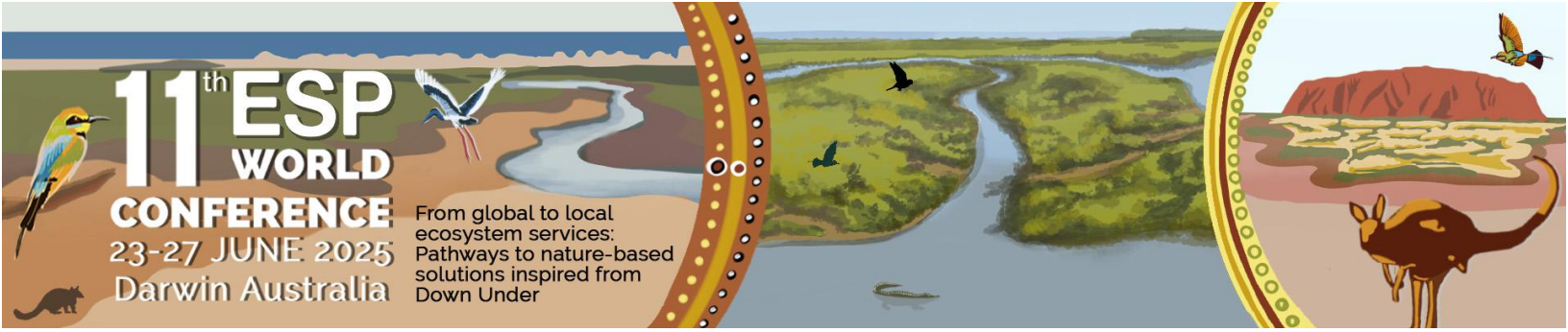


BOOK OF ABSTRACTS

I. SESSION DESCRIPTION

ID: T6

Future scenario analysis and planning of biodiversity and ecosystem services by using the Nature Futures Framework from local to national scales

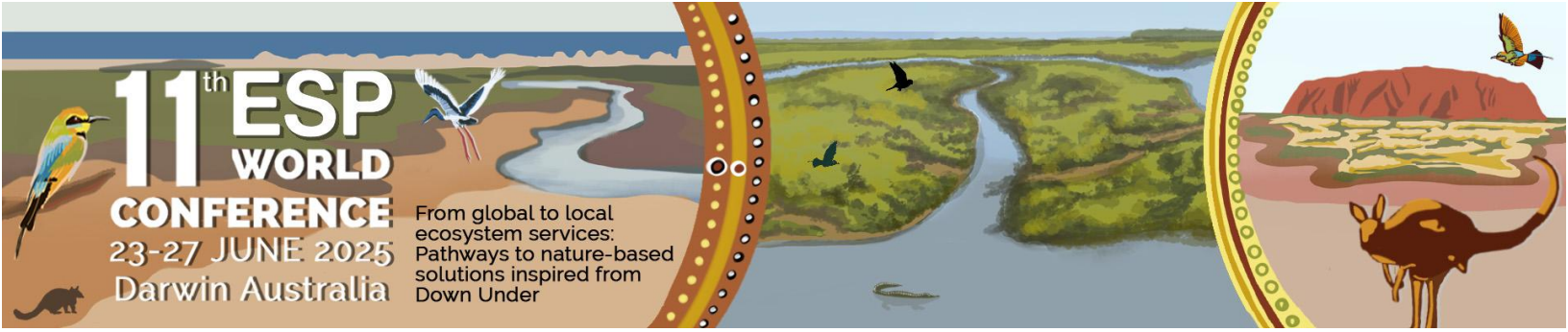
	Name	Organisation	E-mail
Host:	Osamu Saito	nstitute for Global Environmental Strategies (IGES)	o-saito@iges.or.jp

