those related to food safety and food preparation at the level of companies.

It is suggested that before green skills can be subject to the process of RVA, it is necessary for stakeholders to show an interest in green practices and green skills and show ownership and acceptance through their active support of green practices. For example:

- Executives and managers must reflect environmental regulations in their recruitment, training and marketing strategies;
- Supervisors must define, identify and reorient green skills for environmentally friendly green practices in the conduct of job tasks;
- Human resources managers must develop training programmes consisting of green skills;
- Employees must get real benefits in terms of decent jobs, high wages, promotions or further education and training opportunities through the recognition of their green skills.
- Trade unions must ensure that workers gain benefits through training and recognition programmes.
- Occupational associations must promote green jobs in their respective sectors.
- Human Resource Departments/personnel of enterprises need to use a clear competency matrix such as the Malaysia Skills Certificate system based on the National Occupational Skill Standard (NOSS). This framework includes recognition in relation to the Malaysian Skills Certificate (MSC) Level 1, Level 2 and Level 3; Malaysian Skills Diploma (MSD) Level 4 and Malaysian Skills Advanced Diploma (MSAD) Level 5.

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Chapter 10
Case Study: Nepal. The Inclusion of Green Competences in the Recognition of Prior Learning

Ramhari Lamichhane and Manoj Sharma Neupane

Abstract This chapter explores the status of environmentally friendly practices and the use of recognition, validation and accreditation (RVA) mechanisms to recognise skills in four major sectors of the Nepalese industry—catering, PVC manufacturing, automotive and waste management. A field survey was conducted on 20 enterprises in the aforementioned sectors. The Nepalese industrial sector is in a very early stage of its development and the level of environmental awareness among employers and employees is very low. Although the present status of the Nepalese industrial sector is at a nascent stage in the creation of green jobs, there seems to be potential for the creation of such opportunities in the future. However, to make use of these opportunities, it is necessary to understand workers' skills and learning needs that will enable them to work in a way to overcome environmental degradation and mitigate climate change. Green skills that promote greater responsibility towards minimising the negative impact of industrial activities are vital for job creation and sustainable development. The recognition of green skills in the workplace and industry is an area for research that could bring green transformation to the Nepalese economy. The joint efforts of government, enterprises, occupational sectors and training providers, as well as international development partners, are important to institutionalise recognition of green skills in enterprises and industry.

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Abbreviations

ADB	Asian Development Bank
APEC	Asia-Pacific Economic Cooperation
ASEAN	Association of South-East Asian Nations
CBS	Central Bureau of Statistics
CPSC	Colombo Plan Staff College
CTEVT	Council for Technical Education and Vocational Training
DFID	Department for International Development
DFRS	Department of Forest Research and Survey
FNCCI	Federation of Nepalese Chamber of Commerce and Industries
GDP	Gross Domestic Product
GNI	Gross National Income
I/NGO	International/Non-governmental Organization
ILO	International Labour Organization
ILC	International Labour Council
MoF	Ministry of Finance
NAPA	National Adaptation Program of Action
NOSS	National Occupational Skill Standard
NSTB	National Skill Testing Board
NVQF/A	National Vocational Qualification Framework/Authority
PVC	Polyvinyl Chloride
RPL	Recognition of Prior Learning
RVA	Recognition, Validation and Accreditation
SDC	Swiss Agency for Development and Cooperation
SoCA	Secretariat of Constitution of Assembly Nepal
SSC	Sector Skill Committee
TVET	Technical and Vocational Education and Training
UIL	UNESCO Institute for Life Long Learning
UNESCO	United Nations' Educational Social and Cultural Organization
UNESCO-UNEVOC	International Centre for Technical and Vocational Education and Training of the United Nations Educational, Scientific and Cultural Organization
VET	Vocational Education and Training
VT	Vocational Training

10.1 Introduction

Mitigating the negative effects of environmental change is an important driver of the green economy. It is argued in this study that developing green skills, knowledge and attitudes in the workforce will be an important way to promote a greener economy. While the development of green skills is one of the emerging areas of the TVET sector, it is equally important for enterprises to promote green skills as part of staff training and RVA, if Nepal is to promote sustainable infrastructure and tackle the negative impacts of climate change.

Inclusion of green skills in RVA mechanisms and staff training dealing with environmental-friendly practices in enterprises needs to be mutually beneficial for enterprises and the individual as well as the environment, economy and society.

RVA of competences, prior learning and work experience is an efficient way to recognise and motivate people to develop their skills and undertake further education and training. RVA involves the identification, mediation, assessment and acknowledgement of skills obtained from formal, non-formal and informal learning.

As this study shows, only a few enterprises understand the concept and practice of RVA, even though the National Skills Training Board (NSTB) under the country's Council for Technical Education and Vocational Training (CTEVT) has a system which identifies, accredits, recognises and certifies skills acquired in all learning settings. There remains a big gap in the current requirements of green skills and mechanisms for their recognition, validation and accreditation.

This chapter presents an overview of the socio-economic and educational context in Nepal; analyses the environmental challenges and opportunities and the national response to them; conceptualises an understanding of green skills in Nepal drawing on international definitions; examines the status of green skills and RPL in four major sectors of Nepalese industries and discusses some of the major challenges and opportunities for establishing mechanisms for recognising green skill.

The socio-economic and educational context

Nepal is a landlocked country located between the People's Republic of China in the north and India in the east, south and west. People of diverse social, cultural, ethnic and religious backgrounds inhabit the country. Among a population of 27 million, 81.34% are Hindus (CBS 2014).

The Nepalese economy has performed poorly in the last decades, with an average growth in the gross domestic product (GDP) of around 4%. Over 60% of the population depends upon agriculture for their livelihood (CBS 2011b). The poor quality of produce prevents farmers from accessing markets with high returns. The use of obsolete and unproductive technologies holds down the rural standard of living and motivates people to leave rural areas.

The poor state of Nepal's transport infrastructure is one of the causes of low growth in all agricultural sub-sectors. Nepal experienced economic transformation in the late 1980s and early 1990s as a consequence of high growth in manufacturing due to increased investments in infrastructure and industrial zones. However, since 1995,

manufacturing has witnessed a negative or near-zero growth rate. The contribution of agricultural and industrial sectors to GDP is declining, although the service sector is on the rise resulting in it overtaking the agricultural sector in the share of value-added growth and an increase in its share of employment.

Poverty is another challenge. One in every four Nepalese is still living in poverty. Although the officially measured unemployment rate is negligible (2.1%), the underemployment rate is very high—46% (CBS 2011b).

Remittances from migrant workers employed abroad have become an important factor in the Nepalese economy and society over the past two decades. Approximately, 1.9 million Nepalese work overseas, excluding India, of whom about 5% are women (CBS 2011b). At least 800,000 (undocumented) Nepalese workers work in the private sector in India and about 250,000 in India's public sector.

Despite substantial investments in terms of time, money and human resources in the development of the formal education system, only 62% of the rural population has access to education (CBS 2011a). Furthermore, the education provided does not adequately meet the diverse learning needs of the population of Nepal. A good education that takes account of context, culture and ideology remains a key issue for a country like Nepal.

The challenges of environmental degradation

Developing a workforce with green skills is one of the emerging concerns in Nepal in general and particularly in the TVET sector. The negative impacts of climate change and the effect they are having on the industry and the economy are becoming key drivers for transitioning towards a greener economy. Such a transition requires green skills, knowledge and attitudes to tackle environmental challenges.

Nepal is vulnerable to natural disasters and negative impacts of climate change because of its fragile, unstable landscape. Climate change is causing floods, glacial lake outbursts and landslides, as well as a scarcity of water. Besides climate change and depletion of the ozone layer, rapid population growth and urbanisation are major threats to the natural landscape. The proportion of the country that is forested has decreased to 40.36% from 60% a few decades ago (DFRS 2015). Together with climate change, the heavy pollution of industrial areas and problems with waste management are further environmental challenges. Water scarcity is another challenge: many communities do not have access to safe and reliable water supplies, and sanitation is a particular problem in impoverished areas where social and gender inequality is widespread. The increased use of modern extractive technology is a further threat to the natural resources of Nepal.

These negative influences severely affect Nepal's industry and economy in areas such as hydropower, tourism, the cultivation of medicinal herbs and the preservation of forestland. These industries are important and have a great potential to contribute to the development of the economy.

Although green skills and their relevance for the greening of the economy are increasingly a focus of formal education, there is very little emphasis on the recognition and development of green skills in non-formal settings such as workplaces and

through informal learning. This chapter argues that it is imperative to pay attention to developing and recognising green skills through non-formal and informal learning.

Environmental challenges in the four industries

Solid and liquid waste management are common challenges across the four industries in this study. However, some specific challenges were also observed:

- For the catering sector issues are related to food supply: there is a problem with food quality gradings, so catering companies cannot make informed decisions regarding their supply chain. Farmers use traditional methods for growing vegetables without testing the characteristics of the soil. Often water is a problem, so productivity is low and supply is unstable. Efficient use of energy for cooking and the type of energy is another issue. Catering companies are not using electricity (that can be environmentally friendly energy) for cooking. Usually, LPG gas is used in urban areas and firewood in rural areas, both are not green energy. Collection of used oil and separation of waste are additional challenges for the sector.
- The waste management sector has problems finding proper landfill sites. Sometimes there are too many demands made by local communities on waste management workers; but on the other hand, waste management workers often hesitate to address the genuine concerns of the communities.
- Most PVC manufacturing industries are located in populated areas, exposing neighbouring communities to air pollution.
- Similarly, many automobile workshops lack a proper drainage system to dispose of liquid waste. A serious concern in automotive industries is the discharge of polluted liquid waste directly into rivers or thrown improperly onto the nearby ground.

The national response to environmental challenges

Through a series of political and constitutional changes, Nepal aims to develop an environmentally friendly economy by revising existing policies, rules and regulations. Nepal's three-year plan for 2016–2019 incorporated concepts such as climate resilience, a pollution-free environment and renewable energy sources. The government of Nepal has endorsed a national adaptation programme of action (NAPA). Recognising and developing green skills both in public and private organisations could be further important steps for Nepal to transition towards a greener economy and a cleaner, protected environment.

The 2015 constitution of Nepal adopted a sustainable development approach, and the government's greening policies and agendas include the implementation of various programmes and projects; notably, its industrial policy includes provisions for cleaner production and transportation.

A range of environmental legislation, rules and regulations, and policies to mitigate adverse environmental impacts resulting from human actions have been developed in Nepal.

Box 10.1 Environmental legislation, rules and regulations and policies to mitigate adverse environmental impacts

- Relevant provisions in Local Self-Governance Act 1998 are concerned with local-level environmental planning in areas such as forest and biodiversity conservation, land-use management, pollution control and public sanitation;
- The Environment Protection Act 1996 enforces the maintenance of a clean and healthy environment and contributes to sustainable development;
- The Forest Act, 1992 conserves and manages forest and biodiversity;
- The Water Resources Act, 1992 promotes environmental assessment, such as water quality standards, and water use in the local environment;
- The Electricity Act 1992 controls the environmental effects of electricity generation and transmission;
- The Vehicle and Transport Management Act 1992 sets emission standards for vehicles and the regulation of this standard;
- The Industrial Enterprises Act 1992 promotes pollution-control measures for the industrial sector;
- The Pesticide Act 1991 regulates the use, production and distribution of pesticides;
- The Labour Act 1991 imposes health and safety measures in the work environment;
- The Solid Waste (Management and Resource Mobilization) Act 1986 ensures the management of solid waste through the collection, transportation, recycling and disposal, and the classification of hazardous waste;
- The Soil and Water Conservation Act 1982 ensures soil conservation through land-use regulation;
- The Tourism Act 1978 minimises environmental pollution during mountaineering activities;
- The National Parks and Wildlife Conservation Act 1973 manages national parks, wildlife reserves and conservation areas.

Source: Authors, based on various legislations and acts

Furthermore, Article 30 (3) of the 2015 constitution of Nepal identifies the importance of the right to a clean environment (SoCA 2015):

(1) Every citizen shall have the right to live in a clean and healthy environment.
(2) The victim shall have the right to obtain compensation, in accordance with the law, for any injury caused by environmental pollution or degradation.
(3) This Article shall not be deemed to prevent the making of necessary legal provisions for a proper balance between the environment and development, in the development works of the nation (SoCA 2015, p. 20).

In 2011, the Government of Nepal, the Ministry of Labour and Transport Management and the International Labour Office in Nepal launched an initiative to mobilise all stakeholders—governments, employers and workers' organisations, international and national development partners, civil society, media and donor agencies to address the effects of climate change.

10.2 Terminology and Definitions

Conceptualisation of green skills in Nepal

Green skills is a blanket term for knowledge, skills and broader competences, values and attitudes necessary for a worker to engage in an economy with reduced negative impacts on the environment. The European Centre for the Development of Vocational Training (Cedefop) defines green skills as 'The knowledge, abilities, values and attitudes needed to live in, develop and support a sustainable and resource-efficient society' (Cedefop 2012). New economic developments generate new or renewed occupations, related qualifications and skill profiles. Structural economic changes resulting from the greening of the economy create a need to realign diminishing/decreasing sectors and retrain workers accordingly. In Nepal, the national occupation skill standards include newly developed green jobs such as solar PV technician, micro-hydro operator, biogas technician and solar electric technician (repair and maintenance).

Achieving an energy-efficient economy requires greater integration of climate and energy policies with measures to support employment as well as innovative and responsive vocational education and training (VET) policies that encourage the development of skills needed for a low-carbon economy (Cedefop 2012). TVET in Nepal takes into account the changing needs of the market both in developing new curricula and revising existing ones.

The concept of 'green skills' is related to the notion of 'green jobs'. Green jobs contribute to the reduction of negative environmental impact. One could say that there is already a long history of green jobs in Nepal, ranging from environmentally friendly green roads to drip irrigation, improved stoves and biogas to community forestry, and improvement of irrigation canals for farmer's user groups. However, green jobs are not only restricted to jobs in the agricultural sector; to overcome the challenges of unemployment, underemployment and lack of decent jobs as well as the problems of unnecessary migration facing Nepal, the concepts of 'green jobs' and 'green businesses' need to be considered in all sectors. Also, green jobs are not limited to the obvious green sectors such as renewable energy and waste management but can also be developed in tourism, infrastructure-development programmes, the automotive industry, catering and all kinds of manufacturing industries.

Based on Cedefop's study on the greening of the economy (Cedefop 2012), Nepal's skills needs for a greening economy can be analysed in the following way:

- Structural changes lead to increased demand for some occupations and decreased demand for others. The Nepalese economy has been experiencing structural change over the last few decades. The contribution of the agriculture and non-agriculture sectors to GDP was 37.49 and 62.5%, respectively, in the fiscal year 2002–2003 (MoF 2010), while the corresponding shares were 29.37% and 70.63%, respectively, in the fiscal year 2016–2017 (MoF 2017). As a result, there has been an increase in the demand for skilled jobs such as those of waiters, plumbers, and salespersons.
- New economic activities will create new occupations and there will be a need for new skill profiles and qualification and training frameworks. The National Skill Testing Board (NSTB) is developing various occupational profiles (OP)/National Occupational Skill Standards (NOSS) in new areas. In 2009, there were only 125 OP/NOSS developed by NSTB; by the end of 2017, the figure was 286 (CTEVT 2009, 2018). While some of these standards relate to existing occupations, most of them are new kinds of jobs.
- Many existing occupations and industries will experience greening changes to tasks within their jobs, and this will require adjustments to the current training and qualification frameworks for these occupations. In the four industries sector surveyed in this study, there is a need to introduce technicians for waste treatment, organic food technologists and recycling plant operators.

A three-tier approach to the greening of skills

Shyamal Majumdar (2011) proposes a three-tier approach to the greening of skills at the institutional, national and international levels. It will be useful to analyse the status of green skills at all these three levels concerning the situation in Nepal.

The institutional level

At this level, although the terms ‘green skills’ and ‘greening of skills’ are new in Nepal, TVET curricula in Nepal already incorporate environmental components to some extent. However, there is much more to be done in areas such as creating institutional expertise and promoting a culture of research. The skills, knowledge and attitudes utilised by instructors and the management, as well as the teaching–learning processes need to orient towards greening agendas. In addition, TVET activities associated with enterprises and communities need to be included.

The national level

At the national level, the Government of Nepal has formulated and implemented various policies and sustainable development agendas, but it has yet to promote a policy on green skills and the greening of skills. While environmental concerns are included in national socio-economic policies, there are few policies focusing on green skills agendas that specifically target greening the Nepalese economy and society. There are many stakeholders currently involved in implementing, monitoring and enforcing environmental activities in Nepal such as the Ministry of Environment and

Population as well as the associated departments/offices. There are also other governmental departments, non-governmental and private agencies working on sustainable development strategies. However, a coordinated inter-sectoral partnership is still lacking among organisations.

The international level

At the level of the global development agenda, the United Nation's 2030 SDG goals serve as an important framework for Nepal. There are also several organisations with which Nepal liaisons with the regional and international organisations. For example, the Council for Technical Education and Vocational Training (CTEVT) as an apex organisation in TVET sub-sector of Nepal is also the liaison office of the regional organization Colombo Plan Staff College for Technician Education (CPSC) and a UNEVOC Centre.

Regional and international fora organised by these organisations provide sharing and learning opportunities to planners and policy-makers. In addition, the capacity-development programmes organised by other organisations such as UNDP, the World Bank, ILO, ADB and DFID, also provide information about recent developments in the global arena. However, such capacity-development opportunities are too few to provide sufficient opportunities for gaining exposure to global TVET activities.

The TVET sub-sector of Nepal in particular has benefited through these capacity-building and research activities focusing on greening TVET agendas.

The status of RVA in Nepal

Recognition, validation and accreditation (RVA) or recognition of prior learning (RPL) as it is called in the Nepalese context is the identification, validation, assessment and acknowledgement of skills acquired in formal, non-formal and informal learning settings. 'Green skills' refers to knowledge, abilities, values and attitudes needed to live in, develop and support a sustainable and resource-efficient society.

Most people working in forestry, waste management, agriculture, building construction, infrastructure development, tourism, transport and food production acquire their skills non-formally and informally. Since many tasks within existing jobs and work are undergoing greening, these changes will require not only adjustments to the current training and qualifications framework for these occupations but also mechanisms and instruments for the recognition, validation and accreditation of current and emergent green skills practised in these sectors. Although there are difficulties in the recognition of competences acquired outside the formal system, the recognition of green skills in enterprises is mutually beneficial for enterprises, individuals and the environment. For the individual, recognition may ease access to the formal system for further education and training. For people who are deprived of formal education, but have learned skills predominantly in the world of work, recognition may help them to secure an employment. Acknowledging and accrediting their skills and previous experiences can improve their career prospects in green jobs. Needless to say, this career improvement can take place only when green job standards are also simultaneously put in place. Recognition, in this way can help

the workers to become more attractive to the labour market and create a demand for them in the labour market.

Non-formal and informal learning contexts

The inadequacy of formal education to fulfil the needs of skills development has culminated in the emergence of the new approach to learning, whereby valuing knowledge, skills and competences from non-formal and informal learning is regarded as key to 'lifelong learning' (Regmi 2009). A study from Nepal has shown that stakeholders in Nepal agreed that the Nepalese education system should give equal emphasis to formal, non-formal and informal learning settings.

Nepal has harmonised its educational policies towards lifelong learning in line with those of ILO, UNESCO and regional organisations, like APEC, ASEAN, and the European Union. Nepal follows the 2004 Human Resources Development recommendations adopted at the 92nd ILC session (17 June 2004 (ILO 2004)). According to the European Commission, lifelong learning is 'all learning activities undertaken throughout life with the aim of improving knowledge, skills and competences within a personal, civic, social, and/or employment related perspective' (Gvaramadze 2007).

The existing system of skills recognition in Nepal

Nepal currently has a system for recognising skills acquired in all learning settings. The certification system used by the National Skills Training Board (NSTB) was set up in Nepal in 1983 by an autonomous body, the Skills Testing Authority (STA). The STA introduced a system for the classification of occupations and the testing and certification of skills in accordance with the guidelines of the Asia Pacific skill development project/International Labour Organization (APSDEP/ILO). With the formation of CTEVT in 1989, the STA gave way to the NSTB. The NSTB was under the jurisdiction of the CTEVT, which is the apex body for TVET in Nepal. The NSTB was responsible for developing national occupational skills standards (NOSS)/profiles. By the end of 2017, the NSTB had developed 286 NOSSs, tested 383,459 craftspeople and certified 274,400 passed candidates (CTEVT 2018). Skills tests are performance-based, requiring candidates to demonstrate mastery of occupational skills standards for their chosen trade to obtain a national skills certificate. An occupational skills standard is a written specification of the practical skills, knowledge and experience demonstrated by an individual in a particular occupation.

