

Yutaka: how do we prototype the transformative change towards nature positive designs with soil

Tokushu Inamura¹, Tomomi Ogata², Hazuki Kosaka²

¹Kyushu University, Japan
inamura@design.kyushu-u.ac.jp

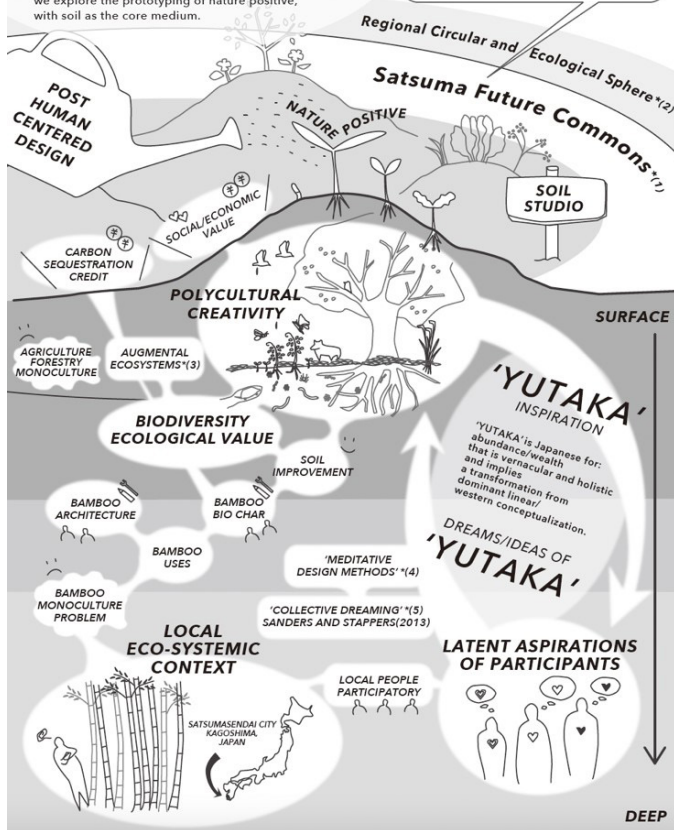
²Re:public, Japan
tomomi@re-public.jp, hazuki@re-public.jp

Abstract

How do we prototype the transformative change towards nature positive designs?

In this visual paper, we explore the prototyping of nature positive, with soil as the core medium.

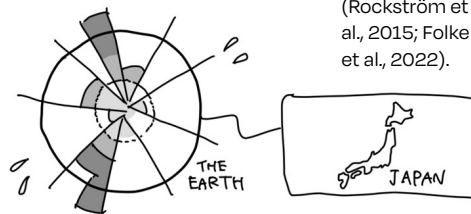
Satsuma Future Commons (SFC) is a hub for a new urban design research and practice. We explore, research, and implement new methods of Circular City Design in Satsumasendai City, Kagoshima, in Southern Japan.



Author keywords

nature positive; circular design; polycultural creativity; meditative design methods

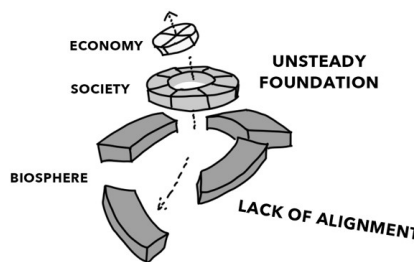
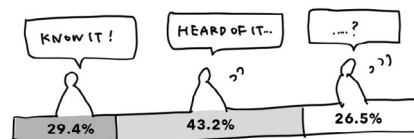
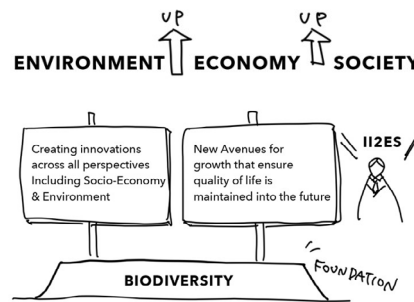
Introduction



(Rockström et al., 2009; Steffen et al., 2015; Folke et al., 2016; Persson et al., 2022).