Abstract:

ntergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) established a task force on scenarios and models of biodiversity and ecosystem services to provide policy support tools and methodologies for scenario analysis and modelling of biodiversity and ecosystem services. As a part of the task force activities, Nature Futures Framework (NFF) was created as a flexible tool to support the development of scenarios and models of desirable futures for people and nature. Reflecting with ongoing activities by the task force on scenarios and models, a new project titled "Development of an Integrated Assessment Model linking Biodiversity and Socio-Economic Drivers, and its Social Application (IAM-B)" was launched in March 2024, with general funding from the Ministry of the Environment, Japan. This project quantitatively estimates the impacts of response options for climate change mitigation and adaptation, and biodiversity conservation and restoration under NFF oriented future scenarios/pathways up to 2050 in Japan. This session presents and shares latest studies which apply NFF for future scenarios building and analysis from different locations, scales and actors to promote co-designing sustainable futures from longer time perspective, co-organized by IPBES task force on scenarios and models, and IAM-B project.

Potential presentation titles:

- Operationalizing the Nature Futures Framework to catalyze the development of nature-future scenarios
- Developing NFF oriented narratives of national scale future scenarios in Japan
- Scenario analysis of biodiversity and ecosystem services: A NFF case study in Sado City, Japan



- Participatory and integrated local scenario development and modelling to support local landscape governance from ridge to the coast: A case study of Minamisanriku-town, northern Japan

- Changes in coastal ecosystem services via climate and socioecological transformation

Goals and objectives of the session:

This session will present latest studies which apply NFF for future scenarios building and analysis from different locations, scales and actors, including pathways to nature-based solutions from Asia, Oceania and other regions, to advance science-policy-society interface towards just, inclusive sustainable futures under diverse socio-cultural and environmental contexts respecting local communities and Indigenous ecological knowledge and values. The session will provide different methodological approaches to apply and operationalize NFF, and share lessons, challenges and opportunities learned from various case studies.

Planned output / Deliverables:

'- Special feature/issue of peer-reviewed journal such as Ecosystem Services

- Book from eBook series Science for Sustainable Societies from Springer Nature

- Overview article which summarizes key challenges and future research directions raised from this session

- Presentations and discussion at this session will be reflected to the NFF guideline which will be revised by November 2025

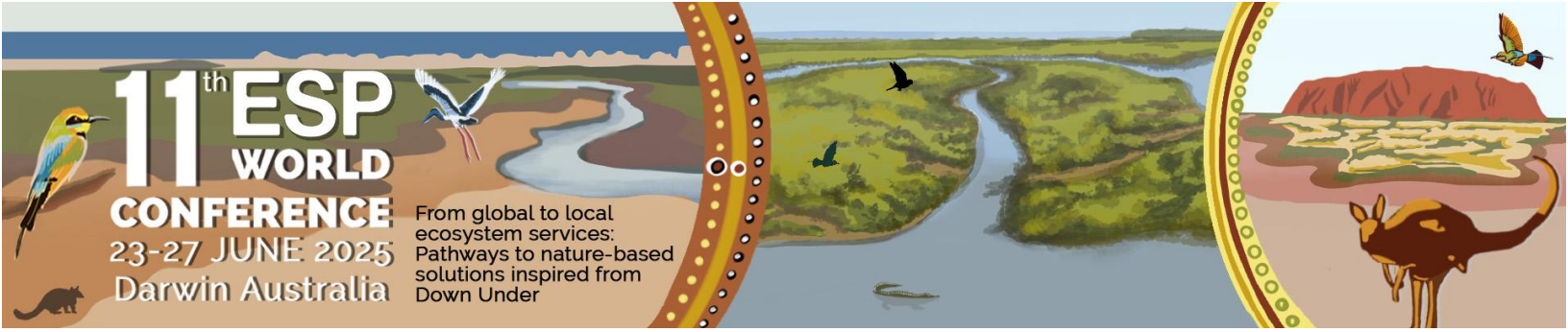
- Policy brief to summarize key policy recommendations based on the presentations and discussion at the session