Testing and certification of skills

NSTB has certified thousands of workers since its establishment. It issues a call for application for skills tests three times a year. Candidates can apply individually or in a group at any time to take the skills test. In some cases, the industries or institutions facilitate and sponsor their trainees/ workers for NSTB skills tests.

Although most of the already developed skills standards for skill tests include technical or core skills, currently they also incorporate green skills, undertaken at the time of revising or updating previously developed standards or the development of new ones.

The development of sector skill committees

In 2013, the Swiss Agencies for Development and Cooperation (SDC) and CTEVT signed a memorandum of understanding (MoU) in which they pledged to work jointly to facilitate the development of Sector Skill Committees (SSC) as well as the National Vocational Qualifications Framework (NVQF). An SSC is an informal body comprising representatives from government, employers, training institutions and federations in the industrial sector concerned. To date, one SSC has been established, dealing with the construction sector.

Level descriptors and learning outcomes

Skills tests are targeted primarily towards the following three groups:

- Graduates from pre-employment vocational training programmes who need help in making the transition from training to work. Many of these programmes are run by international agencies and private sector groups working together with local governments to deliver on-the-job training, integrating gender and social inclusion approaches as well as labour market relevance.
- Experienced workers (employed or unemployed) who lack official certification.
- Workers who have completed an in-service training programme and are seeking an upgrade or additional certificate.

Recognition of prior learning is embedded in skills tests, which are related to a five-level certification system, from elementary level to levels one to four.

- Skills test elementary level requires successful completion of 140 h of vocational training in relevant occupation/trade.
- Skills test Level 1 requires the candidate to be literate with knowledge and skills in the relevant occupation and have a minimum of one year's work experience in a related occupation/trade. Alternatively, the requirement is successful completion of one month (160 h) of vocational training in a relevant occupation/trade, or vocational training with six months' work experience in the relevant occupation/trade.
- Skills test Level 2 requires the candidate to be literate with knowledge and skills in the relevant occupation and have a minimum of one year's work experience in a related occupation/trade. Alternatively, one year in training (minimum 600 h of theory and 800 h of the Level 1 Skills Test in a relevant occupation/trade).
- Skills test Level 3 requires the candidate to be literate with knowledge and skills in the relevant occupation and have a minimum of five years' work experience in a related occupation/trade. Alternatively, two years' work experience and one year in training in a relevant occupation/trade, or one year's work experience after completion of the Level 2 Skills Test in a relevant occupation/trade.
- Skills test Level 4 (specifically for Ophthalmic Assistants) requires the candidate to have three years of experience and one year in training after completion of the Level 3 Ophthalmic Assistant Skills Test, or a Certificate in Health Science (Ophthalmology) or equivalent with three years of experience and one year in training (Fig. 10.1).

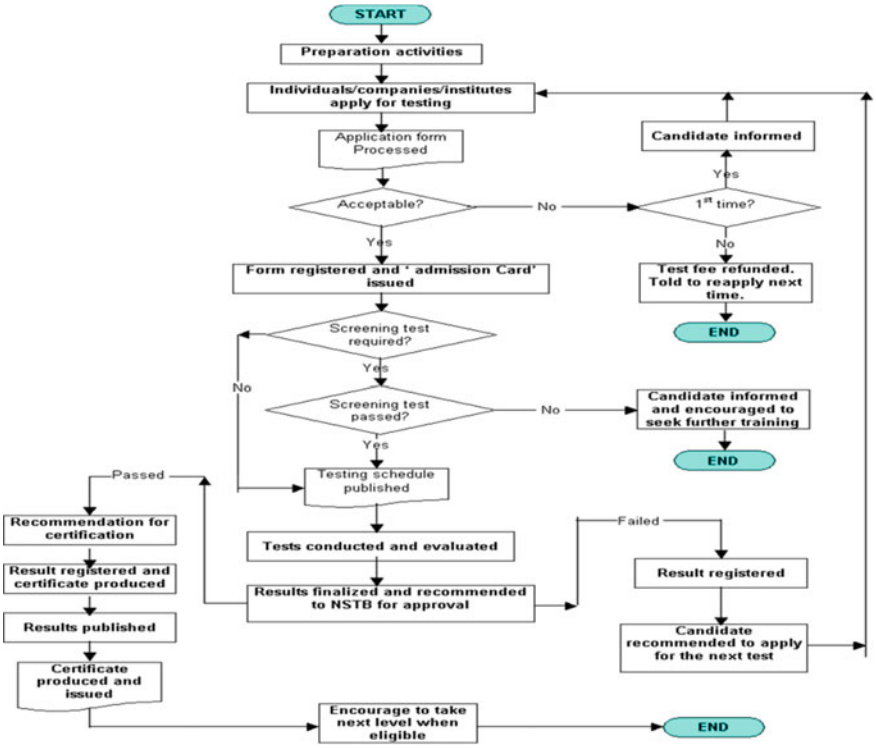

Fig. 10.1 Nepal: skills testing procedures. *Source* Based on CTEVT (2020)

10.3 Methodology of Primary Data Collection

This study has attempted to identify practices of green skills and RPL in four industrial sectors—catering, automotive, waste management and PVC manufacturing. The research design followed the overall methodology of the project (see Chap. 1) and adopted a qualitative approach. Information was collected from 20 selected micro, small and medium enterprises (MSMEs). Of the enterprises surveyed, four were from catering eight from automotive, two from waste management and six from PVC manufacturing. The study used semi-structured interview questions designed by Pavlova (see Chap. 1) after a slight modification. Both employers and employees were interviewed. The questionnaire focused on environmentally friendly practices, promotion of green skills, training activities for employees and recognition mechanisms. Observations were also conducted by researchers during their visits to the enterprises. The research design included the following steps: problem identification, literature review and consultation with experts, site selection, field survey and data collection, analysis of the data together with experts, and reporting of research findings.

10.4 Results and Discussion

Educational level of employees in different industry sectors

A total of 501 employees were employed in 20 enterprises, with the highest number in catering enterprises, followed by PVC manufacturing, automotive and waste management. A high percentage of employees were found to have benefitted from higher education (47.70%), followed by secondary education (24.75%), below secondary (15.96%), showing that despite the fact that skills acquisition is mostly non-formal and informal, education continues to play an important role in enterprises (see Table 10.1).

Awareness of green policies and regulations among employers and executive managers

Fifty-five per cent of the employers and respondents answered that they were fully aware of environmental rules and regulations, whereas the remaining 45% of the respondents reported that they are only partially aware. All respondents from the automotive sector answered that they were partially aware of environmental regulations. In the catering and waste management sectors, in contrast, all respondents were fully aware of environmental regulations related to their enterprises. In the PVC manufacturing sector, there was a mixed response: 71% of the respondents were aware, whereas 29% of respondents were partially aware. Figure 10.2 shows the results across the four industry sectors.

As stated above, the Government of Nepal has devised various policies, rules and regulations for cleaner production and transportation. While most respondents answered that they were aware of environmental regulations, hardly any of them could name the existing government rules and policies related to their field of work. This suggests that the employees have only partial information about the various

Table 10.1 Number of employees by education and sector

Sector	Employees with				Total employees
	Higher education	Vocational training	Secondary education	Below secondary education	
Catering	114	45	38	16	213
Automotive	7	5	29	19	60
Waste management	11	3	4	3	21
PVC	107	5	53	42	207
Total	239 (47.8%)	58 (11.5%)	124 (24.7%)	80 (16%)	501

Source Authors

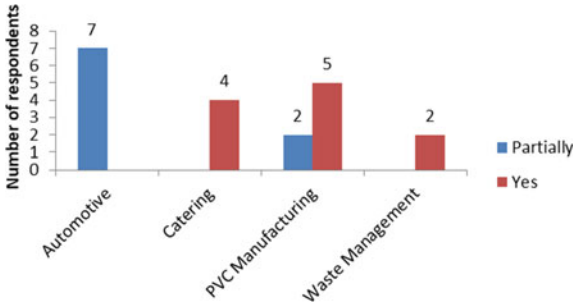

Fig. 10.2 Awareness of green policies by employers in the industry sector. *Source* Authors

aspects of environmental preservation. Most of the employers said that they registered their enterprises in accordance with governmental regulations, but they were unaware of the specific environmental policies that were relevant to their enterprise. Relatively larger enterprises with more than 50 employees mentioned that government departments/ministries occasionally monitored compliance and reported that they have their own internal monitoring section. Smaller enterprises with a fewer number of employees, in contrast, mentioned that such type of external monitoring at the government level was neither conducted on a regular basis nor did they have their own internal mechanisms for monitoring.

Understanding the notion of green skills

The notion of 'green skills' is a new concept and there is still hardly any effort to identify, document or certify green skills either in enterprises or at the institution level in Nepal. However, employees were familiar with the term 'soft skills' and sometimes received orientation in environmental issues through either external agencies or the industries themselves.

Regarding familiarity with concepts dealing with environmental problems, this study found that employers in waste management and catering/hospitality had relatively greater awareness in comparison to employers in PVC manufacturing and automotive. The employers in the latter two sectors are of the view that green skills did not contribute significantly to increasing the competitiveness and productivity of their enterprises. They said that they were following the official regulations only because they were mandatory by law, not because they were intrinsically motivated to do so. Most of the employers in catering and waste management said they were aware and acknowledged the importance of environmentally friendly practices for society. A small number of employers also mentioned that while recruiting workers they took account of previous educational qualifications, including certificates awarded by NSTB, generic and technical skills, attitudes and previous experience as parameters of their competences and considered this recognition as a base for further skills development.

Besides the employers and employees of selected enterprises, members of trade unions, officials from the department of industry and NSTB board members were also interviewed. The term 'green skills' is new for many such stakeholders in this field.

Table 10.2 The importance attached to green skills

Sector	Number of enterprises surveyed	Rating scale in number
Automotive	8	6
Catering	1	7
Catering	3	8
PVC	1	6
PVC	3	7
PVC	1	8
PVC	1	9
Waste management	2	9

Source Authors

Importance of the level of green skills at the enterprise level

Employers and employees were asked to rate their companies on a scale from 1 to 10 on the importance they give to green skills, where 15 is low importance and 6–10 is moderate to high importance. All enterprises rated the importance of green skills at the level from 6 to 9. All seven enterprises in the automotive sector rated them 6, whereas both enterprises in the waste management sector rated them 9. Table 10.2 shows the ratings made by individual enterprises and the average of each category of enterprises.

It is interesting to note that most enterprises attached high value to green skills, yet the observations related to the work environment showed that the actual situation was different. This is probably because most of the enterprises were more concerned with economic gain and maximisation of their production rather than introducing environmentally friendly practices. Enterprises focused on immediate return of investment and accumulation of profit. Both employers and employees were hardly aware of the policies, rules and regulations that they must follow; however, they are aware of the basic concepts and importance of environmental preservation.

Environmentally friendly practices in the enterprises

There were no specific environment-friendly practices observed in most of the enterprises. Most of the respondents (80%) indicated that they followed standard workplace procedures specified in rules and regulations to minimise negative impacts on the environment, dispose of waste responsibly and reuse it, if possible. Respondents in the automotive sector did not clarify which specific environmentally friendly practices they followed but clarified that they paid proper attention to waste disposal. Some of the catering enterprises, like Alfa House and Indreni Foodland, practised solid waste management, liquid waste management, precautions taken regarding hygienic food and a clean environment, and organised programmes for awareness-creation. Enterprises in waste management, being themselves green enterprises, were more likely to say that all their activities were environmentally friendly.

Most employers and employees showed concern and interest in keeping their environment 'clean'. However, in all the enterprises, there was little importance given to collecting and analysing data relating to environmental risk, impacts and management. Two enterprises working in waste treatment, however, said that they had practices for recording data and analysing it as a basis for guiding future improvements. None of the enterprises introduced cleaner technology in the production process, although several policies are in place for environmental promotion regarding the proper management of solid waste, treatment of liquid waste as well as control and treatment of air pollution. The monitoring mechanism is not effective, and reward and punishment systems are poor. Moreover, there were no new green jobs developed in waste and water management, renewable energy and energy saving, or pollution control.

Skill requirements by enterprises

Although green skills are a new concept, all enterprises said that environmental understanding, information and knowledge and green skills were top requirements. They considered skills for proper management and treatment of all types of waste as a basic need. The management of these enterprises, however, was in every instance reluctant to install modern technology for waste treatment because of the high costs involved. Few larger industries and hotels that have installed such machines have had to curtail their use due to a lack of skilled and trained operating and repair technicians.

Among the enterprises participating in the study, the managers of catering and waste management enterprises were comparatively more interested in recruiting technicians with green skills than the managers in automotive and PVC manufacturing. Most of the customers of catering industries were found to be more concerned about issues concerning health and hygiene. On the other hand, the customers of automotive enterprises pay less attention to cleanliness. Their only concern was the service costs they had to pay. Although there is not much current demand for specific green skills and greening skills, such demands are likely to increase in the future because of the increasing awareness of people towards the environment.

While enterprises hardly mentioned the use of specific hard-core skills required for the practice of green jobs, they did refer to the importance of promoting generic green skills. The following skills were selected by participants from the list presented by researchers (see Chap. 1, Pavlova 2014), system and risk analysis, innovation and the ability to identify opportunities for greener technology. Strategic skills, leadership skills, marketing skills, networking and IT language skills were also seen as essential interpersonal skills according to the respondents. Surprisingly, very few respondents mentioned intrapersonal skills such as adaptability to apply new green technologies and entrepreneurial skills.

Generally, the assessment of the suitability of an employee during the recruitment process was almost similar in all enterprises. Most of the enterprises select employees by checking their certificates, interviewing them, and asking candidates to demonstrate the required skills. In small-scale auto workshops, a good demonstration of the required skills rather than certificates was decisive in the selection process.

Mechanisms for recognising skills, prior learning and work experience in the enterprise

Recognition, validation and accreditation of skills acquired outside formal learning settings, such as on-the-job training in the context of the workplace, skills development programmes or apprenticeships, are carried out at the national level by the National Skill Testing Board (NSTB) which is a governmental institution. However, none of the 20 enterprises had mechanisms for the recognition, validation and accreditation of competences, prior learning or work experience. Workers who had more than five years of experience did not consider it necessary to get their skills tested and validated, and be awarded a certificate. Most of them said that a certificate was not important for them as they had the skills required to perform the jobs and customers trusted them on the quality they delivered. Interacting with employers and employees, most were found to be unaware of the national skill-testing mechanism existing in the country, under the CTEVT. After briefing them on the system and upon hearing about the system, most of the respondents were convinced of the importance and usefulness of documents certifying their skills and expressed their interest to have their skills certified. This reveals that enterprises were not being provided with adequate information on opportunities for having skills recognised. Although some enterprises have mechanisms to upgrade their employees based on work experience or duration of their job tenure, enterprises rarely used formal mechanisms of recognition, validation and accreditation of non-formal and informal learning. There was also no conscious effort to develop mechanisms at the enterprise level.

Almost all the employers (in some cases their executive managers) understood or referred to the term 'green skills' as keeping the environment clean. Most respondents reported that they kept their work premises clean. However, because the understanding of green skills is limited, it will be important to develop a comprehensive framework of what green skills are in the first place. Only with the help of such a comprehensive framework will it be possible to document, identify, assess and verify the green skills of employees as well as the skills gaps in the promotion of green practices. This study is the first bottom-up approach towards coming up with a comprehensive framework.

Some enterprises also report that the performance of workers and the duration of their work experience or their job tenure are taken into consideration for promotion and recruitment; however, these mechanisms are completely informal. Formal mechanisms of RPL did not exist yet and there was no attempt to link with the national skills test system under the NSTB and CTEVT with skills recognition at the enterprise level.

Although the term 'green skills' is still not in use, the newly developed or revised TVET curricula incorporate a significant amount of environmentally friendly components. It is a common practice to revise and develop the National Occupational Skill Standard and at the same time incorporate green skills. Such activities at the national level are useful for creating general awareness about green skills and green jobs. However, long-time and systematic efforts will be needed to make both employers and employees fully aware of the importance of green skills and RVA.

Enterprises/employers do not give importance to continuous/frequent training of staff, since training takes time away from work and would therefore result in a loss of profit. The usual custom for enterprises is to provide brief orientation training for newly appointed staff before they join work. In the case of the automotive sector, auto companies sometimes organise a short training course dealing with how to operate new machinery. The main purpose of training in all sectors is to deal with new technology and inform employees about existing regulations and legislation. This training is neither accredited nor certified.

Incorporating green skills in RVA

Respondents from all sectors showed interest in and are aware of the benefits of incorporating green skills in RPL as it has the potential at the enterprise level to increase productivity and at the individual employee level to enhance employability and increased income. Employers and employees alike acknowledge that the development and recognition of green skills can help them compete in the global market, because of the general acceptance and recognition of the importance of the green economy for environmental sustainability as well as economic transformation.

10.5 Conclusions and Recommendations

This study has examined green skills recognition in 20 enterprises in four industries: catering, automotive, waste management and PVC manufacturing. The social and economic development of any country or territory is a function of the availability of a skilled workforce. Therefore, the integration of green skills and environmentally friendly concepts in the workplace would be an effective way to pursue economic and social development. In this regard, the conclusions are presented under four headings.

Policy and regulation

The constitution of Nepal has made it mandatory that each policy should be in line with environmental preservation. The corresponding policies, rules and periodic plans of government have incorporated several provisions for promoting a green and clean economy. However, because of the lack of regular monitoring from responsible agencies such as the Department of Industry, the Department of Labour and the Ministry of Science and Environment, there are many gaps in the implementation of the policy.

Green practices and green skills

Much work needs to be done in promoting awareness of green skills and RPL, among employers and employees. None of the enterprises was found to be concerned about the negative impacts of their activities on the surrounding environment, nor were governmental regulatory mechanisms in place to curb or mitigate the negative effects of environmentally unfriendly practices in the workplace.

Every sector showed interest in green skills even though both concepts are very new to them. Most of the enterprises are interested in the promotion of environmental-friendly practices. Their vision of environmentally friendly work included the promotion of organic products, initiatives on awareness creation among employees, installation of waste treatment plants, designing policies/guidelines for green enterprises, maintenance of equipment and the use of the latest technologies.

Awareness of green skills and green practices both in private and public sectors could be a prerequisite for sustainable development.

The practice of RVA

Although there are some practices of RVA at the national level seen in the establishment of the National Skill Testing Board (NSTB), RVA use among employers in the private sector is low. This study has found that people with a high skill set applicable to their sector are unaware of existing skills-testing mechanisms.

Policy, as well as government initiatives, could increase awareness among employers and employees about the benefits of RVA. During recruitment processes, employers almost entirely depend on the traditional practices of interviewing, work demonstration and certificates of formal training. A skills certificate provided by National Skill Testing Board could be considered while recruiting employees. RPL linked to the NSTB has been implemented to some extent and some environmentally friendly components have already been included in curricula and occupational skill standards. Therefore, there are numerous opportunities and challenges existing in this subject area.

Staff training programmes in the area of green skills

Since the Nepalese industry is still in its early stages of development, the focus of industry and businesses is more on increasing production output rather than considering possible impacts of the production process. Except for some big and multinational companies, there is little inclination among employers to invest in human resources development (HRD). SMEs often hesitate to send their workers for training and orientation programmes conducted by other development partners.

Following the research, some challenges, opportunities and recommendations are presented below.

Major challenges

Major challenges identified through the study included:

- The absence of effective government regulatory activities and a low level of environmental awareness result in a lack of motivation among MSME clients, employers and employees to adopt environmentally friendly practices.
- The increase in production costs and reduction in competitiveness due to financial and technical constraints arise from the introduction of cleaner technologies and the promotion of green skills.
- The low demand amongst consumers for higher-quality goods manufactured using clean technologies.

- The absence of both promotion and advocacy for introducing workers to RVA and green skills and the lack of governmental intervention.
- Businesses do not take the time to take stock of existing skills through recognition processes and do not arrange training programmes as necessary to prepare their workforce to meet current skills demands.
- Failure to use RVA at the time of recruitment by most employers, induction, or in appraisal systems and supervision. This applies to enterprises in both the formal and informal sectors.
- A lack of governmental policies for the recognition of green skills in the workplace, and poor implementation of existing environmental legislations.
- Lack of motivation among MSMEs to adopt environmentally friendly practices.
- Absence of detailed studies that identify the creation of green jobs resulting from new/green technology.
- Absence of labour force projections and new skill requirements for green occupations.