Global biodiversity and Ecosystems threatened! We need planetary health! (Horton, et al., 2014)

The Japan Biodiversity outlook 3 issued by the Working Group for Comprehensive Assessment of Biodiversity and Ecosystem Services), Ministry of the Environment Japan (WGfCAoBaES, MoEJ), also echo's the IPBES report and urges action. In response to Japan's challenges the Ministry has launched the Circular Ecological Economy, proposed by the government in 2018 in the 5th Basic Environment Plan.



Transformative change is needed! (IPBES, 2019)

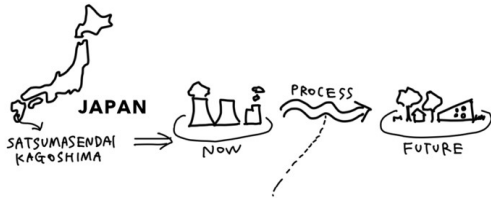
'Integrated Improvements on Environment, Economy and Society' (I12ES). (Cabinet Office, Government of Japan ,2022) The plan aims to achieve the SDG's (United Nations, 2015).

Combining I12ES plan with sustainable use of regional resources and creating partnerships, is synthesized in the Circular Ecological Economy vision (MoEJ, 2021).



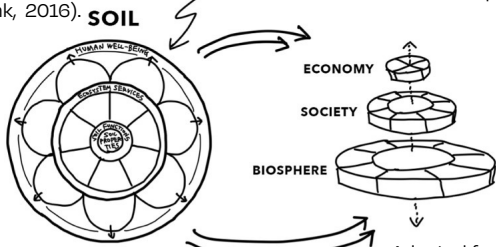
Satsuma Future Commons (SFC)

Launched by the city to realize its vision of a circular city. In the background all of this initiative lies in the macro population decline in Japan as well as aging population (MoEJ, 2021).



The major economic driver however is the Sendai Nuclear Power Station (SNPS), with ongoing discourse regarding its future, alternative.

Soil properties.
(Adhikari & Hartemink, 2016).



Why Soil?

Food, clothing and Shelter, the basic necessities included in the SFC vision, rely on nature, such as rice, natural fibers (e.g. silk, cotton, linen) and wood. Such provisioning services are examples of ecosystem services provided by nature. Agroecological (agriculture plus ecology) practices reported to generally positively link with ecosystem services (Palomo-Campesino, et al. 2018). All such provisions rely on soil as the fundamental enabling infrastructure. Soil is the hidden nexus of food, water and energy (Hatfield et.al, 2017)

Circular economy with innovation hub

located at the 240,000m² area of former unused farmland in proximity to the SNPS (Kamio, 2022).

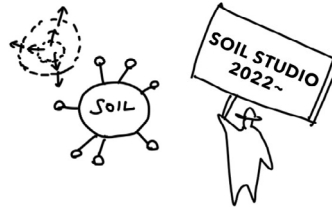
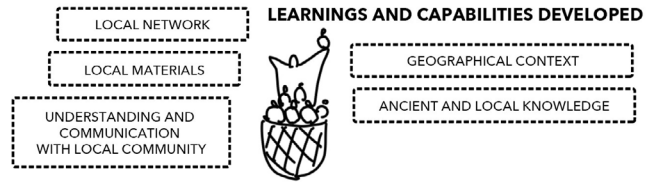
The city developed the plan with collaboration between Kyushu University, and Re:Public inc. Plans and vision were developed with expert input (incl. Inamura) with citizen dialogue including face to face, and correspondence.

Adapted from "the SDGs wedding cake model" Azote for Stockholm Resilience Centre, Stockholm University

OBJECTIVE

This visual paper explores how to prototype this change from a design standpoint and introduces the Soil Studio as a means to prototype transformative change from the ground level. The Soil Studio aims to explore what is *Yutaka* in relation to soil, where *Yutaka* is a holistic and regional conception of wealth, abundance, and harvest.

The authors conducted desk research in Augmented Ecology (Funabashi, 2016; 2018), and prominent models of agroecology.

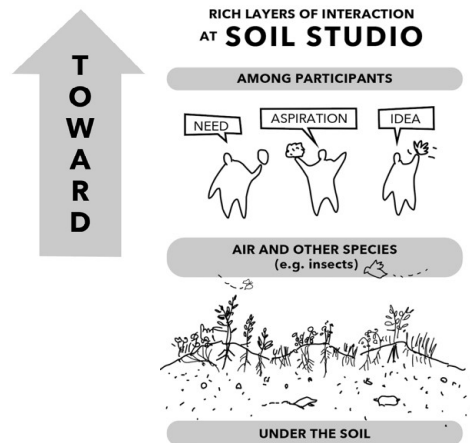


The Soil Studio launched in September 2022, is a format where participants each plant a polyculture in adjacent plots which reflects their own needs, wants, aspirations and world views. This format has been piloted through a test bed in the outskirts of Satsumasendai city, on property provided by local citizens involved in previous projects.