II. SESSION PROGRAM

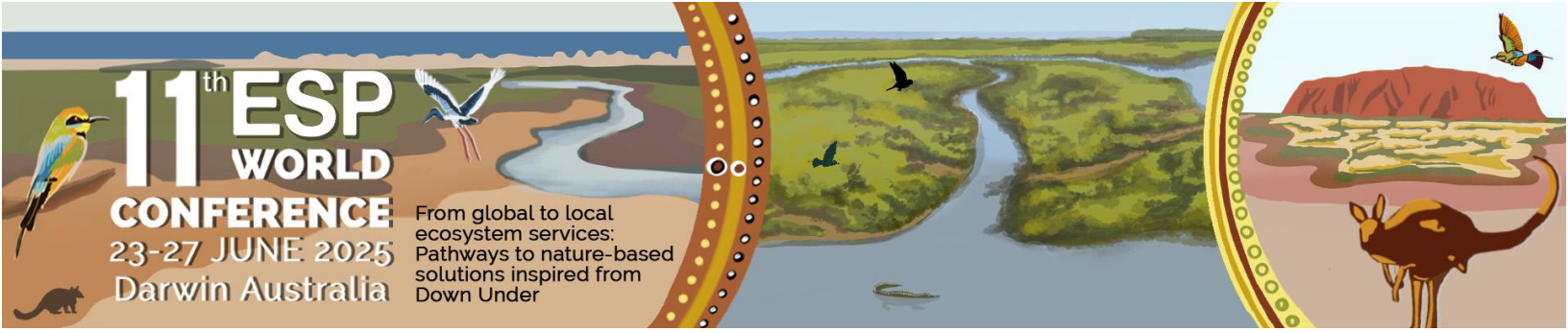
Room: Madla 2
Date of session: 24 June, 2025
Time of session: 15:30-18:00

Timetable speakers:

Time	First name	Surname	Organization	Title of presentation
15:30-15:05	Osamu	Saito	Institute for Global Environmental Strategies (IGES)	Aims and overview of the session



Time	First name	Surname	Organization	Title of presentation
15:35–15:50	Rajarshi	Dasgupta	Indian Institute of Technology	Applying the Nature Futures Framework (NFF) to navigate India's forest future
15:50–16:05	Wanhui	Huang	The University of Tokyo	Future land use and ecosystem service projection for Japan SSPs
16:05–16:20	Mitsuyo	Toyoda	Niigata University	Evaluation of Satoyama Landscape and Co-creation of Sustainable Scenarios on Sado Island, Niigata, Japan
16:20–16:35	Alice	Yamabe	Institute for Global Environmental Strategies (IGES)	Local Pathways to Nature-Positive Food Systems: Insights from Japan's Local Biodiversity Strategies and Action Plans
16:35–16:50	Takehisa	Yamakita	Japan Agency for Marine-Earth Science and Technology (JAMSTEC)	Changes in coastal ecosystem services via climate and socioecological transformation and its scaling law
16:50–17:05	Chihiro	Haga	Osaka University	Integrated Assessment Modeling at the Local Scale: Pathways to a Better Nature Future
17:05–17:20	Yasuo	Takahashi	Institute for Global Environmental Strategies (IGES)	Bottom-up scenario development and integrated modelling to inform landscape and seascape governance in Minami-Sanriku town, northern Japan
17:20–17:35	Rohit	Ramachandran	Institute for Global Environmental Strategies (IGES)	From Vision to Action: Co-Creating Nature-Positive Fisheries Futures in Timor-Leste
17:35–17:50	Osamu	Saito	Institute for Global Environmental Strategies (IGES)	Comprehensive Inventory and Policy Support Tool for Biodiversity and Ecosystem Services
17:50–18:00				Discussion and closing



III. LIST OF ABSTRACTS

The first author is the presenting author unless indicated otherwise.