Major opportunities for the inclusion of green skills in RVA

The inclusion of green skills in RVA would create opportunities:

- to effectively use limited resources by facilitating the reuse and recycling of waste;
- to expand employment opportunities at the local level, since the majority of the population of Nepal still lives in villages where people are more dependent on locally available natural resources;
- to preserve and explore various indigenous and traditional skills of the country (e.g. chemical-free natural fibre has been disappearing due to the overuse of artificial fibre)
- to transform into a greener economy, thus creating additional jobs in several areas such as pollution-control devices, renewable energy installations, etc.;
- to recognise new employment opportunities within the sectors of organic farming, renewable energy, reusing and recycling of waste.

Recommendations

Based on the analysis of the information collected during the survey as well as on other secondary information, the following recommendations are presented:

- RVA and green skills are new concepts for Nepalese industries in general and MSMEs in particular. Therefore, it is important to clarify these concepts to government officials, workers and employers so that efforts can be made in a concerted and coordinated manner. Orientation programmes should clarify the different purposes of RVA and green skills.
- Training and skills development is important for innovation and the introduction of new technologies but they are neglected in most institutions and organisations. Therefore, greater attention should be paid to training and development, specifically targeting the incorporation of skills recognition.

- Existing occupational skills standards, curricula and teaching materials should incorporate green skills to strengthen RVA in the workplace.
- Instructors and teachers should keep up to date about skills for green jobs because the quality of trainees is dependent upon the expertise of trainers and teachers. Therefore, training providers should receive help in organising professional development for their instructors on promoting green skills for the green economy.
- It is imperative that monitoring mechanisms of government are used to implement existing legislation more effectively. This would, therefore, encourage employers and industrialists to follow the existing rules and regulations.
- The current NSTB (NVQA in future) should coordinate with related ministries/departments, professional associations and trade unions to prepare systematic guidelines and tools to recognise green skills as part of workplace learning in alignment with the national skills certification system. This would facilitate recognition, validation and certification processes and it would increase the chances of receiving financial support for the RVA of green skills in the workplace.
- Staff training programmes in enterprises should create awareness about the importance of green skills and their inclusion in RVA. These programmes should be in partnership with governmental agencies, enterprises and international and national non-governmental organisations.
- The government should provide incentives to the enterprises to motivate environmental-friendly practices and their recognition.

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Chapter 11
Case Study: Philippines. Recognising Green Skills for Environmental and Sustainable Development in Four Selected Industries

Elmer Talavera

Abstract This chapter presents a study on the identification and recognition of knowledge, skills and competencies required to convert and maintain green enterprises in a Philippine context and in the light of Philippine policies, legislation and investments to stimulate the development of new green markets. It examines the use of 'green' practices in enterprises, the benefits and challenges in the application of such practices, the extent to which respondent micro, small and medium enterprises (MSMEs) have identified the green skills requirements and whether skills recognition mechanisms such as job cards or other portfolio systems have been put in place as part of recognition processes and workplace training programmes. This chapter begins by giving an overview of the Philippine economy and society and the role of MSMEs in four dynamically developing industry sectors namely, automotive, catering, PVC manufacturing and waste management. Given the environmental challenges and problems faced by enterprises in these sectors, the study looks at the extent to which the government's green job policies, laws, qualifications framework, training regulations and standards address environmental challenges and problems faced by enterprises. The study thus examines connections between macro policies, rules, laws and regulations and micro-level application through practices and green skills and their recognition through recognition mechanisms.

Keywords Environmental challenges · Industries and services · Green practices · MSMEs · Green jobs · Green skills · RVA · Workplace training · Assessment and certification · Greening TVET

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Abbreviations

3R	Reduce, Reuse, and Recycle
5S	Sort, Set in order, Shine, Standardize, and Sustain
ASEAN	Association of Southeast Asian Nations
ASPBI	Annual Survey of Philippine Business and Industry
BOI	Board of Investment
CARS	Comprehensive Automotive Resurgence Strategy
CBT	Competency-based TVET
CEDEFOP	Centre Européen pour le Développement de la Formation Professionnelle
CHED	Commission on Higher Education
CMU	Compact Mobile Unit
COC	Certificate of Competency
COP	Code of Practice
CS	Competency Standards
DENR	Department of Environment and Natural Resource
DepEd	Department of Education
DOE	Department of Energy
DOLE	Department of Labour and Employment
DOLE	Department of Public Works and Highways
DOST	Department of Science and Technology
DOT	Department of Tourism
DOTC	Department of Transportation and Communication
DTI	Department of Trade and Industry
ECC	Environmental Compliance Certificate
ECOP	Employers Confederation of the Philippines
EMB	Environmental Management Bureau
EPA	Enhanced Philippine Agenda 21
GDP	Gross Domestic Product
GODP	Green Our DOLE Programme
IEC	Information, Education, and Communication
ILO	International Labour Organization
IMF	International Monetary Fund
IRR	Implementing Rules and Regulations
IT	Information Technology
LGU	Local Government Unit
LLDA	Laguna Lake Development Authority
LPG	Liquefied Petroleum Gas
MSMEs	Micro, Small, and Medium-Sized Enterprises
NAAQS	National Ambient Air Quality Standards
NC	National Certificate
NCR	National Capital Region
NEDA	National Economic and Development Authority

NESSAP	National Emission Standards for Source Air Pollutants
NGO	Non-governmental Organization
NITESD	National Institute for Technical Education and Skills Development
NTESDP	National Technical Education and Skills Development Plan
OECD	Organization for Economic Co-operation and Development
PAMI	Philippine Automotive Manufacturing Industry
PDP	Philippine Development Plan
PHP	Philippine Peso
POPs	Persistent Organic Pollutants
PQF	Philippine Qualifications Framework
PRC	Professional Regulation Commission
PRII	Philippine Resins Industries, Inc.
ProGED	Promotion of Green Economic Development
PSA	Philippine Statistics Authority
PSSD	Philippines Strategy for Sustainable Development
PTQCS	Philippine TVET Qualification and Certification System
PVC	Polyvinyl chloride
RAC	Refrigeration and Air Conditioning
RMCS	Regional Model of Competency Standards
RPL	Recognition of Prior Learning
RVA	Recognition, Validation, and Accreditation
SW	Solid Waste/s
TESDA	Technical Education and Skills Development Authority
TMP	Toyota Motor Philippines
TRs	Training Regulations
TVET	Technical Vocational Education and Training
UN	United Nations
UNEP	United Nations Environment Programme
WEEE	Waste Electrical and Electronic Equipment
WHO	World Health Organization
WTO	World Trade Organization

11.1 Introduction

A basic premise of the study is that if green skills and green practices are to be promoted and recognised, firms need to understand green skills requirements and the recognition of these skills as an important part of workplace training programmes. There is a lack of interest among micro, small, and medium enterprises (MSMEs) to recognise environmentally friendly practices. However, this could change with the Philippine government's Green Jobs Act of 2016, which provides tax reduction and other incentives for MSMEs.

Thus, this paper will put an emphasis on the voices of employers, employees and enterprises that are largely absent from analysis and policy-making. It is important to know what workers in MSMEs think and are learning about green skills in their workplaces. Most notably, they reported that increasing changes around green skills are being implemented into both work roles but not equally in training.

The Technical Education and Skills Development Authority (TESDA) through its National Institute for Technical Education and Skills Development (NITESD) conducted the fieldwork for this study. The data considered stakeholder perspectives at all levels. The analysis will begin by studying the national government standpoint in addressing workplace environment-related issues in all sectors, and then move to obtaining insights on frameworks and standards established by government authorities in collaboration with industry associations or trade unions and other private sector agencies. Finally, it will look at green skills inclusion in recognition practices from the perspective of enterprises.

Rationale for conducting the empirical study in enterprises

While policies and environmental laws, as well as green standards, competences and qualifications have been developed, there is little information on whether they are implemented at the level of MSMEs or in promoting cleaner production processes in the workplace. In many MSMEs, workers involved in the everyday practice of production do not comply with new regulations and standards. However, the questions of compliance of environmentally friendly regulations should not only concern managers and executives, rather, compliance should concern each worker. Another neglected issue is non-formal education or workplace learning, which is believed to be the core element in meeting the training needs of workers. The training must be conducted on the job and in the working environment, adapting teaching methods to the learning abilities of workers, as well as addressing the issues of access and costs. The learning process must address the entire value chain to build an understanding of causalities, interdependencies and environmental impacts. Promoting green skills is not only about automation and Science, Technology, Engineering and Mathematics (STEM), but also about tracing compliance with environmental regulations at every step in the production process.

The socio-economic environment and the role of industry sectors

The 2019 International Monetary Fund (IMF) statistics ranked the Philippine economy as the 36th largest in the world (IMF 2019). The Philippines is considered one of the largest emerging markets and fastest-growing economies in Asia. The Philippine economy, which used to be agriculture-based, is transitioning to services and manufacturing. Its gross domestic product (GDP) based on purchasing power parity in 2016 was estimated at around US $304 billion. The primary exports include semiconductors and electronic products, transport equipment, garments, copper products, petroleum products, coconut oil and fruits. Major trading partners include the United States, Japan, the People's Republic of China, Singapore, the Republic of Korea, the Netherlands, Germany and Thailand.

Box 11.1 The economic contributions of the industry and services sectors

Automotive industry

- The Philippine automotive manufacturing industry (PAMI)—composed of two core sectors, namely manufacturing of parts and accessories for motor vehicles and the manufacturing of motor vehicles—is one of the major drivers of the Philippine industry, generating approximately P248.5 billion (US$5 billion) sales in 2013;
- The industry roadmap has targeted 300,000 quality jobs by 2022;
- The local vehicle manufacturing industry is expected to attract P27 billion (US$500 million) in fresh investments, manufacture 600,000 more vehicles and add P300 billion to the domestic economy (equivalent to 1.7% of GDP). This has the approval of the Comprehensive Automotive Resurgence Strategy (CARS) programme in 2016;
- The comprehensive operation of the automotive industry extends to other complementary sectors such as textiles, glass, plastics, electronics, rubber, iron and steel. Hence, increasing PAMI's productivity would likewise increase the economic activity of supporting industries, and the Philippine economy (Palaña 2014).

Catering services

- As tourism serves as the main market for hotel and restaurant services, the increase in visitor traffic over the past 10 years resulted in a corresponding boom in the catering industry;
- Catering services include hotels, motels, restaurants, fast food establishments and educational institutions that provide training and other types of organisations responsible for the promotion of hospitality services;
- Businesses also purchase food, tools and supplies to help their establishments to generate revenue for supporting businesses;
- The economy is stimulated by employing locals for jobs such as food preparation. In turn, these workers earn wages and become tax payers and contribute to economic growth;
- The total income in 2012 by the road service (catering) industry reached P267.5 billion (about US$5 billion). More than half of the total income of the Philippines was earned by the National Capital Region (NCR) amounting to P151.6 billion (US$3 billion) (PSA 2012).

PVC manufacturing

- Polyvinyl chloride (PVC) is a versatile thermoplastic material used in the production of hundreds of everyday consumer products. International and local investments have generated thousands of jobs for Filipinos since 2000.

- The Philippine Resins Industries, Inc. (PRII) is embarking on a P1.68 billion (US$50 million) expansion of its polyvinyl chloride (PVC) manufacturing plant in Mariveles, Baatan (Ferriols 2001).

  Waste management industry

- The Philippine waste management sector, which has created many jobs, includes the following activities:
  - Water collection, treatment, and supply;
  - Waste removal and disposal services;
  - Formal recovery of recyclable;
  - Informal valorisation[1] of waste products; and
  - Sewage and remediation activities.
- Output value of the different activities
  - Water collection, treatment and supply: PHP55.1 billion (about US$100 million) (91.1%);
  - Material recovery: PHP2.3 billion (about US$40 million) (3.8%);
  - Waste collection: PHP1.9 billion (about US$33 million) (3.1%);
  - Sewage and remediation activities and other waste management services: PHP0.8 billion (about US$15 million) (1.3%);
  - Waste treatment and disposal: PHP0.4 billion (about US$7.5 million) (0.6%) (PSA 2014).

Source: Authors

Formal sector enterprises

Data for formal sector establishments from the 2010 Annual Survey of Philippine Business and Industry (ASPBI) highlighted 148,266 formal sector establishments. In terms of employment, data collated by TESDA indicates that waste management had the highest employment figures at 47,176 people, followed by manufacturing at 41,528, automotive at 18,337 and catering at 7,479 people. However, many jobs are precarious or casual and operate on a contractual basis. Not all these jobs are salaried; often they are contractual (PSA 2010). Thus, despite considerable industrial development in the country, there are major income and growth disparities between the country's different regions and socio-economic classes. The challenges facing the government are high poverty incidence (33% of the population), increased unemployment rate (6.3% of the active population), and persistent inequality in wealth distribution (PSA 2014).

There are several challenges that come with greening the economy. Since 1990, the Philippines has seen significant growth in the services sector (55% of the labour

[1] Individual, family, micro-, small-, and medium enterprises that extract valuable materials from the waste system and valorise them for own use, repair and sale, fabrication, or recycling.

force market), followed by agriculture (29%) and manufacturing/ industry (16%) (Central Intelligence Agency 2017). Thus, more green practices in the service sector are particularly important to address.

Challenges to achieving more inclusive growth remain. Even though the economy has grown and the unemployment rate has declined somewhat in recent years, it remains high at around 6.5%; underemployment is also high, ranging from 18 to 19% of the employed. At least 40% of the employed work in the informal sector (Central Intelligence Agency 2017). This means that most of the people working in the informal sector have achieved their skills through informal or non-formal education and training while on the job or outside the workplace.

Environmental challenges and national policy responses

Environmental challenges

The World Health Organization (WHO) reported that seven million people worldwide die annually from air pollution—over six million of them were recorded in Asia. Most of these cases are in the People's Republic of China and India, but experts warned that the Philippines might not be far behind (Montano 2016). The Philippines is affected by the increasing density of air pollutants, particularly in cities caused by emissions from vehicles and factories; non-compliance of environmental standards; and incineration (Congress of the Philippines 1990). Incineration is defined as the burning of municipal, biomedical and hazardous wastes whose process emits toxic and poisonous fumes. Industry and enterprises are contributing greatly to these environmental hazards.

The increasing volume of household, commercial, institutional, and industrial wastes is an increasing concern. A single resident in Manila produces an average of 0.7 kg of waste a day, about 130% higher than the global average of 0.3 kg per person per day. According to the Department of Environment and Natural Resources (DENR), Metro Manila alone produced about 8,400 to 8,600 tonnes of trash per day in 2011. In addition, street sweeping, construction debris, agricultural waste and other non-hazardous/non-toxic waste products continued to pile up in many areas of the country. The lack of strict public compliance and enforcement powers of those in authority were identified as factors for improper waste management. Other salient issues related to the collection and segregation of solid wastes and monitoring of solid waste management.

Another pressing environmental challenge is the worldwide six-fold increase in consumer good production and subsequent increase in global waste generation by 900% since the 1990s according to the World Trade Organization (WTO). However, due to high costs, developed countries could only recycle 11% of their waste.[2] The rest were exported to developing countries like the Philippines, where environmental laws

[2] The figure pertains only to the US because of unavailability of global data, and given that the US is the biggest producer of industrial waste, this figure is taken as some kind of watermark for all other industrialized countries for purposes of this study (see E. Stewards at http://e-stewards.org/learn-more/for-consumers/effects-of-e-waste/who-gets-stepped-on/).

were weak and where these toxic and hazardous wastes were accepted as additional livelihood opportunities. In addition, the technological revolution has given rise to a new and growing form of toxic and hazardous waste, e-waste (waste electrical and electronic equipment or WEEE), a consequence of the prodigious growth in the number of computers, cell phones and electronic gadgets that started in the 1990s. The Philippines has continued to be one of the leading destinations for chemical products and toxic substances from developing countries and has become one of the leading importers of 'persistent organic pollutants' (POPs), which continually pollute agricultural lands and poison the rivers, lakes, and seas (Ilagan et al. 2015).

National policy responses to environmental challenge

The leading role of the government in terms of greening has been highlighted by researchers (e.g. Pavlova 2016). The Philippines is a good example. Several governmental policies address environmental challenges. The Philippines addressed its plans for a greener future in the 1990 Philippine Strategy for Sustainable Development (PSSD) supplemented in 2004 with the Enhanced Philippine agenda (EPA) 21. In the Philippine development plan (PDP) 2011–2016, the conservation, protection and rehabilitation of the environment and natural resources were highlighted (Baumgarten and Kunz 2016).

Administrative order No. 17 issued by the DENR in 2002 provides the national policy context for the analysis of skills for sustainability and the greening of the economy and society. A major authority for the implementation of environmental policies is the Environmental Management Bureau (EMB) (Department of Environment and Natural Resources 2002).

Box 11.2 Philippine environmental legislation

National laws were enacted in four broad areas.

1. **Republic Act 6969—Toxic Substances and Hazardous and Nuclear Wastes Control Act of 1990** provides for a legal framework to control and manage the importation, manufacture, processing, distribution, use, transport, treatment and disposal of toxic substances and hazardous and nuclear wastes. The law prohibits, limits, and regulates the use, manufacture, import, export, transport, processing, storage, possession, and wholesale of priority chemicals that are determined to be regulated, phased-out, or banned because of the serious risks they pose to public health and the environment. The swelling issues of industrial waste, proliferation and waste dumping in the Philippines prompted the implementation of this Act (Congress of the Philippines 1990).
2. **Republic Act 8749—Philippine Clean Air Act of 1999** provides a comprehensive air quality management policy and programme that aims to achieve and maintain cleaner air for all Filipinos. The law covers all

potential sources of air pollution: (1) mobile sources such as motor vehicles; (2) point or stationary sources such as industrial plants; and (3) area sources such as wood or coal burning. Gas/diesel powered vehicles on the road will undergo emission testing, and violators will be subjected to penalties. The law also directs the complete phase-out of leaded gasoline; lowering the sulphur content of industrial and automotive diesel; and lowering aromatics and benzene in unleaded gasoline. All stationary sources must comply with the National Emission Standards for Source Air Pollutants (NESSAP) and National Ambient Air Quality Standards (NAAQS) and must secure their permission to operate, prior to operations (Congress of the Philippines, 1999).

3. **Republic Act 9003–Ecological Solid Waste Management Act of 2000** provides for a legal framework for the country's systematic, comprehensive, and ecological solid waste management programme that shall ensure the protection of public health and the environment. Under this law, there are several provisions to manage solid wastes (SW) in the country: (1) Mandatory segregation of SW to be conducted at the source; (2) Systematic collection and transport of wastes and proper protection of garbage collector's health; (3) Establishment of reclamation programmes and buy-back centres for recyclable and toxic materials; (4) Promotion of eco-labelling and prohibition on non-environmentally acceptable products and packaging; and (5) Prohibition against the use of open dumps and establishment of controlled dumps and sanitary landfills, among others (Congress of the Philippines, 2001).
4. **RA 9275–Philippine Clean Water Act of 2004** deals with poor water quality management in all surrounding bodies of water, pollution from land-based sources and ineffective enforcement of water quality standards. It also tackles improper collection, treatment, and disposal of domestic sewage, and wastewater charge systems (Congress of the Philippines, 2004).

Source: Authors' compilation based on the Congress of the Philippines legal enactments

11.2 Terminology and Definitions

Republic Act (RA) 10,771, otherwise known as the Philippine Green Jobs Act of 2016, is the country's legal mandate for promoting green economies amongst enterprises. The law also grants business incentives, such as special tax deductions from their taxable income and duty-free importation of capital equipment on top of the fiscal and non-fiscal incentives already provided for by existing laws, orders, rules

and regulations of the government to encourage them to help generate and sustain 'green jobs' (Department of Labour and Employment 2017).

The law defines 'green jobs' as employment that contributes to preserving or restoring the quality of the environment, be it in the agriculture, industry or the services sector. 'Green jobs' shall produce 'green goods and services' that would benefit the environment or conserve natural resources. The Law envisions a 'green economy' which is low-carbon and resource-efficient, resulting in improved human well-being and social equity in the reduction of environmental risks and ecological scarcities.

The Philippine Development Plan (PDP) 2011–2016 (NEDA 2014) stipulated that green jobs can exist and flourish in all sectors. Green jobs can be found where there are measures taken to: (1) introduce low-carbon policies; (2) adapt to climate change; (3) reduce resource use and energy; and (4) protect biodiversity. The plan prioritised key areas identified as mainstream activities affected by climate change: agriculture, fisheries, forestry, energy, construction, transport (including automotive), manufacturing (including PVC production), services (including catering), tourism and waste management.