Yutaka is drawn from traditional Japanese thought and defined here as a holistic and regional conception of biodiverse wealth and abundance.



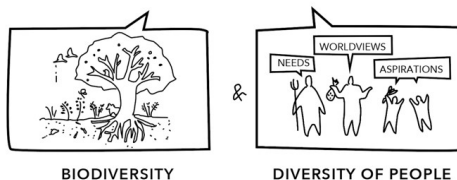
RICH LAYERS OF INTERACTION AT SOIL STUDIO



PAST PROJECTS (2019-2022)



DUAL MEANING BEHIND POLYCULTURAL CREATIVITY



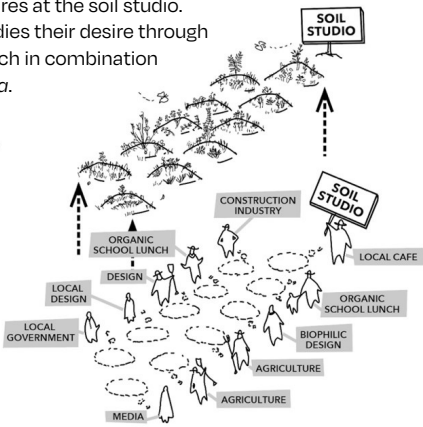
Typically Polyculture is used to denote agricultural species mixtures (Weißhuhn, 2017).

Pilot Soil Studio Overview

People from various backgrounds tried to realize their own dream polycultures at the soil studio. Each mound of soil embodies their desire through emerging biodiversity, which in combination realizes the state of *Yutaka*.

BIODIVERSITY

DIVERSITY OF PEOPLE

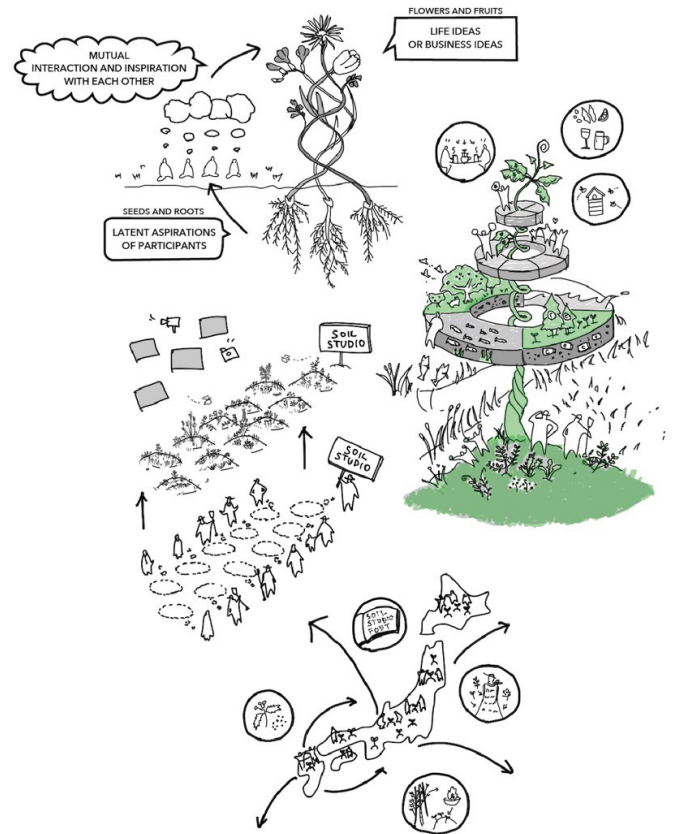


The meditative methods developed by Inamura (Ito, 2021) was combined with co-dreaming of Sanders and Stappers (2012, 2014). With recent shifts in design research toward more-than-human conceptions (Sziel, 2020; Inamura 2022), co-dreaming has been expanded.