1. Applying the Nature Futures Framework (NFF) to navigate India's forest future

First authors(s): Rajarshi Dasgupta

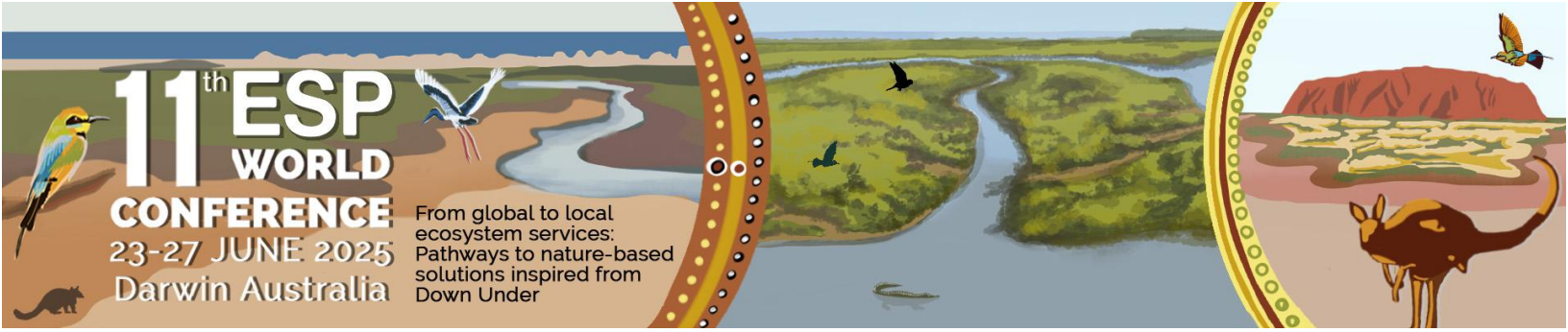
Other author(s): Mrittika Basu

First author affiliation: School of Public Policy, Indian Institute of Technology, Delhi, India

Contact: rajarshidg1@iitd.ac.in

Keywords: Nature Future Framework, Forest Policy, Forest future, Policy analysis

With conflicting demands for land for urbanization and rapid economic growth, India's forest future is painted with multiple uncertainties. The paper explores India's forest future using the IPBES's Nature Futures Framework (NFF) and highlights how pluralistic viewpoints are necessary to guide decision-making related to forest sustainability in the country. We first map the existing forest policies and programs against the three alternative value frameworks of NFF: Nature for Nature, Nature for Society, and Nature for Culture. Second, we deploy a theory mapping approach to screen the dominant narrative of existing forest programs and policies. The main findings of this study indicate two dominant narratives within the federal forest policies, i.e., 'nature for nature' in the post-colonial era and 'nature for society' during the late nineties, where schemes like Joint Forest Management dominated local forest governance. We further observed a priority shift in recent years, which revolves around enhancing India's forest carbon pool through afforestation/reforestation, undermining participatory forest governance and Indigenous rights, and corresponding to the realignment towards the nature-for-nature pathway. In conclusion, the paper argues that there remain significant opportunities to design a more inclusive forest future through the adoption of nature as a cultural pathway, which may include the recognition of traditional agroforestry systems, conservation of sacred forests, and revival of traditional forest practices, among others.



2. Future land use and ecosystem service projection for Japan SSPs

First authors(s): Wanhui Huang

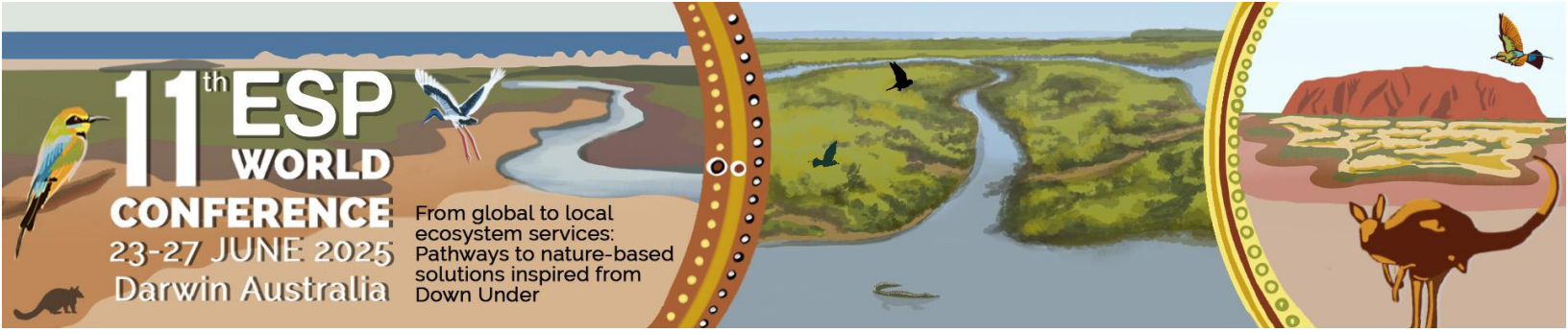
Other author(s): Shizuka Hashimoto, Fumiko Ishihama, Takanori Matsui, Keita Fukasawa, Yuichiro Usuda, Tomohiro Fujita