The pilot application of 'Policy guidelines on the just transition towards environmentally sustainable economies and societies for all' that is being conducted in three countries, including the Philippines, adopted by the ILO Governing Body in October 2015, enables the government, together with employers, workers, organizations and other stakeholders, to leverage the process of structural change towards a sustainable, low-carbon, climate-resilient economy to create decent jobs on a significant scale (ILO 2017).

The Philippines adopts the Cedefop notion of 'green skills' defined in terms of the technical skills, knowledge, values, and attitudes needed in the workforce to develop and support sustainable social, economic, and environmental outcomes in business, industry and the community.

Stakeholder involvement in green skills development in the Philippines

Several stakeholders are responsible for implementing the Green Jobs Law. Green jobs and green skills are being promoted through several departments: the Department of Labour and Employment (DOLE) for formulating the National Green Jobs Human Resource Development Plan (NGJHRDP) on the development, enhancement and utilisation of the labour force; the Department of Environment and Natural Resources (DENR) to establish and maintain a climate-change information management system and network; the National Economic and Development Authority (NEDA) for ensuring the mainstreaming of green jobs concerns in the development plans; the Department of Trade and Industry (DTI) for developing a special business facilitation programme for enterprises; the Department of Transportation and Communications (DOTC) to encourage more investments in public infrastructure and services that foster green growth; the Climate Change Commission (CCC) for developing and administering standards for the assessment and certification of green goods and services of enterprises; and the Department of Finance (DOF) to

administer the grant of incentives to qualified enterprises. In relation to the education system, three entities are responsible for implementing respectively green standards, the green curriculum and green skills. These are the Department of Education (DepEd), the Commission on Higher Education (CHED) and TESDA. In addition, the Professional Regulation Commission (PRC) is responsible for facilitating the recognition of knowledge, skills and competency of professionals working in the green economy. The TESDA, the DOLE, and the Department of Science and Technology (DOST) will also analyse skills, training and retraining needs in relation to the use of green technology that has the potential to create new green occupations.

Meanwhile, the DTI, which has promoted the three-year Green Economic Development (ProGED) Project jointly with the GIZ of Germany since January 2013, aims to enhance the competitiveness of MSMEs by helping them adopt climate-smart and environmentally friendly strategies through a value chain approach (Silva 2016).

Challenges of greening TVET

TVET has been called upon to make a pivotal contribution to the national goals of inclusive growth, poverty reduction and greening of skills in the context of the Third cycle (2011–2016) of the National Technical Education and Skills Development Plan (NTESDP) anchored on the PDP. Under Strategic Direction 15, TVET needs to 'develop and implement programmes intended for green jobs.' This is pursued through the development of new training regulations (TRs) or amendment/ review of existing TRs for green jobs and sustainable development, including agro-forestry, developing the capacity of trainers and administrators to implement 'green skills' programmes and linking-up with local and international agencies in the design, implementation and monitoring of 'green skills' programmes. (www.tesda.gov.ph). TESDA is responsible for formulating the necessary TRs for the implementation of skills training, programme registration and assessment, and certification in support of the requirements for skilled manpower for the 'green economy' (Department of Labour and Employment 2017).

TVET plays a crucial role in enhancing workers' productivity and employability and facilitates the active and meaningful participation of workers in the development process. The plan highlighted strategies that will address issues pertaining to innovation and the greening of skills. Most of all, TVET will be responsible for mitigating the effects of climate change in the world of work and workplaces. In this regard, TVET has the aims of (1) 'greening' existing jobs to meet the current demand for retrofitting and the retooling of the industry to ensure that existing industries continue to grow; and (2) training new workers with the appropriate green skills particularly for the renewable industries and emergent 'green' technology sectors. The challenge, therefore, is to strategise environmental education and skills development in anticipation of a green shift in the priority sectors that include agriculture, forestry, fishery, manufacturing (electronics and automotive) services, solid waste and waste water management, energy, transportation and construction (based on the draft NGJHRDP of DOLE 2017).

TVET has a big role to play to support the government policy of protecting and caring the environment. New competences need to be developed relevant to this concern. Going into 'green jobs' will require the retooling of skilled workers in sectors with high environmental impacts.

The status of the recognition of green skills

In the Philippines, recognition, validation and accreditation of learning outcomes and competencies of workers in enterprises (i.e. in non-formal learning) is one of the components of competency-based TVET and is part of the strategic directions of the National TESD Plan 2005–2009 (NTESDP) (www.tesda.gov.ph). As of December 2017, TESDA had 33 qualifications/TRs out of 2589 promulgated TRs covering environment-related knowledge, skills, and attitudes in the TRs and curricula. In catering services, automotive, PVC manufacturing and waste management sectors, 5S (sort, set in order, shine, standardise and sustain) and 3Rs (reduce, reuse, recycle) are included in the required knowledge and skills which were considered 'green'. The 5S methodology is also a 'must' for all TVET trainers. TESDA likewise amended the TRs for automotive servicing NC III to include LPG conversion and repowering in the set of competences to promote cleaner emissions of vehicles. Ship's catering takes precautions to prevent pollution in the marine environment by implementing waste management and disposal systems. See Table 11.1 for the list of TESDA TRs with a 'green' outlook related to the four industries.

TESDA also conducted a training programme in collaboration with the Department of Energy (DOE) to integrate the use of energy-efficient lighting in the TR for electrical installation and maintenance qualifications. All the qualifications with a green outlook have been accommodated in the Philippine Qualifications Framework (PQF). The Competency Standards are aligned with the PQF, a national policy describing the levels of educational qualifications and setting the standards for qualification outcomes. It is competency-based and labour market driven. It consists of eight levels of education and training that encourage lifelong learning to allow individuals to start at the level that suits them and then build-up their qualifications as their needs and interests develop and change over time (www.gov.ph). The Philippine TVET Qualification and Certification System (PTQCS), consistent with the

Table 11.1 A list of TESDA training regulations with a 'green' outlook

Industry	Training regulations
Automotive services	Automotive Servicing NC II, Automotive Servicing NC III, Automotive Servicing NC IV
Catering services	Ship's Catering Services NC I, Ship's Catering Services NC II (ship's cook), Food and Beverage Services NC II/ III/ IV
Polyvinyl Manufacturing	Plumbing NC III
Waste management	Garbage Collection NC I, Sanitary Landfill Operations (Spotter) NC II, Sanitary Landfill Operations (Foreman) NC III

Source Authors, based on the Technical Education and Skills Development Authority

PQF, has five different levels of complexity across the three different domains. The qualification levels under PTQCS start from NC I to Diploma.

Development of green qualifications

In accordance with international requirements, TESDA developed qualifications related to refrigeration and air-conditioning. This was done in partnership with DENR and practitioners as part of the national CFC phase-out plan and in accordance with the Montreal Protocol and the Clean Air Act. Through the TESDA training regulations (TRs) on the refrigeration and air-conditioning (RAC) sectors, competences for technicians are identified and addressed during training programmes on recovery, recycling, and retrofitting of RAC systems, which are major sources of ozone-depleting CFCs. In line with this, a code of practice (COP) for RAC was developed by the project with some funding from the World Bank and the Government of Sweden. The TRs promote safety parameters for workers, customers, tools/equipment, and most importantly environmental concerns.

The competency standards of the PQF follow the ILO Regional Model of Competency Standards (RMCS), which prescribes three types of competences, namely: (1) basic competences all workers in all sectors must possess; (2) common competences workers in a sector must possess; and (3) core competences workers in a qualification must possess. Environmental concerns/ concepts are integrated into the basic competences of the TRs. The three learning domains of the competency standards are aligned to the principles of lifelong learning: learning to live together, learning to be, learning to do, and learning to know, as well as to the twenty-first-century skills.

Inviting experts from industry to develop training regulations

TESDA invites experts from industry and/or industry associations who follow guidelines and procedures on how to align each unit of competency to the PQF descriptors. The TRs have four major parts: (1) description of the qualification and job title; (2) competency standards, including the basic, common and core competences; (3) training standards; and (4) national assessment and certification arrangements.

The competency-based TVET (CBT) system recognises various delivery modes in different learning settings – both on- and off-the-job – if CBT specified by the industry drives the training. TVET has developed three delivery modes: (1) Institution-based, which delivers training programmes in public and private TVET institutions, including regional, provincial, and specialised training centres; (2) Enterprise-based, which implements training programmes within enterprises/firms; and (3) Community-based, which delivers training programmes at the local/community level, mostly in partnership with LGUs and NGOs.

Assessment and certification

For every unit of competency that is completed by a learner during training, a certificate of training achievement is awarded, and after completing all the required units of competency, he/she is awarded with a Certificate of Training. The latter indicates the title of the course, the qualification level according to the PQF descriptors, and the units of competency that the learner has acquired. The attainment of each unit

of competency is pre-conditioned on the attainment of specific learning outcomes as described in the competency standards. As a prerequisite for graduation, a learner undergoes the national competency assessment, and he/she is given a certificate of competency (COC) after satisfactorily demonstrating competence in a cluster of units of competency or a national certificate (NC) after satisfactorily demonstrating all units of competency comprising a qualification using the assessment criteria provided by the TR/CS computed by an accredited competency assessor.

Assessment and certification also include the recognition, validation, and accreditation of competences and learning and work experience. This system observes two major principles: (1) competency assessment to collect evidence relative to a unit or cluster of units of competency, and (2) RPL to give recognition to an individual's skill, knowledge, and attitudes acquired through previous training, work, or life experiences.

11.3 Methodology of Primary Data Collection

The study adopts the overall methodology developed by the project for all participating jurisdictions and used the developed instruments such as survey/interview questions, the observation list and the list of generic green skills to collect data (see Chap. 1). This country study reflects results from 29 of 32 enterprises (targeting eight companies in each sector). The study was confined within the National Capital Region (NCR) or Metro Manila, given that in this area there were enterprises representing the four targeted industries (catering, automobile, PVC and waste management). Of the 29 respondent firms, seven were from the automotive industry, six from PVC manufacturing, eight from catering services and eight from waste management. Sixteen enterprises from the formal sector were interviewed and five from the informal sector. Given the limited size of the sample, the study does not pretend to generalise across the four industries. It is exploratory in nature and draws on preliminary insights into the recognition and development of greener skills in the identified industry sectors.

Box 11.3 General information on the enterprises

- *Enterprises in waste management* undertook testing of used oil and waste products; microbiological and mechanical testing; verification and certification of public and private firms; and buying and selling recyclable materials such as plastics, meats and paper products.
- *Enterprises in automotive services and sales* undertook servicing of new vehicles and restoration and sale of used vehicles.
- *Catering services* included food delivery, fast food restaurants, stalls and eateries.

- *PVC enterprises* included the sale and installation of plastic pipes and piping systems.

Source: Authors

11.4 Results and Discussion

Educational attainment of the employees

Analysis of the educational attainment of 1,490 employees in the 29 firms showed that overall, the four industries displayed a very high level of education of personnel—81% of employees across all sectors had higher education, 9–10% had attained a secondary education and TVET qualification, and only 1% was below secondary. Enterprises in PVC manufacturing had 92% (454 out of 495) of their employees with a higher education qualification, followed by waste management, 78% (415 out of 529), automotive industry 76% (296 out of 391) and catering services, 55% (41 out of 75).

Environmentally friendly practices in the enterprises

On the question, 'What environmentally friendly practices enterprises are followed?' only 11 (42%) out of 26 respondent enterprises had 'green jobs' such as waste water management, renewable energy, energy saving and pollution minimisation. Waste management firms ranked the highest, with seven out of seven respondent enterprises attesting to having such 'green jobs', whereas only two of the four firms in PVC manufacturing claimed to have 'green' jobs and only one out of seven automotive enterprises had 'green' jobs. Only one out of the eight catering enterprises had 'green jobs'. However, environmentally friendly practices were not only restricted to green jobs. This became clear when firms were asked about the various practices, illustrated in Table 11.2, reflecting environmental sustainability at work in the four industries.

Promoting green practices

Respondents were asked to give their perceptions on how much importance they attached to the theme of green skills in their enterprises on a scale of 1 to 10, where 1 meant low consideration and 10 meant high consideration to these issues. Twenty-five out of 29 responses fell under the scale of 6–10. Four enterprises answered between scales 2–5. However, while high importance is placed on 'green skills', there is only a modest promotion of the required skills for the implementation of environment-friendly practices as illustrated in Table 11.3. PVC enterprises employed the highest number of methods for promoting green skills.

Table 11.2 The number of respondents who had a high appreciation of environmentally friendly practices

'Green jobs' in respondent enterprises (11 out of 26)
Green practices (21 out of 64 responses)
• Waste segregation (21)
• Waste management disposal (13);
• No–smoking policy (6);
• Use of biodegradable products (4);
• Followed the 5Ss (Sort, Straighten, Shine, Standardise and Sustain) (3);
• Promoted paperless campaigns (2);
Other green practices (total of 15 responses)
• Paper recycling
• Fuel-efficient vehicles
• Use of safety gears
• Environmental CSR
• Emission reduction
• Switching–off of light sources
• Complying with city ordinances
• Proper utilisation of wastes
• Food safety
• Prohibition of the use of plastics
• Cleanliness
• Material recovery facility
• House rules
• Complying with the Clean Air Act
• Environmental Compliance Certificate (ECC) issued by the Department of Environment and Natural Resources (DENR).

Source Authors

Table 11.3 Promotion of green practices across all sectors (31 responses)

• Marketing strategies to promote cleaner and carbon free products and services (8);
• Incentives in the enterprise for cleaner production (7);
• Procedures of consulting people to advice consumers about environmentally friendly practices (6);
• Brochures and events to disseminate environmental awareness (5);
• Innovation and new technologies adopted (5)

Source Authors

Skill requirements for the implementation of environmentally friendly practices

Enterprises in the four industries described important green skills required for the daily operations undertaken by employees (Table 11.4).

How do the respondents acquire their skills?

The employees in the 29 firms across the four industries acquired their green skills in a variety of ways. Both the automotive and PVC manufacturing enterprises identified all the contexts of acquisition. In the catering services and waste management,

Table 11.4 Skill requirements in the enterprises

Cognitive skills (31 respondents)
• Environmental awareness and willingness to learn—21 (67.74%);
• Undertake system and risk analyses—8 (25.8%);
• Innovation skills to respond to new technologies—2 (6.45%)
Intrapersonal skills (16 respondents)
• Adaptability and transferable skills—12 (75%);
• Entrepreneurial skills. 4 (25%)
Interpersonal skills (32 respondents)
• Strategic and leadership skills—10 (31.25%);
• and communication/ negotiation skills—10 (31.25%)
• Coordination, management and business skills—7 (21.88%);
• Marketing skills—4 (12.5%);
• Networking, IT, and language skills—1 (3.12%)

Table 11.5 How did the respondents acquire their skills? (38 respondents)

- Self-directed learning/informal training—13 (34.21%);
- Company-training—6 (15.78%);
- Hereditary apprenticeships—4 (10.53%);
- Continuing vocational education and training—4 (10.53%);
- Environmental awareness and willingness to learn—4 (10.53%);
- Short-term skills development programmes—3 (7.89%);
- Literacy and basic skills programmes—3 (7.89%)
- Others (exposure to …)—1 (2.63%)

Source Authors

employees acquired their skills predominantly through self-directed training (seven out of eight) and three out of five respectively (Table 11.5).

Benefits of practising green jobs and skills

On the question of *whether including green skills in RVA* mechanisms could be beneficial, responses from 25 firms showed that 36 per cent of respondents expected the recognition of green skills to be beneficial for enterprises. They said that it could improve productivity and make enterprises more competitive. On the other hand, 32 per cent of these enterprises expected green skills recognition to benefit the individual in strengthening confidence and motivation, and in promoting core generic skills, social inclusion, higher earnings and better career prospects. Another 32 per cent highlighted benefits for the country by recognising skills that are environmentally friendly.

The benefits of green practices and green skills were also confirmed by a 2012 survey conducted by the Employers Confederation of the Philippines (ECOP) in collaboration with ILO (ECOP & ILO, 2012) covering three areas (NCR, Cagayan De

Table 11.6 Benefits of practising green skills

Enterprise
• Good for consumers;
• Promote profitability;
• Good for company image;
Employees
• Improve skills and competitiveness;
• Promote decent work;
• Improve health and safety;
• Increase awareness of the importance of ecological conservation;
Economy
• Good for sustainable development
• Generate additional employment.

Source Authors, adapted from ECOP and ILO, 2016

Oro, and Cebu) in the Philippines. Forty-three participants, representing enterprises from manufacturing, food and beverage, land development and real estate enumerated benefits at the level of enterprise, individuals and the nation (Table 11.6).

Reasons for not having 'green' jobs with 'green' practices

This study also examined the reasons for not adopting green practices. The background research by the ECOP and ILO (2012) pointed out the disadvantages of adopting green projects. They were:

- Restrictive in terms of the permitted practices (38 per cent of survey respondents);
- Threat of reducing the profit (25 per cent);
- Causing job loss (13 per cent);
- High start-up costs to implement initially (13 per cent);
- Risk of business shut-downs (13 per cent).

The participants of that project further elaborated that, aside from financial considerations, there is also a lack of awareness and expertise in the Philippines on climate change, environmental issues and green jobs. Additional and appropriate financial and technical support is needed to shift towards green initiatives or launch environmentally friendly practices.

The current study revealed the following reasons why some enterprises did not have green jobs or green practices:

- Lack of oversight due to sub-contracting especially in waste management and automotive, where a lot of jobs are outsourced to external contractors;
- Lack of money to buy expensive equipment. This was mentioned by enterprises in the automotive and PVC manufacturing sectors;
- Presence of policies (i.e. city ordinance) that prohibit the use of environmentally harmful materials, such as plastics, in the case of the catering sector.

Mechanisms for recognising skills, prior learning and work experience in the enterprises

Awareness of RVA frameworks

Very few firms (both employers and employees) said they were aware of the existence and use of RVA frameworks. Only two (1.67 per cent) of 120 respondents said they had heard of frameworks such as the Philippine Qualifications Framework, or other competency-based training frameworks or guidelines prepared by DENR. Only one (0.83 per cent) respondent was aware of a framework developed for human resource development.

Methods used to assess green skills

Only seven out of 30 total responses on methods used to assess green skills alluded to having a job-card system in which employees' skills were documented. The identified green skills were in waste segregation and disposal, energy conservation, and knowledge of environmental laws such as the Clean Air Act and recycling, among others. In terms of the different sectors, six respondents highlighted the use of different methods, as illustrated in Table 11.7.

The green skills that are not assessed include: the theoretical understanding of green practice; research and development; waste disposal and familiarity with hazardous waste products.

Enterprises did not have a systematic use of RVA mechanisms, in the absence of which, four respondents stated, the use of ad hoc examples such as 'mentoring', coaching and apprenticeships acted as approaches to RVA.

Vision for green skills recognition as part of workplace training

Most of the respondents in the four industry sectors talked about their enterprises' increasing initiatives to implement 'green' training programmes for protecting the environment:

Table 11.7 Methods used to assess green skills (six respondents)

Industry	Methods
Automotive services	Recognise the ability to comply with the training requirements set by Toyota Motor Philippines (TMP) and apply them to the dealership
Catering services	Interview to identify if there is knowledge on health and sanitation
	Check ability to segregate waste segregation and serve a memo to non-compliant employees
PVC Manufacturing	Self-evaluation and performance checking
	Internal and external audit
Waste management	Check waste management (oil and water separation)

Source Authors

Box 11.4 Importance of green training programmes for protecting the environment

Automotive sector

- Upgrading automotive technology to meet the demand for fuel efficiency and reduce emissions;
- Providing green customer services;
- Learning to use eco-friendly equipment and materials.

Catering services

- Important for recognising green skills;

PVC manufacturing

- Updating existing training manuals;

Waste management

- Promoting sanitation standards;
- Promoting the systematic collection of waste;
- Promoting more programmes and incentives at the international level;
- Promoting compliance with governmental efforts and standards (i.e. DENR and Laguna Lake Development Authority).

Source: Authors

Prospects of staff training and RVA

In September 2017, the Implementing Rules and Regulations (IRR) for the Philippine Green Jobs Law was signed. Clearly, the potential for the inclusion of the green skills in RVA is great, not only at the macro level but also at the individual level. Enterprises made suggestions on the prospects of improving skills training and RVA as shown in Table 11.8. Only 12 (41.38 per cent) out of 29 firms *cited recommendations for the inclusion of green skills in RPL.* All recommendations called for staff training programmes.