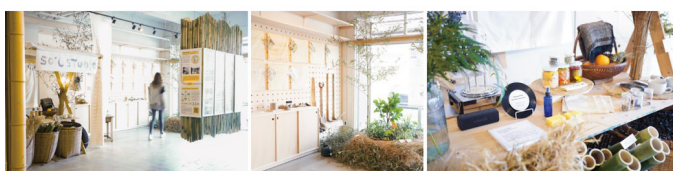
matches the re-search on feelings of connection to nature. (Mayer & Frantz, 2004).

What are the characteristics of the Soil Studio



2ND SEP. 2022	21ST OCT. 2022	14TH NOV. 2022	12TH DEC. 2022
UNCOVERING	GREETING FACING THE LAND AND PREPARING	PLANTING	TRIAL WORKSHOP OF HARVESTING AND INTEGRATING IN OTHER LIFE SYSTEMS
LEARNING SESSION	PREPARING THE LAND	SELECTING PLANTS FROM LOCAL SHOP	COLLECTING ALL SPECIES IN EACH FARM BOTH PLANTED AND WILD.
<p>WORLDWIDE SOIL PROJECTS</p> <p>POST HUMAN-CENTERED DESIGN</p>	<p>MAKING BAMBOO BIO CHAR</p> <p>PLOWING AND HILLING</p>	<p>SOWING</p> <p>PLANTING</p>	<p>OBSERVATION</p> <p>AND RECORDING BY BUNDLE DYE METHOD</p>
MEDITATION 1	MEDITATION 2	MEDITATION 3	
Q. HOW IS YOUR WORK OR PROJECT CONNECTED TO OTHER LIFE SYSTEMS?	Q. WHAT IS YOUR VISION OF YOUR DREAM POLY-CULTURE?	Q. HOW WILL YOUR POLY-CULTURE GROW AND INTERACT WITH ITS SURROUNDINGS?	
OUTPUT OF MEDITATIVE IDEATION			
			<p>MAKING A LIST OF FOUND SPECIES AND LIVING ORGANISMS</p>

Results



1: Polycultural creativity

The key difference is to foster the individual human aspirations/desires/needs of the participants through polyculture.

2: Design Studio Concept

The Studio concept: 'what is Yutaka in relation to the soil?'. This is a provocation to learn and develop new ideas for how to connect biodiversity to value. Design approaches have shown many possibilities of innovative use of natural materials (Solanki & Corbin 2018).

3: Yutaka Concept

Invoking the concept of *Yutaka*, abundance and wealth based on ancient and holistic world views, is a unique point of the Studio.

4: Methods

Some key methods conducted during Studio praxis included, co-dreaming, meditative design methods, prototyping, and learning sessions.

5: Agroecological technique

Funabashi has presented a no tilling method (though hilling is allowed), minimum soil improvements and no external fertilization (2016). Here, Bamboo bio-char (a local monoculture issue) was used to improve soil conditions and be eligible for carbon credits. As for species of plants, commercial species were chosen, however the Studio format is open to local/heritage varieties and seeds.

6: SLOC scenario

Soil that is Small, Local, Open and Connected. In line SLOC scenario proposed by Manzini (2011).

7: Societal Context

The soil studio is part of a joint research project between industry and academia and built on a memorandum of cooperation between the city municipal government and university faculty. The city's vision reflects citizen feedback, national policy, and intergovernmental goals. As such the studio pilot is interlinked with layers of regional societal systems, connecting policy to individual.

Conclusion

A studio model was established based on Funabashi's work on Augmented Ecosystems through desk research and a site visit. Agroecological methods were combined with the 'collective dreaming' of Sanders and Stappers, utilizing Meditative Design Methods developed by Inamura to explore latent aspirations of human participants to envision a thriving polyculture. The participants then engaged in prototyping and making based on the polyculture. The preliminary results and feedback were recorded. Participant feedback provided highly encouraging anecdotes on the success of the pilot. These results were shown in a public exhibition in the city. The documented interactions of the participants indicate a sense of connection to nature and drive a virtuous cycle of dreams and inspirational learning from the emerging nature positive polyculture. The studio empowers participants with a potent means to explore what is *Yutaka* in relation to soil.