First author affiliation: The University of Tokyo

Contact: huangwh@g.ecc.u-tokyo.ac.jp

Keywords: Land use simulation, Future projection, Japan SSPs, Scenario analysis, Ecosystem Services Evaluation

Due to Japan's long-term population decline and urban shrinkage, human impact on the landscape is expected to increase. Therefore, managing national land is crucial to achieving a sustainable society. Japan has developed a Japan Shared Socio-economic Pathways (SSPs). Japan SSPs is developed based on the Global SSPs, reflecting its own views by providing alternative future socio-economic scenarios that can be used to explore climate change impacts and adaptation and mitigation measures. However, their spatial implications, such as detailed land use patterns and changes in ecosystem services, are underexplored. This study created a high-resolution (100 meters) spatial land use projection based on the land use demands for 2050, as calculated by the Japan SSPs. The TerrSet Land Change Modeler's Random Decision Forest algorithm was used for projection. Using these projected land use maps, the current (2020) and future ecosystem services (2050) were evaluated and compared across multiple SSPs. Ecosystem services evaluated in this study include carbon storage and water yield, which were evaluated using the Integrated Valuation of Ecosystem Services and Tradeoffs (InVEST) model developed by the Natural Capital Project. The future scenarios projected and evaluated in this study include SSP1 (sustainability), SSP2 (middle of the road), SSP3 (regional rivalry), SSP4 (inequality) and SSP5 (fossil fueled development) under the same emission and concentration scenario of Representative Concentration Pathway (RCP) 2.6. Japan SSPs calculated the land use demand for each scenario; however, the amount of ecosystem service provided was not disclosed. This study quantified the services and clarified the spatial characteristics. These results are expected to contribute to proposing a national land strategy that supports a sustainable society.



3. Evaluation of Satoyama Landscape and Co-creation of Sustainable Scenarios on Sado Island, Niigata, Japan

First authors(s): Mitsuyo Toyoda

Other author(s): Tsuneo Sekijima, Takuhiko Murakami, Rei Shibata, Natsuki Yoshikawa, Yutaka Gonda