11.5 Conclusions and Recommendations

This chapter, based on research conducted by TESDA, has examined issues pertaining to skills recognition as a tool to improve the environmental and sustainable development in the four industry sectors, namely, automotive, catering services, PVC manufacturing, and waste management.

Table 11.8 Prospects of staff training and RVA (enterprises perspective)

Automotive enterprises
• Training should be free
• Local government units (LGUs) should provide training that emphasises the application of green skills in their working environment
Catering services
• Training on water/liquid disposal should be provided
• Pre-employment training on health and hygiene
• Training on how to follow the guidelines of the Department of Health (DOH)
• Promoting valid health certificates for all food handlers
Waste management
• Green skills training should open possibilities for business
• Green training programmes should present economic opportunities;
• Need to complement the positive perception of green jobs with a concrete plan of transition
• Galvanise governmental and social support towards awareness raising activities
PVC manufacturing
• Training should be not only at the basic level but also at the advanced level
• Training should be imparted to owners of enterprises first

Source Authors

The Green Jobs Law of 2016 has been pivotal in the increase of green jobs and green practices in enterprises participating in this research. Most of the enterprises remarked on the absence of jobs specifically dealing with green practices before the promulgation of this law. Despite this, a huge majority of these firms observed several practices reflecting environmental sustainability in the workplace, such as waste segregation, waste management disposal, and compliance with environmental rules. The importance given to the topic of green skills and environmentally friendly practices is high, especially in the catering sector. However, the promotion of required skills for the implementation of environment-friendly practices is still modest and there is low utilisation of strategies such as the use of brochures and events, innovations, and incentives for cleaner products/ services and marketing.

Interestingly, employers perceived that the creation of green jobs would lead to improved competitiveness of workers, promotion of decent jobs, and additional employment. Some of them, however, cited disadvantages such as a reduction in profit, and increased costs related to the financial and technical support of green initiatives.

Assessment of RPL in some enterprises involves the verification of certificates. In other enterprises, documentation is undertaken with a job-card system while the certification of RPL is carried out by government agencies (e.g., some environmental authority), the mother company, or training institutions.

Employees' green skills included technical, cognitive, intrapersonal and interpersonal skills. Employers appreciated the cognitive skills of their employees, the

most prominent of which were environmental awareness and willingness to undertake green practices. However, both intra-personal and inter-personal competences registered low appreciation from the employees participating in the research.

The enterprises were not knowledgeable about the national RPL framework, and this was evident given the low utilisation of learning outcomes described in the Philippines Qualifications Framework, competency-based training, HRD frameworks and guidelines designed by the EMB-DENR.

A small number of these enterprises have mechanisms to recognise/assess existing green skills that employees acquire in the workplace, community, or through non-formal education and training programmes. There is no systematic use of RPL; rather, RPL is based on ad hoc examples such as mentoring, coaching and apprenticeship.

It was found that employers used simple methods of RPL assessment (i.e. self-evaluation and interview). Through such methods, employers noticed gaps and deficits in the green skills of workers. The areas where these gaps were most prominent were research and development, waste disposal and familiarity with hazardous waste products, among others.

Most workers acquired their skills non-formally or informally through self-directed learning or on the job or in-company training. Only a few workers had acquired their skills through initial and continuing vocational education and training.

Enterprises believed that green skills had a great potential if enterprises, associations and organizations would support their inclusion in RPL mechanisms. Green skills inclusion in RPL needs to be complemented by other elements such as awareness raising, efficient information dissemination, and technical and financial assistance. Such support activities must be implemented through governmental and societal support.

Factors, in order of prominence, contributing to the effective inclusion of green skills in RVA include: laws/ government policies; business opportunities; environmental and economic realities; support/funding/incentives from the government; international conventions; strong LGU enforcement. All these factors are predicated upon sustained information, education and communication (IEC) actions; advocacy; and social marketing.

The passage of the Green Jobs Law, which provides incentives and tax and duty-free importation of capital equipment, makes the potential for green skills inclusion in recognition in the Philippines realisable.

This study, which includes the participation of seven other Asian countries and one Asian territory, should provide valuable inputs in designing and implementing rules and regulations for the recently enacted Green Jobs Law in the Philippines. Specifically, the mechanisms in the identification of green jobs and the attendant green skills leading to the design of training and assessment and certification of programmes should investigate the different models, not only from the Philippines, but also from the international community.

International development organizations can strategically support the development and distribution of learning/ instructional materials – preferably with formats – that can be shared to facilitate massive and immediate learning to benefit the developing economies and the micro-enterprises of/ in the informal sector.

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Part III
Identifying Patterns and Building Blocks in Green Skills Inclusion in RVA

Chapter 12
Increasing Awareness: Good Practices to Promote Skills Recognition Among Micro, Small and Medium Enterprises

Madhu Singh

Abstract This chapter gives readers an understanding of the need for establishing recognition, validation and accreditation (RVA) mechanisms in micro, small and medium enterprises (MSMEs), as well as the ways in which MSMEs support and promote RVA. It is based on research results from 191 MSMEs across four industries—automotive, PVC manufacturing, catering and waste management—in seven countries and one territory. Ninety-eight enterprises were studied in the formal sector, and ninety-three in the informal sector. The key issues investigated through the empirical study were: the need and potential for recognising formal, non-formal and informal learning in enterprises; the mechanisms and processes used to recognise skills; challenges, gaps and concerns regarding recognition in enterprises; ways for promoting and supporting recognition; the inclusion of green skills in RVA mechanisms; the perspectives of enterprises on making RVA a part of staff training and the anticipated benefits of green skills through RVA.

Keywords Skills recognition in enterprises · Ways of supporting recognition · RVA; staff training · Benefits of recognising green skills · MSMEs · Non-formal training

12.1 Introduction

This chapter focuses on the following questions: What needs might motivate employers and employees to learn about skills recognition? What challenges are there for engagement with green skills recognition in the workplace? How do enterprises see RVA in relation to non-formal workplace training or continuous education and training? What building blocks are needed for the inclusion of Green skills RVA in the workplace? These questions formed the basis for understanding the engagement of enterprises with RVA mechanisms for recognising green skills.

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12.2 The Need for Recognising All Learning: Formal, Non-formal and Informal

Most employees in the MSMEs participating in this research said they acquired their skills informally through on-the-job self-directed learning, through non-formal skills training programmes, literacy and basic skills training or through hereditary apprenticeships, meaning that business skills passed down through family members. Figures available from India (see Table 12.1) on the modes of skills acquisition in the enterprises show that enterprises in the informal waste management sector reported a high percentage of employees and employers who had acquired their skills, knowledge and competences through self-directed learning (63.8%), enterprise training (57.4%) and short-term skills training programmes (51.1%). Figures from the Philippines (see Table 12.1), 18 out of 35 responses (62.4%) alluded to self-directed learning, six out of 38 (20.6%) referred to in-company training; four (13.7) out of 38 responses referred to hereditary apprenticeship; another four responses referred to continuing vocational education and training. Finally, three responses referred to literacy and basic skills training.

Beyond the importance of acquiring skills informally, enterprises also highlighted the importance of employees' education and identified an especially close link between education and environmental awareness. In Bangladesh, although workers

Table 12.1 Modes of skills acquisition in enterprises: India and Philippines

	India (N = 47 enterprises)	Philippines (N = 29 enterprises)
Self-directed learning	30 (63.8%)	18 (62.0%)
Hereditary apprenticeship	2 (4.3%)	4 (13.7%)
Enterprise training	27 (57.4%)	6 (20.6%)
Short-term skills development programmes	24 (51.1%)	N/A-
Literacy and basic skills programmes (Below secondary %)	6 (12.8%)	3 (10.3%)
Initial vocational education and training	11 (23.4%)	N/A[a]
Continuing vocational education and training	12 (25.5%)	4 (11.4%)
Total responses	112 responses	35 responses

Source Author

[a] No data were provided under this category

with lower educational levels had technical competences they lacked formal vocational qualifications, which, according to the country study, was a crucial factor contributing to low environmental awareness. Whereas employers, managers, and some employees with higher qualifications were aware of government environmental policies and regulations, workers with less than a secondary education and those without formal vocational training lacked this awareness. According to the Bangladesh country study, workers in the latter category could not state or name any of the relevant environmental policies and/or regulations that their enterprise followed, nor were they able to state any negative consequences of air and water pollution. However, these workers were also among those who felt the negative effects of unsustainable production practices the most, thus potentially jeopardising their health.

There is also a difference in educational levels across industry sectors. According to the Philippines country study, informal sector employees in general had lower levels of education compared to formal sector employees. Results from the country studies showed that education played an important role in facilitating access to jobs, especially in terms of whether the access was to jobs in the formal sector or the informal sector. In Hong Kong SAR, People's Republic of China, the difference between the two sectors in catering was that while informal catering restaurants were often family-run and smaller in operational scale, and often did not comply with labour laws, formal catering restaurants operated under government regulation. Of the formal catering restaurants interviewed, three were part of an international chain who were more inclined to introduce internal policies compatible with the regulations and laws.

With regard to the importance of education, it also emerged that employers considered employees' academic qualifications relevant only when they reflected work-related content and on-the-job training. The Malaysia country study, for example, highlighted that the right technical and vocational education and Training (TVET) linked to special attachment programmes such as on-the-job training, industrial training and vocational subjects could help to promote better job performance in the workplace as well as greater environmental awareness. The right technical and vocational education was important for employees as well as for the productivity of enterprises.

The above findings have shown the high importance attached to acquiring skills non-formally and informally in the Asian context, illustrating the need for making this learning visible as well as the high potential there is for establishing mechanisms for the recognition of non-formal and informal learning.

Even though employers valued competences over and above degrees and diplomas, they also recognised that an educated workforce gave their enterprises legitimacy and a competitive edge over other enterprises with a less educated workforce. It also gave them highly qualified workers who were environmentally aware and in a better position to access a job in the formal economy.

The difference in levels of education shown in Table 12.2 illustrates that many workers lack education or have not had access to education at higher levels such

Table 12.2 Educational levels of employees in enterprises: Bangladesh, People's Republic of China, Kazakhstan, Nepal and the Philippines

Country/territory	HE		TVET	SE	Below SE	Total
Bangladesh	44 (4.5%)		32 (3.3%)	99 (10.2)	799 (82%)	974
People's Republic of China	69 (8.8%)		500 (63.7%)	100 (12.7%)	116 (14.8%)	785
Hong Kong SAR, PRC	26 (8%)		1 (0.3%)	209 (63.9%)	91 (27.8%)	327
India			N/A	N/A	N/A	47
Kazakhstan	12 (47%)		9 (32.2%)	5 (20%)	N/A	26
Malaysia	N/A		N/A	N/A	N/A	48
Nepal	239 (47.7%)		58 (11. 57%)	124 (24.75%)	80 (15.96%)	501
Philippines	1206 (80.9%)		142 (9.5%)	128 (8.6%)	14 (1%)	1490

Source Author

as secondary and vocational education. This deficit illustrates the need for establishing educational pathways. The view was also expressed that recognising technical competences without considering educational background, was not enough for promoting environmental awareness. A broad technical and vocational education complemented with work-related training was highlighted as a prerequisite for higher environmental awareness, improving knowledge about occupational health as well as promoting decent working conditions for employees.

12.3 The Mechanisms and Processes Used by Enterprises to Recognise Skills

Employers may be interested in the educational levels, the credentials and experience of workers and potential employees, but ultimately the most important issues for the employer are assessment and determining whether or not the person can do the job. The purpose of the micro-level empirical studies was, therefore, to find out what recognition practices and processes were available to them and used in carrying out assessments, and thus the ways in which RVA was promoted and supported. Table 12.3 gives an overview of the RVA methods used in enterprises to recognise skills.

In Hong Kong SAR, PRC, with the exception of the formal catering industry, many enterprises had not heard about RVA. Although they did not use RVA mechanisms in the workplace, they believed that RVA could be useful as it would help to recognise and credit prior skills and experience, and therefore help companies save resources on training.

Table 12.3 RVA methods used to recognise skills

Philippines	• Job card to identify green practices such as waste segregation, energy conservation, knowledge of environmental law, recycling (7 out of 30 respondents) • RVA policies, tools and methods (12 out of 26 respondents) • Different methods for testing green skills such as testing TMP training compliance (automotive); waste segregation (catering); self-evaluation and performance checking; internal/ external audit (PVC manufacturing); assessment of oil and water separation (waste management) (6 out 29 respondents)
Nepal	• Upgrade employees based on work experience or duration of their job tenure in the same enterprises • Job card • Coaching; mentoring and apprenticeships
Kazakhstan	• Job interviews • Certificates and degrees checked • Safety practices in the workplace based on instructions checked and put on record
Bangladesh	• Testing competences, skills and knowledge • Demonstration of skills at the time of recruitment • Assessment of occupational health and safety
Hong Kong SAR, PRC	• Basic Food Hygiene Certificate for Hygiene Managers issued either by government or educational or private institutes checked • Certificate in Chinese cuisine issued by Vocational Training Council (VTC) checked
People's Republic of China	• Informal recognition of competences to evaluate employees' competences if they can do the job and have the right values and virtues • Certificates inspected by formal sector employers • Interviews to assess and recognise the professional knowledge mentioned in employees' certificates or resumes • Interviews, demonstration of skills and test methods
India	• Certification of prior experience and results from training programmes

Source Author

By contrast, the usual recognition practices in formal enterprises were to interview employees and to check previous certificates and degrees obtained during training programmes and seminars. In Hong Kong SAR, PRC, at the time of the interview, formal catering companies had a strong preference for hiring people who had gained a certificate in Chinese cuisine issued by the Vocational Training Council (VTC).

There were also some differences across industry sectors in the use of RVA mechanisms. In the People's Republic of China, for example, formal PVC manufacturing companies were more likely than formal catering enterprises to use formal RVA mechanisms. In the catering sector, employers tended to value employees' current practical operational skills as well as virtues and broader competences, paying attention to attitudes and dispositions. They, however, did not care about the employee's

previous learning ability or certifications. When recruiting new staff, most of the SME catering companies said that they adopted the interview, demonstration of skills and test method. Recruiting through friends' introduction was another way.

Four formal PVC manufacturing enterprises in the PRC study were reported to have human resource departments. At the time of recruitment and before providing training, employers in these enterprises assessed skills and abilities of employees by using interviews. The human resource development (HRD) departments were responsible for issuing standards for assessing, recording and documenting skills and competences and were also responsible for assigning work to qualified personnel. Such processes of assessment and recognition were, however, not accredited with certificates but instead internally recognised within the enterprise. The employers from all four PVC small and medium enterprises (SMEs) in the formal sector criticised the lack of a certification authority to provide such certification in the PVC industry. They compared their situation in the People's Republic of China with the USA and countries in Europe, where formal arrangements within enterprises and industrial settings were in place for the certification of professional competences. Employers showed a high level of interest and willingness in RVA and expressed the view that the establishment of recognition processes would greatly reduce human resource costs, save training time, and improve enterprise standards and operational effectiveness.

12.3.1 Challenges and Concerns with Introducing Recognition Mechanisms in Enterprises

There was a difference between formal and informal sector enterprises in regard to the use of RVA methods. In most countries, informal enterprises lacked a systematic or formal use of RVA mechanisms. There was only an 'informal recognition' of employees' practical skills. However, some enterprises reported mechanisms to upgrade the skills of their employees based on work experience or duration of their job tenure in the enterprises they worked.

First, there was a lack of awareness about recognition and its associated processes and procedures. Furthermore, skills recognition was neither known nor understood. Many enterprises were not conscious that a recognition system that was integrated in the qualifications framework of the country or territory existed, implying that such systems were neither understood by enterprises nor promoted by governments. Enterprises were therefore ignorant about the benefits and issues related to their eligibility for RVA processes. The Nepal country study reported that even employees with more than five years of experience did not consider it necessary to have their skills tested, validated and certified through the national system. Bangladesh has an RVA system at the national level, but this system is only being implemented in selected sectors such as transport, electrical wiring, agricultural food processing, catering, garments and information technology. Furthermore, it was reported by

the national expert from Bangladesh that RVAs currently being undertaken through competence tests at registered RVA assessment centres are often attached to only VET institutions, rather than to industries or enterprises.

In Hong Kong SAR, PRC, interviewees in the automotive industry said they had not heard of RVA mechanisms although automotive is one of the industries where RVA has been introduced by the government. The automotive enterprises believed that this could be because an apprenticeship scheme that already existed was used to certify skills. This could have been the reason for not using the RVA system.

Reticence for recognition is another challenge, considering that most employees felt employers were happy with their current competence and that these competences were already visible and trusted by their employers, thus, there was no need for further validation.

The increase in operational costs through the introduction of RVA mechanisms was another concern. In Hong Kong SAR, PRC, a general concern expressed across formal catering enterprises was that the implementation of environmental protection practices would most likely increase their operational costs. Another concern was about the likelihood that RVA would raise the qualifications level for entry into a job. Given the currently low educational attainments of employees in the waste management sector, it was felt that if a certificate became a prerequisite, this could strongly affect the willingness and ability of people to enter the sector. They also worried about an increase in operational costs and requirements for additional human resources and did not believe the use of RVA would improve productivity or strengthen confidence and boost motivation of workers. If no economic value could be gained, the enterprises were not prepared to be in favour of skills recognition or the inclusion of green skills in RVA mechanisms.

12.3.2 Ways for Promoting and Supporting Recognition

Although, in the current situation, jurisdictions have reservations over the inclusion of green skills in RVA, and highlighted several barriers to RVA, few interviewees believed that RVA can be achieved without increased attention from the government to their industry. They suggested several measures that could facilitate green skills inclusion in RVA. Thus, despite the current thinking on green skills as probably increasing operational costs, there was unequivocal support for the need for a strong political push from the government. It was suggested that an awareness campaign for industries and the private sector would help to clarify the benefits of RVA and greening.

In most of the jurisdictions participating in this study, industry sector councils are already playing an important role in promoting and supporting RVA. The case study of the Sector Council for Green Jobs (SCGJs) in India has shown that campaigns helped to mobilise low-qualified workers such as cleaners, casual labour and solar energy installers to take part in their recognition programmes. Counselling and guidance sessions helped as these were organised to lead candidates through the process of

applying for recognition. Workers were told that they would need to spend less time in training programmes. To make it easier for candidates from disadvantaged communities, counselling sessions helped to understand what recognition meant. SCGJ also supported the training of assessors and other RVA staff such as master craftsmen in the methods and processes of recognition.

Overall, while most of the enterprises discussed the presence of barriers to recognition in the enterprises they were also aware of the importance of promotional strategies, practices and materials to support the implementation of effective skills recognition in enterprises.

12.4 The Prospects of Implementing RVA of Green Skills as a Part of Staff Training

Enterprises made several recommendations on how to include green skills in recognition mechanisms. Many of these recommendations related to integrating RVA into staff training programmes especially as this would also support under-qualified workers who had limited access to training and education. Such programmes, they said, should deal with the application of green skills in the working environment as well as take account of economic opportunities that green training programmes could offer. Depending upon the training needs in the sectors, enterprises highlighted particular kinds of training programmes they would like to have. For example, catering enterprises in the Philippines said they were interested in green training programmes that included capacity-building elements to increase awareness of the importance of safe water/liquid disposal, health and hygiene, compliance with health guidelines and certificates for food handlers laid down by the Department of Health.

The seven countries and one territory participating were not interested in lengthy training programmes. In Nepal, enterprises had already introduced the practice of brief orientation training for newly appointed staff before recruitment, or short training courses dealing with ways to operate new machinery as well as information on existing regulations and legislation in the country. However, these courses were neither accredited nor certified.

While enterprises were generally positive about RVA for promoting green skills and green practices, they considered the importance of embedding RVA in training programmes as a crucial step for transitioning towards a greener enterprise. They also considered it necessary to involve governmental and sectoral support wherever activities involved greater understanding and deeper appreciation of issues on sustainable development. As the jurisdictions were in the process of elaborating upon rules and regulations for the implementation of green jobs and a greener economy, enterprises saw this development as an enabling factor in promoting green skills inclusion in RVA not only at the macro level of policies but, significantly, at the level of enterprises and at the individual level.