Relevance to readers



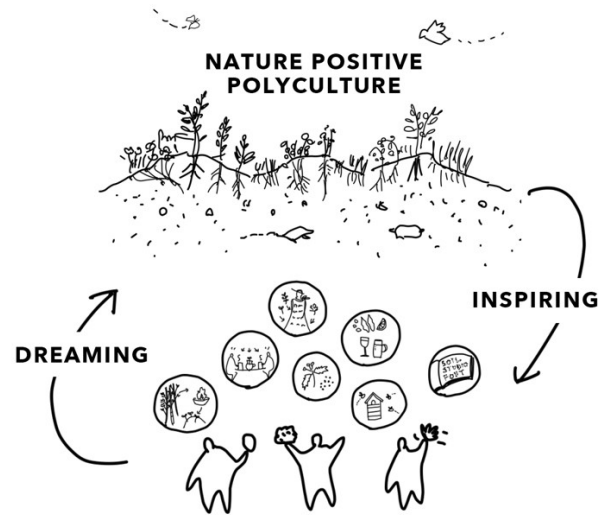
The concept of *Yutaka* is relevant as an example of vernacular/local worldviews to drive design development in the nature positive space.



Readers in the Societal, or design for government space, can be informed about how individuals might be engaged in large scale societal transformations on the ground level, with alignment to layers of policy.

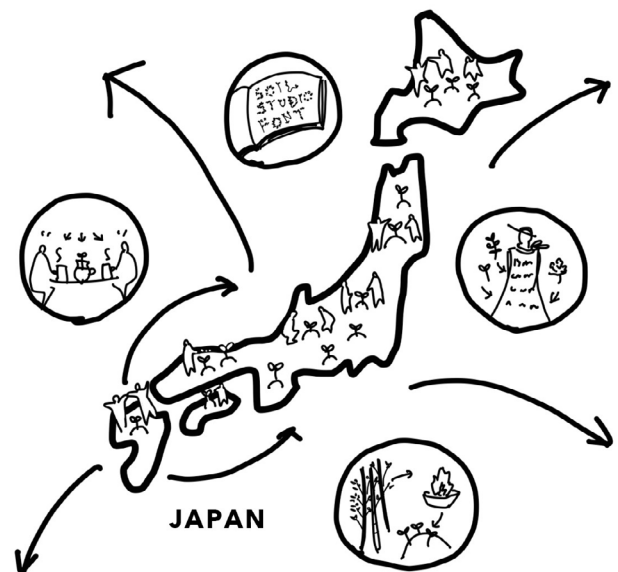


Those who are researching mindfulness, meditation and related concepts will find novel applications reported through the case to add to the overall literature of meditative design processes.



Future Research

Though the project is still early in its pilot stage, it has demonstrated potential as a transformative model towards agroecological states of *Yutaka*. Next steps will be to develop the existing Soil Studio, enabling participants, as well as quantitative and digital approaches. The Soil Studio presents aspects that more than the sum of their parts, though based in local worldviews and ecological contexts, have clear structural, methodological, and societal aspects that can be adapted to other localities, beyond Japan and the Asia-Pacific region. Testing the studio format to see how it applies to other sites are also an important trajectory, considering the global spread of circular, participatory and nature positive approaches, it can be hypothesized that the soil studio format will be relevant in many places, and the adaptations necessary also need to be clarified.