First author affiliation: Niigata University

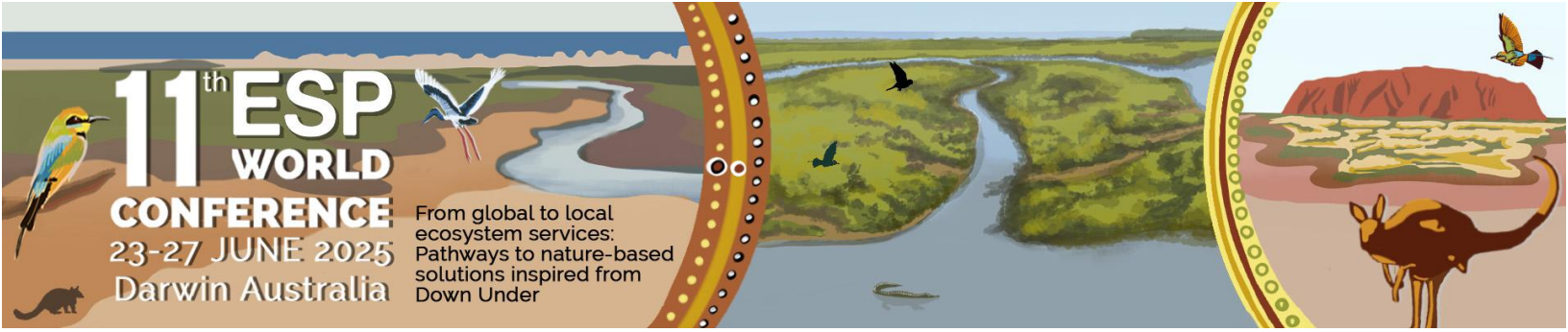
Contact: toyoda@cc.niigata-u.ac.jp

Keywords: satoyama landscape, biodiversity conservation, co-creation, dialogue, Sado Island

Sado Island, located in Niigata Prefecture, is the largest remote island in Japan. This island is well known for its re-introduction project of the endangered "toki" (nipponia nippon, Japanese crested ibis) and has achieved significant success in biodiversity conservation. However, the satoyama landscape of the island, consisting of rice paddies and surrounding components, is rapidly deteriorating due to aging and depopulation, although it is an important source of biodiversity. In this context, it is essential for Sado Island to anticipate future changes in the landscape based on scientific data and to explore solutions for sustainable landscape management.

A research group led by Niigata University has been conducting ecological studies to clarify trends in the increase of abandoned farmland and unmanaged artificial forests, as well as the responses of flora and fauna to these changes. They are also evaluating the impact of landscape changes from the perspectives of species diversity and disaster resilience. The goal is to identify practical approaches to the conservation and management of a more resilient satoyama landscape.

In collaboration with the "Sado Island Ecological Sustainability Lab," a living lab launched in 2022, dialogue sessions involving local citizens and government representatives start in 2025 to review the scientific data gathered and to jointly consider the implications of those data. In the presentation, we will summarize the research findings so far and describe the approach to designing dialogue sessions based on a co-creative model.



4. Local Pathways to Nature-Positive Food Systems: Insights from Japan's Local Biodiversity Strategies and Action Plans

First authors(s): Alice Marie Yamabe-Ledoux

Other author(s): No

First author affiliation: Institute for Global Environmental Strategies (IGES)

Contact: yamabe@iges.or.jp

Keywords: Nature-positive, Food systems, Japan, Local Biodiversity Strategies and Action Plans

The transition to nature-positive food systems is critical for addressing biodiversity loss and broader sustainability challenges, as recognised in the Kunming-Montreal Global Biodiversity Framework. This underscores the need to integrate food system transitions into biodiversity policy and planning at all levels. This study examines how such transitions are envisioned and operationalised in 76 Local Biodiversity Strategies and Action Plans (LBSAPs) across Japan.

We conducted a systematic review of food-related actions, targets, and indicators, classifying them by food supply chain stages, sustainability dimensions, and their alignment with nature-positive scenarios. Drawing on the food-related objectives outlined in Japan's National Biodiversity Strategy and Action Plan (2023-2030), we developed a taxonomy to analyse and compare local measures. The analysis reveals a diverse range of locally tailored measures shaped by the interplay of natural resource availability, local socio-ecological challenges, and culturally embedded food traditions. Most actions focus on production and consumption, suggesting a need to broaden the scope of local actions to address the entire food system. Social and environmental objectives are strongly represented, but economic dimensions are less prominent, indicating a potential gap in integrating financial viability into food system transitions. From a Nature Futures perspective, local strategies largely reflect values associated with Nature for Society and Nature for Nature, while Nature for Culture remains comparatively low, highlighting the untapped potential to connect food systems to local cultural identity and heritage.

We assess the degree of alignment between local, national, and global biodiversity frameworks and identify opportunities and gaps in enabling transformational change toward nature-positive

food systems. Our findings illustrate how food systems act as a key interface between people and nature, reflecting the diverse values embedded in the Nature Futures Framework.