12.4.1 Cases Where RVA of Green Skills is Being Implemented as a Part of Staff Training

As mentioned above, the Skill Council for Green Jobs (SCGJs) in India integrates RVA of green skills in staff training across several industries and services. RVA processes undertaken by SCGJ entail identifying green job roles and responsibilities, identifying skills gaps, designing training curricula and content based on individual training needs as well as addressing the green skills requirements of national occupational standards and aligning individual competences to the expected outcomes of India's national qualifications framework at different levels. It also develops the capacity for the effective delivery of green qualifications.

RVA is an essential part of green skills training as most of the people who are candidates for SSGJ training have acquired skills in the so-called green sectors such as waste management or renewable energy.

Results from case studies on skills recognition and staff training show that RVA was beneficial in that individuals' skills and competences in enterprises and industries were made visible. Employers and employees became aware and showed interest in recognising green skills versus simply practising green activities. RVA was beneficial for the employees as it made them realise that their recognised skills were transferable and that recognition would help them secure long-term employment—RVA was important for employability in the long-term and not just something helping them to secure short-term employment. They also realised that employability often involves new training and credentials, as well as being able to transfer skills from jobs that were polluting to ones that were greener and had the potential to contribute to a greener environment and society.

In solar energy enterprises, RVA and staff training were able to provide employees assurance about getting a job with the service contractors, giving them an opportunity to become regular employees. Furthermore, avenues were opened for them for employment with other organisations carrying out solar energy installations. Finally, a culture of safety, including personal health while performing their activities, has been implemented. By mapping skills in relation to job roles in qualifications, the recognition process has been able to ensure consistency across all enterprises servicing solar energy.

The two case studies from India underscore RVA in the context of structured training programmes leading to formal credentials. The success of the implementation of skills recognition in India can be attributed to institutional support SCGJ received from National Skills Development Agency (NSDA), the National Skills Development Corporation and the Directorate General of Training (DGT).

Furthermore, through RVA and staff training, the SSGJ has been able to meet the demand for certification coming from employees. Certification is important for employees because it gives them assurance that their skillset is valid and is aligned to structured training programmes based on national standards. RVA is justified on the grounds of the need for education and training especially for low-qualified workers hitherto without access to training. It also helped to open up avenues for informal sector workers to enter formal sector jobs.

12.4.2 The Importance of Linking Staff Training to Business Opportunities

Overall, enterprises felt that it was important for RVA and staff training in relation to green skills to open avenues for economic opportunities. Most enterprises focus on profit and output. Staff training or RVA were often neglected, not because they were thought to be unimportant, but because they were viewed as something that took away time from work and therefore resulted in a loss of profit. Most enterprises organised some form of short training courses on ways to operate new machinery. Introducing workers to new technology and providing information about existing regulations and legislations in the country were some of the main purposes of training in most enterprises in Nepal. However, staff training was neither accredited nor certified, and small business operators, compared to the big multinational industries, were less likely to invest in human resources development (HRD). Micro enterprises hesitated to send their workers for training and orientation programmes conducted by other private providers, as they could not afford the cost.

The case studies highlighted a key difference among the enterprises: small and medium-sized enterprises were more likely to organise staff training and RVA than micro-enterprises in the informal sector. In the People's Republic of China, formal PVC manufacturing enterprises supported training because they believed it improved skills, satisfied the development of their businesses and increased corporate profits. All four catering SMEs had some form of workplace training, and they placed emphasis on the importance of including green skills and RVA in their training programmes. The staff training conducted by the small and medium-sized PVC enterprises dealt with new green technologies. They concentrated on meeting professional development requirements set up by the enterprises and filled skill gaps caused by them not being able to recruit persons with the appropriate skills. Based on the skill gaps identified, there was also a difference between the four enterprises in terms of their specific training objectives. The four SMEs in the PVC sector answered positively when asked if they had workplace learning/ training programmes that helped to conduct RVA. Owners explained that RVA meant that the employers first identified and assessed the previous skills and learning of employees or potential employees before recruiting the candidate in a training programme.

12.5 The Anticipated Benefits of Recognising Green Skills Through RVA

Nepal alluded to the economic growth of sectors such as forestry, waste management, agriculture, building construction, infrastructure development, tourism, transport and food production, thus giving rise to an increase of green jobs and practices. The greening of the economy would make it necessary to adjust the current training and qualifications for occupations as well as introduce mechanisms and instruments

for recognising current and emergent green skills. Furthermore, it was believed that, although there were challenges in setting up systems and processes for the recognition of competences acquired outside the formal system, RVA could be effective if it was a mutually beneficial situation for employers and employees, as well as for both the environment and individual enterprises (Table 12.4).

Many employees could readily identify with the same benefits as employers, such as assurance of a skilled workforce and saving time and money on training that dealt with a duplication of what the workers already knew. However, many employees saw additional benefits, chief among these benefits was the opportunity to access further education and training. This was seen as particularly advantageous for those low-educated workers who currently found it difficult to secure decent work, even though they possessed skills acquired in the world of work. Another benefit was the opportunity RVA provided for not only recognising but also certifying existing skills. Acknowledging and accrediting their skills and previous experiences would improve their career prospects in green jobs, and it would give them a chance to enrol for formal education.

For enterprises, employers and employees alike from all industry sectors highlighted the potential RVA had to increase enterprises' productivity, enhance employability and increase the income of employees. They acknowledged the competitive advantage in the global market through the development and recognition of green skills. They generally accepted the importance of having a greener enterprise as a precondition for environmental sustainability and economic development. Many employers also indicated that they could certify their workforce in green skills only when green job standards were simultaneously put in place. RVA can raise awareness of vocational education and training within an enterprise, and strengthen its culture of learning, and it can have a positive effect on work interactions across the enterprise as it strengthens the expertise of all employees.

For the country as a whole, employers and employees considered green skills recognition through RVA mechanisms would help identify skills required for reusing and recycling waste, create opportunities to utilise limited resources effectively and expand employment opportunities in villages. This was mentioned by employers and employees alike from Nepal, who were aware of the fact that the majority of Nepalese are dependent on locally available natural resources, as well as on the opportunities to preserve and explore various indigenous and traditional skills in the country. For example, they mentioned the need to preserve traditional skills related to the production of chemical-free natural fibre, a practice that has been disappearing due to the overuse of artificial fibres. A greener economy would create additional jobs in several areas such as repair and maintenance of various pollution control devices, waste management, recycling, renewable energy installation, as well as in the area of organic farming.

Most enterprises participating in this study from India agreed that skills recognition was not only a result of the existence of greening practices but that it is a symbiotic relationship wherein skills recognition also largely pushes the demand for green skills and their formal recognition.

Table 12.4 Perceived benefits of RVA

At the individual level RVA can	
Nepal	• Facilitate access to further education and training for the under-educated • Increase career prospects in green jobs given green job standards were also simultaneously put in place • Create a demand for green jobs in the labour market • Enhance employability • Increase the income of employees
India	• Help informal sector workers to attain decent jobs in green industries. This would improve career progression and upgrading of skills of the workers • Facilitate the engagement of experienced practitioners and master artisans from the informal sector as resource persons in future and existing green jobs • Skills recognition and certification would be beneficial to employees in terms of: increases in salary, efficiency in the production process, self-confidence, motivation to save the environment and career prospects
Philippines	• Strengthen confidence and motivation of individuals • Help to develop skills • Facilitate access to education and social inclusion • Improve earnings and career prospects
At the enterprise level RVA can	
Nepal	• Increase the productivity of enterprises • Increase competitive advantage in the green economy
Philippines	• Improve productivity and make enterprise more competitive
People's Republic of China	• Greatly reduce enterprises' human resource costs • Save training time • Improve enterprise standards and operational effectiveness
For the country as a whole RVA can	
Nepal	• Help identify skills required for reusing and recycling waste • Create opportunities to utilise limited resources effectively • Expand employment opportunities in villages, where the majority Nepalese are dependent on locally available natural resources • Create an opportunity to preserve and explore various indigenous and traditional skills in the country • Preserve disappearing traditional skills related to the production of chemical-free natural fibre • Create additional jobs in several areas such as repair and maintenance of various pollution control devices, waste management, recycling, renewable energy installation, as well as in the areas of organic farming
Philippines	• Potentially reduce environmentally negative effects

Source Author

12.6 Summary and Results

The study has filled an important gap in existing knowledge of the need and potential to value and recognise skills within MSMEs in the Asian context. While previous research on RVA has broadly looked at the recognition of prior learning in the educational context, there is much less detailed information on the potential of recognition mechanisms to include skills in enterprises. The findings have shown the importance of acquiring skills non-formally and informally illustrating the potential there is in Asian MSMEs for establishing mechanisms for the recognition of non-formal and informal learning to make this learning more visible and to improve its usability and its positive effect on productivity.

The study further found that employers unequivocally supported the view that an educated workforce gave their enterprises a competitive edge over those enterprises with a less educated workforce. Education also gave them higher-quality workers who were environmentally aware and who were in a better position to access jobs in the formal economy. Even though employers often did not trust educational degrees and would not hire workers unless they had additional work experience, enterprises' views on the role of education and skills acquisition highlighted the potential of recognition mechanisms to also provide workers with possible career progression and education pathways.

On the question of mechanisms and processes used to recognise skills in enterprises, several case studies reported that enterprises, especially in the informal sector, made no systematic use of RVA mechanisms except for some ad hoc examples such as mentoring, coaching, apprenticeships and job card training. In most of the participating jurisdictions, enterprises said that even though they had a system of RVA related to their qualification frameworks, these were not being used. However, some enterprises said they had internal mechanisms to upgrade their employees based on their work experience.

Skills recognition is not a stand-alone process, but is integrated into broader organisational processes such as recruitment, training and competence development. Many enterprises reported that RVA was performed for recruitment purposes using job interviews and examination of previous certificates and degrees obtained during training programmes and seminars. Enterprise-driven RVA for human resource development was mostly conducted in an informal way, such as through interviews and peer learning or simulations, tests and demonstrations for the purpose of improving economic opportunities in enterprises.

On challenges and concerns, only a few of the participating enterprises had established an infrastructure to support the implementation of recognition processes. In only a few enterprises was recognition an established activity mostly embedded in existing recruitment practices. Most enterprises offered few services in support of recognition. Despite the wide array of required skills mentioned by enterprises, these skills among workers often remained unrecognised and thus invisible and with poor transferability.

Including green skills in recognition mechanisms requires commitment and support from several stakeholders, both inside and outside the enterprise. These stakeholders often include sector skills councils, municipal corporations and social partners as well as agencies related to the implementation of qualifications frameworks. In many jurisdictions, green skills recognition is increasingly taking place in relation to green job roles formalised in qualifications frameworks. There is, therefore, a greater awareness that enterprise-based recognition practices are important for promoting alternative progression pathways for attaining a certificate as well as for promoting human resource development to improve economic opportunities in enterprises.

Recognition and certification are important in their contribution to greater self-awareness of workers about the skills they possess and the skills they require. Given that one of the purposes of the questionnaire was to investigate the inclusion of green skills in RVA, several enterprises said that they had RVA policy tools and mechanisms for recognising green skills, but what they were referring to was green job tasks and activities (such as waste segregation) or occupational health and safety, rather than green skills themselves.

Notwithstanding the close link between green practices and green skills, most MSMEs found it difficult to separate the two concepts. Most MSMEs found that the questionnaire aided their understanding of the difference between practices and skills and the importance of translating green practices into green skill requirements. In some jurisdicctions, it was argued that since workers had never undergone a process of assessment or certification, they were not able to understand what green skills they possessed or what specific green skills were required of them. These findings again show the great potential RVA mechanisms can have in contributing to the visibility of green skills, clarifying recognition processes and creating an awareness of recognition processes as stepping-stones to further education and training, career and personal development.

The study highlights important recommendations made by the participating enterprises emphasising that recognition mechanisms for green skills must be integrated into staff training and continuing education and training programmes not only for the few but for the majority of those dealing with the daily processes of economic production and services in and by MSMEs.

Employers and managers strongly supported the concept of recognition as part of a training agenda supported by the government and social partners. RVA supplemented with training meant that skills and competences were identified and gaps in skills and competences were clarified before training was provided. RVA was also an important tool to guarantee demand for the training. There was acknowledgement that green economies need to offer training and career-focused education throughout individuals' working lives. Given the opportunity costs of training, employers and employees emphasised the importance of involvement of government and social partners and external agencies with close relations to the industry in offering continuous reskilling and aiding workers to develop new skills throughout their working lives. MSMEs recommended workplace training that was either provided internally inside enterprises or externally through non-formal TVET providers.

There are tangible benefits of recognition for employees, enterprises and society more widely. Employees saw benefits in terms of their personal skills being recognised, their skill gaps addressed and achieving portable qualifications recognised outside the enterprise. Expected benefits for the enterprise were diverse, ranging from employees equipped with competences that encouraged green behaviour, improved productivity and enhanced business practice and competitiveness—a better-qualified workforce, to meeting the requirements of a quality-management system as well as the regulatory requirements of greener enterprises. Given their limited training resources, enterprises acknowledged the efficiencies that green skills recognition would enable them to achieve such as through the designing of training objectives based on the identification of skill deficits. They were aware that recognition had a potential to improve the productivity of informal occupational learning, which was currently unrecognised. RVA systems would also assist with increasing occupational mobility of workers by motivating them to take part in further education and training activities, which can be lacking among low-qualified workers. Inclusion of green skills in RVA practices would also potentially reduce the negative effects of climate change.

There was not much difference between the perceptions of employees and employers. The same benefits accrued to the enterprise and the individual. It was difficult to separate employer and employee perspectives.

12.7 Concluding Remarks

Despite the challenges there is a huge untapped potential which can be tapped if RVA mechanisms and staff training can be promoted in Asian MSMEs. Simple RVA features such as the establishment of career profiles which contain a record of workers' skills and training and which workers could maintain themselves could be important tools to introduce in Asian enterprises. These tools could make informally acquired learning visible and therefore useable for improving the productivity of the enterprises, promoting the career development of employees or promoting green practices in their enterprises.

Progress in robust skills development in Asia is ongoing, but as it is driven by global needs there is increasing pressure to address training for sustainable societies and development that includes not only the minority who have access to qualifications, but the majority of MSMEs which make up the jurisdiction's economic backbone.

Quick responses from the education system to provide people with the qualifications and credentials to adapt to the changes in the world of work are needed. However, in a world of continuous reskilling and greater self-employment, people may need help with repeatedly moving from one job to another. While formal TVET is good at getting school-leavers into work, it does nothing to help people adapt to changes in the world of work. Our recommendation therefore is to make non-formal training an integral system of TVET. RVA through non-formal training provides

people with the desired qualifications, as non-formal training content is more flexible and personalised to the training needs of small business operators. Non-formal training can be delivered in the form of modules, courses and short segments and yet lead to the acquisition of formal degrees and diplomas.

Inclusion of green skills in RVA requires a coordinated approach between individuals, training providers and employers. Only through a coordinated approach can the several challenges of low-skilled workers be addressed: some may find reskilling expensive in terms of time and money, others may have low motivation. The tremendous learning opportunities offered by the Internet simply do not appeal to everyone. Some employees have poor reading and numeracy skills and low-level problem-solving abilities and poor technological literacy. The answer to upgrading the employability of low-skilled and mid-skilled workers requires a coordinated effort that brings together individuals, employers and providers of education.

The candid insights provided in this chapter into the attainment and recognition of emergent green skills will be beneficial for governments, academics, practitioners, training providers. Important trends and changes that affect industry, the labour market and education have been discussed. Enterprises will benefit from the cultivation of a workplace that encourages and values learning and environmental sustainability.

Chapter 13
Recommendations for Supporting Green Skills Inclusion in RVA

Margarita Pavlova and Madhu Singh

Abstract The analysis of the cases presented in Chap. 2 reveals that the richness of individual experiences, developed through environmentally friendly practices, should be captured in the RVA practices. Based on this analysis, this chapter recommends principles for the inclusion of green skills in the recognition, validation and accreditation of non-formal and informal learning in MSMEs. More specifically, it suggests a multi-dimensional approach (macro, meso, micro) that can be included in lifelong learning policies in the seven countries and one territory that participated in the study, but also to be used more broadly by policy makers. The proposed approach goes beyond narrow task-related skills and knowledge to include value-based behaviour and attitudes that are particularly relevant to green skills. Therefore, this chapter proposes recommendations that address the need to provide broad descriptors of knowledge, skills and competences as well as learning objectives that guarantee the future design and further development of RVA policies and practices based on the new opportunities offered in green economic restructuring and SDGs.

Keywords Green skills inclusion in RVA · Policy instruments · Funding mechanisms · Administrative interventions · Government efforts

13.1 Background

The list of recommendations suggested in this chapter is the result of the analysis conducted in the case studies, using a three-level-approach (macro, meso and micro), as outlined in the introductory chapter. The data from the cases presented in

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Chap. 2 of this book as well as the discussions that took place within the three focus groups with experts from each jurisdiction formed the basis for the development of building blocks and recommendations that aim to guide policy and practice on green skills inclusion in RVA. These recommendations relate to actions that stimulate the greening of economy and formal and non-formal TVET, improve the effectiveness of RVA mechanisms and ensure support at different levels, including micro, medium and small enterprises (MSMEs).

At the macro level, an important starting point in developing the list of recommendations has been the influence of government in integrating the recognition of green skills in economic development strategies such as renewable energy, green infrastructures and ecosystem services and green job growth in enterprises. The emphasis is on enforcing, at the level of country or territory, the political and legislative requirements of green practices in enterprises and green skills inclusion in RVA. Political decisions ensuring the legal basis of RVA in enterprises as well as direct funding, and financial involvement (tax incentives, and carbon taxes) and the governance of green skills recognition will be of crucial importance in promoting sustainable development and mitigating the degradation of the environment. The recommendations also highlight the need for policy instruments to emphasise education and training and the qualifications system in promoting green skills development and skills recognition in small, medium and micro enterprises.

At the meso-level, emphasis is placed on the importance of formalising green/ greener jobs and green skills. Formalisation of green skills and green/ greener jobs through the establishment of new occupational standards and qualifications requirements will help to develop and assess skills required for the labour force to meaningfully participate in green economic restructuring. These standards will be important reference points for new or revised practice. Formalising greener work practices into standards will ensure quality assurance, including quality of input, processes and outputs. On the input side, a growing area of activity around addressing the need for green skills has taken place in the context of greening TVET (technical and vocational education and training), developing green/ greener qualifications and green/greener occupational standards through sectoral bodies such as skill sector councils that are devoted to promoting greening. Company standards measured through ISO quality-management systems are also increasing in importance as they incorporate notions of value chain and skills standards that cut across formal and informal sector activities. Processes will refer to the role of regulatory agencies, inter-institutional relationships and multi-stakeholder partnerships that are important to ensure quality processes in the development of green skills standards and maintaining recognition procedures and tools. Certification and the accompanying entitlements relate to the output side and are an option for individuals and enterprises interested in green practice.

At the micro level, the list of recommendations addresses questions concerning the usefulness of skills recognition for individuals and enterprises, the beneficiaries of green skills recognition. Enabling factors that support the development and recognition of green skills at the micro-level such as relevant information, advocacy, guidance and counselling, training, and financial support are of importance to all organisations (public or private, workplaces, industry, NGOs and community-based organisations, TVET and educational institutions), although the principles target MSMEs.

13.2 Macro Level—Policies and Laws

1. *Government to ensure that the country or territory has a definition for the concept of green skills required for different occupations that is related to green growth strategies and green skills.*

In the face of pressing economic and environmental challenges, green skills are vital to produce a workforce with skills equally matched with the labour market for the sake of improving environmental conditions and combating climate change. It is important to recognise the prerequisite role of having the right skills as an enabler of smoother transition into the green economy. The case studies highlighted that many jurisdictions are, in general, new to the idea of green skills and this led to an urge for governments to promote the inclusion of green skills into their green growth strategic plans. In turn, providers of technical and vocational education and training (TVET) were also urged to promote green skills but often found themselves constrained by the curricula or training regulations. Clearly, green skills should be applied not only to traditional environmental sectors dealing with energy, resource efficiency and environmental services, but should be extended to jobs in all occupations in those sectors that are not widely known for their high carbon emissions or controversial environmental non-compliance, but which can transform existing practices to become more sustainable. This includes sectors such as manufacturing, trade, construction and others, as well as the four industries surveyed. An explicit green growth strategic plan that specifies the types of green skills required for different occupations will be useful in influencing industries, businesses, employers and employees, workers, educational providers and local communities to recognise existing skills gaps and develop strategies to bridge these gaps.