References

- Adhikari, K., & Hartemink, A. E. (2016). Linking soils to ecosystem services—A global review. *Geoderma*, 262, 101-111.
- Cabinet office, Government of Japan. (2022). 「生物多様性に関する世論調査」の概要 [Population Survey regarding biodiversity.] <https://survey.gov-online.go.jp/hutai/r04/r04-seibutsutayousei/gairyaku.pdf>
- Folke, C., Biggs, R., Norström, A.V., Reyers, B. & Rockström, J. (2016). Social-ecological resilience and biosphere-based sustainability science. *Ecology and Society*, 21(3), 41. <http://dx.doi.org/10.5751/ES-08748-210341>
- Funabashi, M. (2016). *Synecoculture manual 2016 version (English Version)*. Research and Education material of UniTwin UNESCO Complex Systems Digital Campus, e-laboratory: Open Systems Exploration for Ecosystems Leveraging, No.2. Retrieved from https://synecoculture.sonycscl.co.jp/public/2016%20Synecoculture%20Manual_compressed.pdf
- Funabashi, M. (2018). Human augmentation of ecosystems: objectives for food production and science by 2045. *npj Science of Food*, 2(1), 1-11.
- Hatfield, J. L., Sauer, T. J., & Cruse, R. M. (2017). Soil: the forgotten piece of the water, food, energy nexus. *Advances in agronomy*, 143, 1-46.
- Horton, R., Beaglehole, R., Bonita, R., Raeburn, J., McKee, M., & Wall, S. (2014). From public to planetary health: a manifesto. *The Lancet*, 383 (9920), 847. [https://doi.org/10.1016/S0140-6736\(14\)60409-8](https://doi.org/10.1016/S0140-6736(14)60409-8)
- Inamura, T. (2022). Design Praxis with the Kingfisher and Bacteria; The River as Place for Post Human-Centered Design learning. *Design for All Institute of India*, 17(6), 51-64.
- IPBES. (2019). *Global Assessment Report on Biodiversity and Ecosystem Services*. Secretariat of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services.
- Ito, S. (2021). A research report: Research on co-design models for sustainable development goals. *Kyoto Sangyo University Bulletin of the Institute of Comprehensive Academic Research*, 16, 187-205.
- Kamio, R. (2022). Rural futures - the transition towards a circular society based on the harmonious coexistence of nature and humans: the case of RE:STORE in Satsumasendai City. *The Proceedings of the Fab 17 Research Papers Stream*. Rotterdam: Hogeschool Rotterdam, pp. 101-109.
- Manzini, E. (2011). The new way of the future: Small, local, open and connected. *Social Space*, 100-105. https://ink.library.smu.edu.sg/lien_research/75
- Mayer, F. S., & Frantz, C. M. (2004). The connectedness to nature scale: A measure of individuals' feeling in community with nature. *Journal of environmental psychology*, 24(4), 503-515.
- Ministry of the Environment Japan (2021). Circular and Ecological Economy Volume 2.
- Palomo-Campesino, S., González, J. A., & García-Llorente, M. (2018). Exploring the connections between agroecological practices and ecosystem services: A systematic literature review. *Sustainability*, 10(12), 4339.
- Persson, L., Carney Almroth, B. M., Collins, C. D., Cornell, S., de Wit, C. A., Diamond, M. L., ... & Hauschild, M. Z. (2022). Outside the safe operating space of the planetary boundary for novel entities. *Environmental science & technology*, 56(3), 1510-1521.
- Rockström, J., Steffen, W., Noone, K., Persson, Å., Chapin III, F. S., Lambin, E., ... & Foley, J. (2009). Planetary boundaries: exploring the safe operating space for humanity. *Ecology and society*, 14(2).
- Sanders, E.B.-N. and Stappers, P.J. (2012). *Convivial toolbox: Generative research for the front end of design*. Amsterdam: BIS Publishers.
- Sanders, E.B.-N., & Stappers, P. J. (2014). From designing to co-designing to collective dreaming: Three slices in time. *Interactions*, 21(6), 24-33.
- Solanki, S., & Corbin, L. (2018). *Why Materials Matter: Responsible Design for a Better World*, Prestel.
- Steffen, W., Richardson, K., Rockström, J., Cornell, S. E., Fetzer, I., Bennett, E. M., ... & Sörlin, S. (2015). Planetary boundaries: Guiding human development on a changing planet. *Science*, 347(6223), 1259855.
- Sznel M. (2020, May 5). The time for Environment-Centered Design has come. *UX Collective*. <https://uxdesign.cc/the-time-for-environment-centered-design-has-come-770123c8cc61>
- United Nations. (2015). Transforming our world: The 2030 Agenda for Sustainable Development. United Nations. https://www.un.org/ga/search/view_doc.asp?symbol=A/RES/70/1&Lang=E
- Weißhuhn P, Reckling M, Stachow U, Wiggering H. (2017). Supporting Agricultural Ecosystem Services through the Integration of Perennial Polycultures into Crop Rotations. *Sustainability*, 9(12): 2267. <https://doi.org/10.3390/su9122267>
- Working Group for Comprehensive Assessment of Biodiversity and Ecosystem Services, Ministry of the Environment. (2021). *Summary for Policymakers of Japan Biodiversity Outlook 3 (2021 Report of Comprehensive Assessment of Biodiversity and Ecosystem Services in Japan)*, Nature Conservation Bureau, Ministry of the Environment, Japan.