2. *Government to establish legislation on the appointment of a skills development department or industrial body to serve as a comprehensive service point for enterprises and companies in advocating greening in the country or territory.*

Advocating green skills should be an initiative that is taken at the top governmental level in a bid to have far-reaching impacts. It is strongly recommended, therefore, that a new industrial body or existing skills development department specifically look at demand and supply of green skills. The body will need to be familiar with policy, strategy and administration of the qualifications system to provide recommendations to the qualifications authority responsible for implementing recognition, validation and accreditation (RVA) in relation to green skills, on the inclusion of green skills in RVA. In addition, the industrial body will be responsible for conducting studies measuring the impact of green skills recognition on environmentally friendly practices. Hence, the body should recruit relevant green skills experts and advisors who identify the current skills base and anticipate future skills for the green economy. It should also be able to establish close links with enterprises and companies to map the existing green skills gaps and develop corresponding policies and measures. One way is to establish a green skills development board with one person appointed from different governmental departments to sit on this board. Enforcement would signal

a clear and strong commitment by the government and would be a good top-down approach to speed up the development and promotion of green skills.

3. *Develop policies on taxation and financial incentives that are friendly towards the use of green products and technologies.*

Environmental taxes and subsidies can be an effective way to steer the economy in the use of green products and green technologies. Environmental taxes have the function of increasing demand for cleaner alternatives and this in turn can result in making green products and technologies more viable and more competitive. Environmental taxes also give incentives to the private sector to develop greener technologies and drive their adoption by companies. Through tax measures, government may be seen to be directing the market in a prescriptive way; hence, these measures require a lot of research on the types of clean technology to be developed and thorough analysis of the risks involved. Only through such researches can comprehensive policies be developed that fit the purpose of promoting the use of green products and technologies. Taxation and financial incentive policies for promoting green products and technologies should also be highly transparent in terms of their coverage and costs and pay attention to acceptance and ownership by the community and all stakeholders.

4. *Revise existing skills development policies (including qualifications frameworks) in-line with the promotion of green skills and their integration into RVA processes by setting clearly defined targets.*

In an attempt to open up and expand green-specific job markets, promote green skills and support the diffusion of green technology, it is imperative that existing skills development policies be revised to strengthen vocational and professional training in green skills. The targets of skills development and skills recognition should be able to address demand and supply of green skills, skills upgrading and development of emerging green skills needed in the future. The policies should also include upskilling for those mid-career employers who will need to adopt environmentally friendly practices or adapt to greener working practices. Based on previous UNESCO publications that have discussed the importance of linking recognition practices to qualifications frameworks, it is suggested that existing skills policies explore further the ways in which recognition of prior green skills acquired through non-formal and informal learning can be credited to lead to formal qualifications. Skill policies should centre on revising existing curriculum and training standards, mobilising public–private partnership in green skills training, incorporating green skills in RVA mechanisms and linking RVA to different key stakeholders, including TVET institutions and providers, education professionals, employers and employees as well as industry and labour associations and associations of small and micro enterprises.

5. *Develop a government policy together with industry and employer associations aimed at recognising RVA within enterprises (e.g. online portfolios).*

Inevitably, the promotion of green skills can be enhanced within enterprises via the development of RVA mechanisms and tools such as job-cards and different portfolios. The RVA process should validate workers' competences and practical work

tasks as well as provide upskilling opportunities to close the skill gaps. With the understanding of the current context in which there is no international classification of green jobs against which green profiles can be measured, RVA tools and mechanisms could, in the future, map existing skills against environmentally friendly practices and skills recommended for different occupations. This initial mapping would show that the workers could fulfil at least half of the requirements for the further validation process to be meaningful; if not the main alternative should be to take the full training programme. The recognition process would lead to the documentation of attainments leading to either a full qualification or partial qualifications i.e. a statement of attainment. Alongside the recognition policy and process, the government needs to build a close relationship with industry leaders, enterprise associations and labour unions to address the challenges of integrating RVA into human resources and career development. RVA tools and mechanisms need to be used in enterprises of different sizes both in formal and informal work settings.

The policy should also stipulate a need for a branding strategy that promotes the country's or territory's qualifications frameworks in combination with the inclusion of green skills recognition in the framework. The government should take up a role to have a frequent and close dialogue with industry to enhance the public image acceptance of the qualifications framework by different stakeholders. The RVA policy should also focus on providing enterprises and companies with information about the different qualification levels that use green skills in the description of their levels and job tasks.

6. *Government to consider providing incentives for green(ing) TVET institutions through grants and additional funding.*

It is imperative to harness the potential of TVET for delivering green skills training and provide education tailored to the needs of all industries. This is only possible if governments increase the provision of support and incentives through grants and funding to TVET institutions for them to adopt a holistic approach for greening TVET, including adjustment of learning outcomes to accommodate and incorporate green skills into different subjects and learning activities.

7. *Governments to consider simplifying approval processes for enabling greening of economy.*

Greening of industries requires concerted effort and unanimous support across a diverse range of government departments, from environmental departments to labour, education, innovation, and economic departments. However, inter-ministerial/ departmental collaboration cannot alone reflect the true complexity. For example, the systems of governance in the People's Republic of China, Malaysia and India are very complex. In these countries, the division between central/ federal, state and local governmental levels has meant that both the relationships between different ministerial departments on the one hand and the extent of decentralisation on the other, have huge impact on the efficiency and flexibility of any policies, including climate and environmental policies, propagated and adopted. In addition, simplification of the approval processes (if applicable) when the industry wants to green its facilities or

operations is crucial. Establishing a clear structure (or decentralising the management of green skills implementation to a specified body) is expected to simplify approval processes and effective monitoring of implementation. By minimising conflict of interest among different government departments, increased efficiency in the implementation process as well as better communication and coordination for greening the economy can be expected.

8. *Governments to recognize RVA certification as a means to increased salary of employees and workers to be reflected in salary scales (to stimulate recognition, validation and accreditation).*

As discussed in the previous chapters, mechanisms for RVA can serve as a significant stimulus for individuals to realise their labour market suitability or employability in the context of greening economy and skills. In an attempt to further stimulate the introduction of RVA schemes, a RVA certification that provides a monetary reward for workers' years of experience, completed training courses and acquired skills can help job satisfaction, career progression and self-confidence. Legislation that ties certification through RVA with salary can greatly benefit workers as it enables certified, competent and experienced workers to benefit from salary rises and greater security of earnings. Enactment of such legislation can facilitate a change in the mode of employment, enabling workers to shift from part-time to full-time jobs. It can offer them better opportunities to move up the career ladder, from lower positions to senior management levels. It can also help them to change from precarious informal sector work to less precarious and more decent jobs in the formal economy.

9. *Ensure that recognition, validation and accreditation (RVA) mechanisms are based on occupational standards that incorporate green skills.*

There should be occupational standards that set out skills and knowledge and outcome standards that employees are required to attain in different industrial sectors across MSMEs. For example, in the People's Republic of China in 2011, a letter of intent was signed with Guangdong Occupational Skill Testing Authority on benchmarking occupational standards in the national qualifications framework. It was decided to establish an RVA system based on occupational standards that specified the number of qualifications under the qualifications framework requiring green skills as well as associated green skill education and training.

13.3 Meso Level—Advocacy and Support

1. *Ensure that agencies responsible for analysing existing laws and regulations can also ensure that formulated requirements for workers are included in occupational and certification standards as well as teacher training standards, and are linked to RVA mechanisms (Examples: sector skills councils or inter-sectoral organisations or other regulatory agencies.).*

As stated in Sect. 13.1, there is a need to establish a new industrial body or reform the existing agencies that focus specifically on green skill development within the qualification framework of the country or territory. For example, the body can be a council or agency formed by sector skills councils and other cross-sectoral organisations. The agency needs to have a sound knowledge of policy, strategy and administration of qualifications systems and RVA mechanisms in the country or territory for enhancing green skills diffusion into the framework. It also needs to be able to analyse existing environmental laws and regulations that are relevant for different industries in order to ensure that they are reflected in RVA, green skills training and occupational and certification standards. The agency should be able to have the function and authority to recommend or refine environmental laws in accord with preferred industry practices.

2. *Use existing mechanisms or develop new ones to include green competences in occupational standards.*

Establishing and administering occupational standards within a country or territory is usually conducted via accredited industry committees or well-recognised skills councils. For green competences to be fully incorporated into occupational standards and receive certification through RVA, the following steps are suggested:

- develop green competence standards through the joint participation of government, industry experts, associations of enterprises and TVET institutions, and social partners (employer and employee associations);
- develop assessment tools for green competences;
- gain approval from education and training and qualifications authorities;
- ensure the accreditation and registration of green training programmes;
- ensure accreditation of assessors and assessment centres;
- conduct competence assessments;
- ensure that all certificates relating to green skills are issued by accredited awarding agencies.

3. *Use media to advocate green/greening initiatives undertaken by government and industry.*

Mass media has a central role to play in promoting environmental awareness and education. Strategic communication processes are imperative to achieve the best result in terms of green skills inclusion into different occupations. Yet, areas such as ‘greening industry’, ‘green skills’ and ‘green economy’ are reported as not being widely discussed at the local level, and we found little awareness about them in the studied countries and territory. This implies a poor public understanding of the significance of greening jobs and greening vocational and professional education systems. To focus on such issues, the media should enlighten people on greening initiatives in the country or territory, create or help shape an environmentally friendly ideology that can mobilise the public to reduce pollution and mitigate the bad effects of climate change, affirming thereby the significance of mass adoption of green skills in workplaces and enterprises. Media should keep people up to date on the latest green policies and take up a surveillance role in order to keep track of governmental process

on inclusion of green skills into the RVA mechanism, as well as monitor and promote green training offered at TVET. Mass reporting on successful case studies of green skills adoption in the world of work needs to be taken up by media. Government and industry as well as associations of enterprises need to also play a proactive role in interacting closely with media in order to bring to its attention good practices in MSMEs.

4. *Advocacy programmes for enterprises should be designed for creating awareness of potential environmental dangers.*

In the light of the global recognition of attaining the goals of sustainable development, it is necessary to design advocacy programmes for enterprises in order to create awareness of potential environmental dangers. In the past, most enterprises have put an emphasis on economic activity that bring profits and have neglected negative impacts on the natural environment. Those enterprises have been responsible for polluting the environment and intensifying climate change, ignoring the fact that their practices threaten lives and put an extra cost to enterprises' operation and to society as a whole. To attain the goals of sustainable development and alleviate environmental problems, advocacy programmes are essential for enterprises. They should be designed in such a way to create awareness of potential environmental dangers. Such awareness can have the effect on enterprise of leading them to allocate more resources to green jobs and reduce their negative environmental impact. This is expected to result in a greater recognition and understanding of green skills and competences, which in turn will provide a more bottom-up approach to green TVET.

5. *Establish a platform for green skills competition and awards for successful green enterprises.*

To encourage enterprises to practice environmental friendly practices and to introduce more green jobs, it is necessary to establish platforms that recognise and reward the achievements of green enterprises. From an economic perspective, green skills and competences may reduce costs incurred by enterprises, as green skills often help to minimise the use of resources, reduce water and electricity bills. However, this connection between actual environmental practices and the reduction of costs to enterprises could be enhanced through further incentives such as through the establishment of awards for environmentally friendly practices. Establishing platforms for green skills competitions and awards for green enterprises could be an effective way of motivating enterprises to put more resources into developing green jobs and environmentally friendly practices. As well as being recognised as a green enterprise, they will also fulfil their social responsibility.

6. *Skills councils to develop specific guidelines for enterprises to support green practices, clarifying concepts of green skills (including not only technical knowledge and skills, but also holistic generic skills—cognitive, inter-personal, intra-personal skills and attitudes) and RVA.*

A recurring issue in the area of green skills emerging from the countries and territory participating in this research is not merely the focus on conventional environmental

industries such as waste management and renewable energy, but also the emphasis on greening of other industries or trades such as catering, automotive, or PVC. For smoother and easier adoption of green practices at workplaces, specific guidelines for enterprises can be very useful. Guidelines can be specific to different industry sectors, making them more relevant for workers to apply in their daily practices. Skills councils should also address the issue of limiting green skills to technical knowledge and skills. Instead, they should promote other green skills such as generic green skills that include attitudes, behaviour, cognitive, inter-personal, and intra-personal skills pertaining to greening the environment. Skills councils need to interact with different industries as well as the public on merits of RVA mechanisms and on how inclusion of green skills into RVA would be beneficial for workers.

7. *Industry associations to collect a levy to be used by individuals to pay for their RVA process.*

For jurisdictions with high unemployment and low emphasis on human resource development at the level of enterprises, a skills development levy serves as a training and education incentive for employees and highlights the importance of promoting a skilled workforce. Since voluntary investment in enterprise training is generally not the case in the participating countries and territory, putting in place a regulatory framework such as a levy scheme would be expected to be more effective in ensuring that industry and enterprises invest in training employees. The levy can be used for implementing RVA processes as they involve resources and time such as information dissemination, guidance, portfolio development, documentation of evidence and verification, coordination, mapping, competence assessment and follow-up. Since RVA processes should not be for profit, the fees could be determined according to the assessment methods used and the level of qualifications to be attained. To encourage companies/enterprises to engage in the training and education of their employees, it will be important for industry and enterprise associations to offer incentives by collecting a levy from companies to support individuals to pay for the RVA process. The levy can also help unemployed and youth to improve their skill-sets.

8. *Financial institutions to provide financial incentives or advantages to greening of enterprises.*

The financial sector needs to take responsibility to help in accelerating the transition towards a low-carbon economy, given that products, services and investments in the economy are directly linked to the lives and futures of individuals, businesses and society. While effects of environmental pollution and lack of sustainability are beginning to emerge, there appears to be a growing awareness that minimisation of negative environmental impacts is a business responsibility. In this context, it will be important to highlight the role that banks can play in providing loans with favourable interest rates and better terms to enterprises to green their operations, services and products as well as create a market of green jobs. So far, most enterprises in our study have been reluctant to invest in green initiatives. However, this could entail the danger of losing the environmental or social missions to the economic mission of enterprises. To avoid this from happening banks could step in to provide low-interest loans to

help businesses, especially MSMEs, to initiate energy efficiency retrofits, develop new innovative and eco-friendly products and services, thus helping to contribute to greening the job market. To ensure green finance, the financial sector, especially banks, needs to be knowledgeable about environmental issues, incorporating environmental risks in their asset-allocation decisions. There is also a need to build the confidence of banks for lending money to greening initiatives and projects (that can be partly supported by government).

9. *Local government to provide financial incentives to companies involved in greening.*

While banks are one of the sources of green funds, governments should also provide financial assistance opportunities in the form of tax credits, subsidised loans or grants to businesses to support green initiatives at the company/ enterprise level. Incentives from governments can be in the form of loans or payback schemes whereby taxes are waived for businesses who have invested in energy-saving practices. In the United States, for example, similarly to incentives by the federal government, local governments offer tax credits to industry and manufacturers in the areas of energy efficiency improvements, use of electric cars, installation of renewables, as well as tax deductions if companies meet green standards. It is suggested that loans or incentives should be extended for introducing RVA mechanisms in companies/enterprises as well as for staff training.

10. *Translation of 'greening laws' into local regulations/ ordinances and the monitoring of their compliance.*

Environment-related laws need to be properly recognised at the ground level and thus supported and incorporated into local regulations for enforcement. The local body should be authorised to monitor the compliance of green laws and regulations and should design penalties for non-compliance.

11. *National authorities/state bodies together with associations of enterprises, sector councils, employers and employees' associations should consider making an RVA certificate a prerequisite for employment of workers who lack certification showing that they have generic green skills, among other skills.*

Employees without generic green skills are a huge impediment to efforts in greening industry and the economy. Therefore, it is necessary to be clear about what generic green skills need to be incorporated in RVA and green skills training. As suggested in Chap. 1 on green skills, these need to include:

- cognitive skills such as environmental awareness and awareness of green laws, willingness to learn about sustainable development, innovation skills to identify sustainable opportunities and create new strategies to respond to green challenges, strategic and leadership skills to bring about green change in companies;
- inter-personal skills such as management, marketing and business skills to develop strategies that target economic, social and ecological objectives, and consulting skills to advise managers, co-workers and consumers on green solutions and green technologies;

- intra-personal skills such as adaptability and flexibility towards new changes and awareness of the green laws should be included in the green skills training programmes;
- technological skills such as quantification and monitoring of either waste, energy or water, minimisation of energy, water and materials used, environmental risk management, etc.

To make a difference in the generic green skills levels of employees, government bodies must work with skills councils and industry and enterprise associations to explore the opportunity to make an RVA certificate a prerequisite for workers who have never attained a formal certification before.

12. *Industry and employers' associations and trade unions should develop RVA guidelines to reflect greening of enterprises and supporting them in promoting green skills of their employees through RVA.*

Guidelines developed by industry and employers' associations will support MSMEs in reviewing their operations and identifying areas for improvement in relation to greening and skills necessary to implement change. During recruitment and induction processes for new employees MSMEs' or SMEs' associations should organise short training courses on greening operations, skills and attitudes required and explain the ways these skills can be recognised via RVA. This training should be also available for existing employees.

13. *Green skills inclusion in the quality-management system of enterprises (ISO 9001) or other quality-management initiatives.*

To speed up the inclusion of green skills into workplaces, it is proposed to reap the benefit of international occupational standards by incorporating green skills under ISO 9001 or other quality-management initiatives. Many businesses apply for an ISO licence as this gives their company or enterprise a higher credibility and recognition in the international context. The goal is to help businesses to become more efficient and improve customer satisfaction. If RVA of green skills were to be included in ISO 9001 or some other quality-management system, it could ultimately drive the global market to go green, as companies would be required to meet the compliance of the ISO standards to attain certification. Inclusion of green skills into ISO standards not only promotes its mass adoption, but also allows companies to identify major risks and develop appropriate green solutions through greening skills and their inclusion in RVA mechanisms.

14. *TVET regulatory bodies as well as associations of TVET institutions and TVET providers should mainstream green skills and practices in TVET in view of steering graduates towards jobs that incorporate green practices in both rural and urban areas.*

In the light of the increasing importance of sustainable development, many sectors and industries are in the process of transitioning to greener practices. This research has found that there is a huge potential for greening jobs in the informal sector,

in such industries as catering, manufacturing and automotive. In order to include TVET in a holistic greening strategy for society and to supply qualified talents to green jobs and occupations, it is imperative for TVET regulatory bodies, associations of TVET institutions and TVET providers to mainstream green skills and practices into education and training programmes. In addition to fostering the development of green skills, this will motivate students to contribute to greening the economy in both rural and urban areas, and facilitate the transition to green practices.

15. *Establish model green TVET institutions to raise awareness among stakeholders the benefits of adopting green practices in the TVET sector.*

The TVET sector can explore the opportunity in establishing model green TVET institutions with a holistic approach for greening, including generic green skills and specific green skills training programmes/provision across different disciplines. The training programme or study course can line up with industry partners in delivering the training outcomes. These pilot training programmes allow industries and students to address environmental opportunities, and students can be well informed of any updated green initiatives inside the business. The model TVET institution will create a positive impact in mobilising stakeholders and members of society to understand the merits of adopting green practices and drive the greening curriculum within TVET sectors in the region.

16. *Support greening of TVET through international cooperation and knowledge-sharing.*

To enhance the greening of TVET around the world, international organisations should facilitate knowledge transfer and sharing of experiences. In facing threats of climate change and other serious environmental issues, the importance of greening TVET has been widely recognised over past years. However, the knowledge base and resources on greening TVET in different jurisdictions may differ. For instance, research into and practice of green skills development in some jurisdictions lags well behind that in others, thus hindering greening processes. Therefore, there is a need for international cooperation to facilitate TVET greening. Through international cooperation, best practices could be widely shared, particularly, by means of online resources. These can support TVET institutes from different jurisdictions in effective design of their own curriculum and teaching materials, and adapt them to their peculiar local contexts. Such examples of international cooperation have already started taking place, including at UNESCO-UNEVOC International Centre for TVET as well as the Colombo Plan Staff College, which are respectively an international organisation and a regional inter-governmental organisation that have begun to provide platforms for international cooperation in the APR and globally.

13.4 Micro Level—Implementation and Benefits

1. *Ensure that real benefits, through the inclusion of green skills in RVA, will increase over time for both workers (better incomes, decent work, and career mobility) and employers (productivity, profitability due to the use of green technology).*

To protect workers' jobs and livelihoods in the informal sector as well as to enhance their working conditions through the creation of decent green jobs, it is imperative to include green skills in RVA. In the light of the growing importance placed on greening the economy and promoting green growth, many new jobs and occupations are expected to be created in informal sectors, such as catering, manufacturing and automotive. In many of these new jobs and occupations, the demand for workers with requisite green knowledge, skills and competences is growing faster than the supply, often because the education and training system is not responsive. With the inclusion of green skills in RVA, workers in the informal sector can be helped by complementing the recognition of their previous learning, skills and work experience with short topping-up training in green skills, which can then lead to certification of their skills. This official (certification) as well as social recognition (decent green sector jobs) will protect workers in their jobs as well as be advantageous in raising their incomes, improving their working environment and facilitating their career mobility. The certification of skills of workers in the informal economy needs to be undertaken in relation to skills standards in the qualifications framework of the country or territory as this will, apart from leading to raising environmental standards, give workers the security that the outcome of the recognition process is equal to a recognised standard and meets the skill demands of employers. It also improves their employability in the formal economy as well as promoting their continuing education and training.

2. *Ensure that businesses, companies and organisations understand the certification and qualifications system of their country or territory.*

Associations of industries and enterprises as well as local governments are advised to offer training and seminars to help relevant parties so that they may gain a thorough understanding of the existing certification system. The human resource department, for example, should brief management and employers as well as workers on how the company is to implement RVA. It should explain the merits of undergoing the recognition process. It is essential for enterprises and companies to have strong ties with associations of companies/enterprises and industry as well as government bodies so that the recognition process meets the green skills demands of employers and industry.

3. *Encouraging enterprise-based learning for promoting compliance with environmental rules and regulations, and for promoting orientation and training programmes for employees on existing policies, acts, rules and regulations as well as their relevance to green practices and green skills.*

Capacity building and knowledge transfer are crucial elements for greening enterprises. In order to protect the environment and conserve resources, enterprises have to comply with various environmental rules and regulation. Thus, it is critical that employers and employees comply with rules and regulations and adopt environmentally friendly practices at work. Since employees seldom voluntarily opt for training programmes, it is essential that enterprise-based learning be provided to all employees in the form of orientation and training programmes. With these programmes, employees who have never received green education will have the opportunity to update their knowledge and develop green skills and attitudes, as well as learn about related policies, acts, rules and regulations. Such training aims to result in greening enterprises and enhancing compliance with environmental rules and regulations. Very often, formal training is not responsive to the market realities and skill requirements in enterprises. For this reason too, it is important to promote enterprise-based learning.

4. *Defining roles and responsibilities of staff and workers in bigger companies for greening.*

For bigger companies, a well-designed greening strategy has to be set up, with the roles and responsibilities of staff clearly defined, so that an effective green operation can be achieved. At the executive and management level, a holistic greening strategy should be set up, with policies and regulations tailor-made for each industry sector and work level. Furthermore, the goal of this strategy should be clearly identified, so that the executives and managers can reflect and review progress. Managers and supervisors should have methodological systems and evaluation processes for identifying and recognising green practices and behaviour of employees. Moreover, they should identify and analyse other potential needs/ demands/ requirements for green skills, in order to support the greening strategy of the enterprise. Human resoures departments should offer informed guidance in the area of RVA and develop flexible methods for the recognition of green skills, so that workers' green skills can be effectively recognised and used in enterprises. Moreover, with these methods, they can assess and hire employees in accordance with the enterprise's greening strategy.

5. *Occupational associations and NGOs should take responsibility for implementing RVA in micro enterprises within the informal economy.*

As most micro enterprises in the informal economy lack the resources and capacity to conduct RVA, it is suggested that occupational associations and NGOs should take up responsibility for implementing RVA in micro enterprises. As mentioned above, it is important to include green skills in RVA mechanisms. This can benefit workers in several ways. Recognition does not only mean official recognition, but recognition of the person whose knowledge has been validated, who is admitted for a training programme or who is recruited for a more decent and dignified job, e.g. in the waste management sector, or who becomes employable for a better job in the formal economy. All these benefits could be important for strengthening self-confidence. Very often, formal education and training is not responsive to the demands of the informal economy. For this reason, work-based training is necessary.

These programmes should include both further learning opportunities based on prior learning assessment as well RVA related to certification. Given the small scale of operation of micro enterprises in the informal sector, the inclusion of environmental and resource conservation concerns within micro enterprises needs to be incorporated into the overall greening strategy of the particular industry sector or within a regional greening strategy of a group of micro and small enterprises. Occupational associations and NGOs should take responsibility for implementing RVA in these enterprises: for instance, they can provide advice and consultancies so that these enterprises can implement RVA adapted to their own context.

6. *Include green skills in non-formal educational programmes for low-qualified and marginalised workers.*

The study established a need for the development of green skills in the informal sector, in such industries as catering, manufacturing and automotive. As a majority of workers in the informal sector are low-qualified and marginalised, it is necessary to conduct green skills training as part of a non-formal education or training programme or follow-up RVA with education and skills training. It is crucial to make participation in non-formal education and training as attractive as possible. All RVA processes within non-formal training should centre on assessment in terms of an extent to which they motivate participation in further education and training. It is important that when education and training programmes are being put in place, a particular focus should be on progression. Training providers need to be able to advise candidates, to mobilise, counsel and register them, to facilitate assessment, offer skill gap training and to complete the certification process. Training providers need to facilitate such individuals to acquire the full qualification through tailor-made bridge courses.

As already mentioned, the benefits of RVA should be made visible to the workers in terms of improvement in their working conditions, and in terms of enhancement in their incomes. Furthermore, with these green skills, low-qualified and marginalised workers will be able to develop environmentally friendly practices in their work, so that resources can be conserved and environmental problems alleviated.

7. *Implement tax reductions and penalties, to ensure that regulations are met by the companies and incentives are in place to reduce environmental impact through greening of operations.*

The use of incentives can motivate enterprises to adopt environmentally friendly practices and reduce their environmental impacts. Generally, the ultimate goal of a company is to maximise their profit: an emphasis on increasing production can often result in environmental problems. Thus, enterprises should be aware of government incentives and use them to adopt greening in their operations. For instance, companies that meet regulations can receive tax reductions, while those companies who cannot meet regulations will be penalised. As a result, companies will be motivated to meet regulations and protect the environment, to reduce their cost.

8. *Include greening of MSMEs into social responsibility programmes.*

MSMEs should put greening at the heart of their businesses and this can be supported by the corporate social responsibility programmes of bigger companies. Corporate social responsibility requires companies to minimise environmental and social risks as part of the supply chain management. It is about sharing business values with the community. In terms of making a difference to the community, big companies should make use of their resources and experiences to guide start-ups and MSMEs on how to green their businesses. Most mega-companies publish their annual business reports, some of which cover their environmental and social effort. Such communication channels to the public and to other companies can drive continuous improvement in the journey to a low-carbon economy.

13.5 Conclusions

The above list of recommendations is based on principles and enabling factors identified through the research study reported in this book. The recommendations demonstrate that the inclusion of green skills in RVA mechanism requires a complex, multifaceted approach that expands over three levels and is not limited to questions of RVA methodology, techniques, tools and instruments, but rather acknowledges the existence of policies, frameworks and standards for both greening of economies and skills and RVA, and the relevance of recognition arrangements and their usefulness to the end-user in the workplace. The recommendations also highlight that there cannot be sharp boundaries between the three perspectives—macro, meso and micro. A systemic approach is useful for reflecting on the practice of green skills and RVA activities not only for the individual and the enterprise but also for industrial sectors and for society as a whole.

Principles presented at these levels are closely related, and activities suggested by these principles should support each other. However, this three-level systemic analysis and the resulting list of recommendations serves both, a theoretical understanding of the enabling factors that can facilitate the inclusion of green skills into RVA as well as approaches that can guide practical applications. These principles can serve as a benchmarking tool for a country's or territory's evaluation and strategic development plan in support of greening, green skills development and RVA.

Appendix A
The Questionnaire

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1. **General information**
2. Name of respondent and position (e.g. CEO/Executive Director/Manager/…)
3. Name of enterprise
4. Nature of the enterprise (please tick below or circle the appropriate description)

Formal sector (regulated by labour laws)		Informal sector (deregulated) sector	
Catering		Catering	
Automotive		Automotive	
Waste management		Waste management	
PVC manufacturing		PVC manufacturing	

5. Number of employees
6. Educational levels of employees

Educational level	Number of employees at this level
Higher education	
Particular level of vocational education and training	
Secondary	
Below secondary	

7. Type of products and services offered (use extra page if required)
1. **Policy and Regulations**
8. Are employers and employees aware of environmental regulations for your industry sector?
9. Can you name regulations and/or policies that you follow?
10. Who is responsible for setting these regulations and policies?

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11. Who is responsible at your enterprise for implementing/monitoring these policies?
12. How is your compliance assessed and by whom?

2. **Concept of green skills/greening of skills**

Green skills/greening of skills help to reduce the negative effects of economic activities on the environment.

13. We would like to know how much importance is attached to the theme of green skills and environmental-friendly practices in your enterprise. Could you rate yourself on a 1–10 scale:

Rating: 1……2……3…….4……..5……6……..7……..8……..9……..10.

1: We do not take these issues into consideration when we organise our practices	10: We pay close attention to green skills and environmental-friendly practices and are adjusting our practices accordingly

14. What are environmental friendly practices at your enterprise? We have introduced:

    a. Rules and regulations in the following areas: ……
    b. Positive environmental work practices and the standard required to:

        – follow workplace procedures to minimise environmental impacts;
        – minimise and dispose of waste in an environmentally responsible way;
        – use non-renewable resources responsibly and reuse them where possible;
        – record data relating to environmental risks, impacts and management.

    c. Brochures and events to disseminate environmental awareness. By environmental awareness, we mean the following: ……
    d. The following innovations and new technologies for cleaner production and cleaner transportation. This is what we understand by ‘cleaner’: ……
    e. The following incentives in the enterprise for cleaner production, services and trade: ……
    f. The following marketing strategies to promote cleaner and carbon-free products and services: ……
    g. The procedure of consulting the following people to advise consumers about environmental practices.

15. What is being done in your company about promoting skills required for the implementation of environmental-friendly practices? We have introduced:

    – Rules and regulations related to green skills/greening of skills;
    – Brochures and events to disseminate environmental awareness (generic green skills);

- The following incentives in the enterprise for learning new skills required for new green technologies and practices: ……
- Courses required for developing specific green skills (technical skills);
- Courses required for marketing strategies to promote cleaner and carbon-free products and services;
- Other (please specify).

16. Do you have jobs in your enterprise that deal with green practices (such as waste and water management, renewable energy, energy-saving and pollution minimization)? Please describe.
17. If you are not using environmental-friendly practices, please provide reasons.

3. **Skill requirements in the enterprise**

18. What skills/competences (interpreted in a broad sense) are required to sustain environmental-friendly practices in your enterprise?

Cognitive competences

a. Environmental awareness and a willingness to learn about sustainable development;
b. Systems and risk analysis skills to assess, interpret and understand both the need for change and the measures required;
c. Innovation skills to identify opportunities and create new strategies to respond to green challenges.

Interpersonal skills and technological skills

a. Strategic and leadership skills to enable policymakers and business executives to set the right incentives and create conditions conducive to cleaner production, cleaner transportation, etc.;
b. Coordination, management and business skills to facilitate holistic and interdisciplinary approaches that encompass economic, social and ecological objectives;
c. Communication and negotiation skills to discuss conflicting interests in complex contexts;
d. Marketing skills to promote greener products and services;
e. Networking, IT and language skills to enable participation in global markets; consulting skills to advise consumers about green solutions and to spread the use of green technologies;

Intrapersonal competences

a. Adaptability and transferable skills to enable workers to learn and apply the new technologies and processes required to green their jobs;
b. Entrepreneurial skills to seize the opportunities of low-carbon technologies.

Specific skills (e.g. use of specific equipment; following specific practices; application of new technology and processes required for the new task).

Attitudes (e.g. adaptability, environmental, social, cultural sensitivity and enthusiasm).

Behaviour (e.g. participation in projects and tasks, working with others and taking part in courses).

19. When you recruit people, how do you assess their suitability?

    – by checking their qualifications stated in certificates;
    – by interviewing;
    – by asking to demonstrate skills;
    – by testing knowledge;
    – by recognizing prior expertise that has not been stated in certificates;
    – other (please specify).

4. **Recognition of prior learning (RPL)**

20. Do you have mechanisms to identify, document, assess, recognize and certify skills that your employees have attained through achievement and performance in the workplace, community, artistic or other life activities, as well as learning through non-formal workshops, conferences and training programs?
21. Do you have employees who have RPL certificates?
22. If these certificates were not issued by you, what organizations did issue them?
23. In what ways RPL is used at/helpful for your enterprise and why?
24. Do you have a job-card system in which employees' skills are documented?

5. **Inclusion of green skills in RPL**

If you have RPL at your enterprise:

25. Do you take into account green skills/greening skills in RPL?
26. What are these 'green skills', which you have identified?
27. Do you have some RPL framework against which such identification and assessment takes place?

    – learning outcomes descriptors of the national qualifications framework;
    – competency-based training;
    – framework developed for human resources development;
    – guidelines prepared by some environmental authority;
    – other (please specify).

28. What are the methods used by your enterprise to assess green skills/greening skills?
29. In your assessment, what green skills/greening skills are lacking among your employees in your enterprise

Cognitive competences

a. Environmental awareness and a willingness to learn about sustainable development;
b. Systems and risk analysis skills to assess, interpret and understand both the need for change and the measures required;
c. Innovation skills to identify opportunities and create new strategies to respond to green challenges.

Interpersonal skills and technological skills

a. Strategic and leadership skills to enable policymakers and business executives to set the right incentives and create conditions conducive to cleaner production, cleaner transportation, etc.;
b. Coordination, management and business skills to facilitate holistic and interdisciplinary approaches that encompass economic, social and ecological objectives;
c. Communication and negotiation skills to discuss conflicting interests in complex contexts;
d. Marketing skills to promote greener products and services;
e. Networking, IT and language skills to enable participation in global markets; consulting skills to advise consumers about green solutions and to spread the use of green technologies.

Intrapersonal competences

a. Adaptability and transferable skills to enable workers to learn and apply the new technologies and processes required to green their jobs;
b. Entrepreneurial skills to seize the opportunities of low-carbon technologies.

Specific skills (e.g. use of specific equipment; following specific practices; application of new technology and processes required for the new task).

Attitudes (e.g. adaptability, environmental, social, cultural sensitivity and enthusiasm).

Behaviour (e.g., participation in projects and tasks, working with others and taking part in courses).

30. In what contexts have your employees acquired their green skills/greening skills?

    – Self-directed learning/informal learning;
    – Hereditary apprenticeships;
    – Company training;
    – Short-term skills development programs organized by ….
    – Literacy and basic skills programs organized by …..
    – Initial vocational education and training;
    – Continuing vocational education and training;
    – Other (please specify).

6. **Workplace learning and training programs (in general)**

31. Does your enterprise support staff development through training staff?
32. What are the purposes of this training?

    – To deal with new technologies;
    – To deal with new regulations and legislation;
    – To deal with lacking skills as we were not able to recruit the appropriate person;

- To meet the requirements of professional development that are set by our enterprise;
- Other (please specify).

33. What is the nature of this training? Please describe:

- the expected skills;
- the curriculum;
- the providers of the training;
- the trainers;
- the assessment methods;
- the certification.

34. Who does the accreditation of the training programme?
35. What are the outcomes of the training programme?

- At the individual level (salary, motivation etc.);
- At the enterprise level;
- At the national/community levels.

36. Who awards the certificate?

7. **Workplace learning and training programmes in relation to green skills (specifically)**

37. Do you have workplace learning/training programmes in the context in which RPL is conducted (i.e. you first identify and assess the previous skills and learning before recruiting the candidate in the training programme)?
38. To what extent do you include green skills/greening skills in the design of training programmes that could be used as a part of RPL (if appropriate for your enterprise)? Could you rate yourself on a 1–10 scale:

Rating: 1…2……..3…….4……..5……6……..7……..8……..9……..10.

1: We do not take these issues into consideration when we develop training programmes	10: We pay close attention to the inclusion of green skills in training programmes that could be used as a part of RPL

39. Do you have the following developed for a systematic use of RPL:

- Policy guidelines developed;
- Tools developed;
- Methods developed.

40. At the moment there is no systematic use of RPL in relation to green skills, only ad hoc examples.
41. What is the purpose of doing RPL in the context of these training programmes at your enterprise?

- For professional certification and credits;

- Workforce development more generally;
- Link RPL with NQFs;
- Strengthening green skills.

42. What do you consider to be the uses/benefits of including green skills in RPL more specifically?

- At the individual level (e.g. strengthen confidence and motivation because green skills are closely tied to core generic skills and social inclusion; earnings; career prospects etc.);
- At the enterprise level (e.g. improve productivity, the enterprise more competitive);
- At the national level (e.g. reduce environmentally unfriendly negative effects).

8. **Way forward**

43. What is your vision for a way forward in promoting 1) environmental-friendly practices; 2) green skills through RPL?

44. What are the perceptions of various stakeholders on the inclusion of green skills in RPL?

- Public sector stakeholders;
- Private sector stakeholders;
- NGOs and civil society.

45. What are your recommendations on how to include/improve the RPL of green skills?

Appendix B
Observation Sheet

Observe environmental-friendly work practices

Name of the enterprise:

Element	What to observe	To what extent		
		Limited	Moderate	Fully present
1. Follow environmental workplace practices	1.1. Workplace practices and work instructions relating to potential environmental impacts are recognised and followed 1.2. Changes to work practices and procedures that impact workplace environmental practices are responded to positively and promptly in accordance with enterprise requirements 1.3. Relevant legislation, codes and national standards that impact workplace environmental practices are recognised and followed			

(continued)

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(continued)

Element	What to observe	To what extent		
		Limited	Moderate	Fully present
2. Contribute to improved environmental work practices	2.1. Suggestions are made to designated personnel for improvements to workplace practices where possible 2.2. Information is gathered and improvements are suggested to support the development of improved workplace approaches to environmental practices 2.3. Environmental issues and their relationship to workplace practices are discussed in the workplace with colleagues and designated personnel 2.4. Contributions to the review of environmental practices and policies are made within the limits of responsibility			
3. Recognise and report on a potential environmental threat	3.1. Signs or symptoms of the potential environmental threat are recognised 3.2. Information about or observations of a potential environmental threat is reported to supervisors and/or appropriate authorities 3.3. Location and extent of the potential environmental threat are accurately recorded 3.4. Reports on the potential environmental threat are completed according to enterprise guidelines			
4. Maintain environmental records	4.1. Environmental records are accurately prepared as required according to enterprise policies and procedures 4.2. Environmental records are stored securely in a form accessible for reporting purposes			

Based on the Australian unit of competences AHCWRK202A Observe environmental work practices.

Appendix C
Glossary

Formal learning	Formal learning takes place in an organised and structured educational environment, usually leading to a certificate or a diploma
Green economy	UNEP defines the green economy as an economy that improves the welfare of people and provides social justice, while significantly reducing environmental risks and environmental depletion
Green jobs	Green jobs are decent jobs and are defined as employment that contributes to preserving or restoring the quality of the environment, be it in the agriculture, industry or the services sector. 'Green jobs' shall produce 'green goods and services' that would benefit the environment or conserve natural resources
Green economic restructuring	Measures were taken by the government, companies and individuals to support transitions to a greener economy that helps to reduce the ecological footprint of different economic sectors and ensures the wellbeing of employees and citizens
Green skills	Green skills are those skills needed to reduce environmental impacts and support economic restructuring with the purpose of attaining cleaner, more climate-resilient and efficient economies that preserve environmental sustainability and provide decent work conditions
Green skills development (in short, greening of skills)	Development of knowledge, skills, attitudes and behaviours that allow employees and citizens to be engaged in activities in support of green economic restructuring

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Green skills recognition	Inclusion of green skills into recognition, validation and accreditation mechanisms (RVA)
Greening TVET	Greening TVET describes the efforts of fostering the culture of sustainable practices in TVET and facilitates the transition to climate-resilient societies, greater resource efficiency and circular economy (UNESCO-UNEVOC)
Informal learning	Informal learning is the acquisition of practical competences, expertise, work practice and attitudes to perform, which leads to no qualification, degree or certification
Lifelong learning	Lifelong learning implies the acquisition of knowledge, skills and values throughout life, a continuous process of learning to know, to do, to live together and to be the 'four pillars' of education
MSMEs	Micro-enterprises are composed of between two and ten workers, whereas small and medium enterprises (SMEs) consist of more than ten employees
Non-formal learning	Non-formal learning refers to semi-structured training without resulting in a formal qualification certification

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