5. Changes in coastal ecosystem services via climate and socioecological transformation and its scaling law.

First authors(s): Takehisa Yamakita

Other author(s): Hiromichi Igarashi, Hiroya Yamano, Osamu Saito

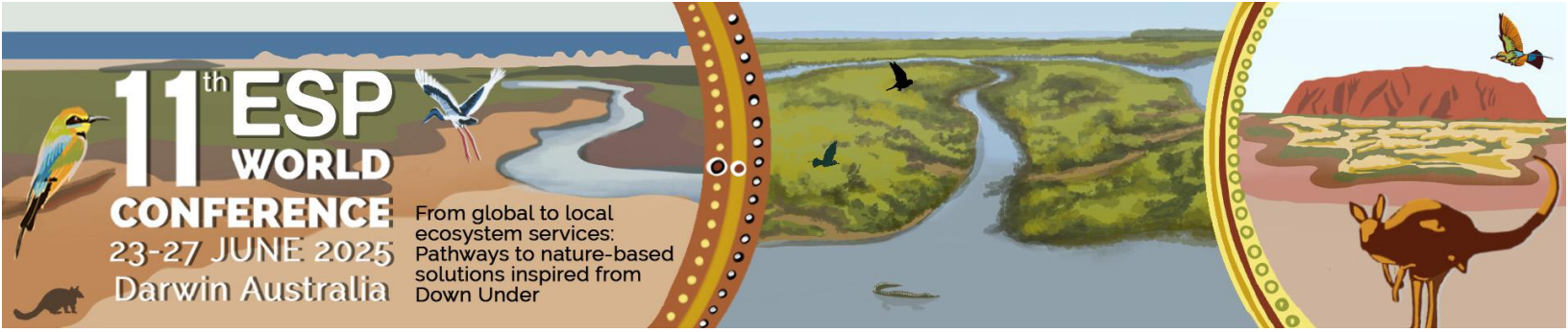
First author affiliation: JAMSTEC (Japan Agency for Marine-Earth Science and Technology)

Contact: yamakita3@gmail.com

Keywords: Ecosystem services valuation, Nature-positive society, Marine Ecosystem Services (MES), Voluntary carbon credit trading, Nature Futures Scenarios

In response to the SSP on climate change, the S21 project (iam-b.jp), funded by the Ministry of the Environment, is underway to examine biodiversity-version socioeconomic scenarios and demonstrate the feasibility of a nature-positive society. The mapping of major natural capital and Marine Ecosystem Services (MES; fishery resources, CO2 absorption, and cultural services) in coastal areas of Japan and the local version of the Ocean Health Index in the previous project (PNCES/S15) are to be updated and evaluated under Nature Future Scenarios, which proposed in IPBES. On the other hand, regarding climate change, voluntary credit transactions for seagrass and seaweed beds have been progress in Japan in recent years.

In this presentation, we will introduce the updated status of biodiversity and ecosystem services valuation, including monetary valuation, and discuss what synergies and trade-offs exist at the sites where credit trading has been implemented in Japan. As a result, we will determine whether and to what extent there are differences between the distribution of valuations and characteristics of important services in the national scale valuation and those in individual sites. We especially discuss what scaling rules can be applied to ecosystem service valuations from the local to the broad scale.



6. Integrated Assessment Modeling at the Local Scale: Pathways to a Better Nature Future

First authors(s): Chihiro Haga

Other author(s): Akari Asako, Kenya Mitsui, Taito Kamata, Rei Shibata, Takashi Iwakawa, Michinori Kimura, Jaegyu Kim, Takanori Matsui, Tsuneo Sekijima

First author affiliation: Osaka University

Contact: chihiro.haga@ge.see.eng.osaka-u.ac.jp

Keywords: scenario analysis, Nature Futures Framework, biodiversity conservation, land-use change, renewable energy

Nexus approaches among social-ecological systems are essential to achieving global biodiversity targets. In rural Japan, population decline and renewable energy development significantly influence biodiversity and ecosystem services. This study conducted a scenario analysis by integrating a socio-economic simulation model (Extended SnapShot Tool, ExSS) with a vegetation succession model (LANDIS-II) to evaluate policy interventions toward better futures.

The indirect drivers comprised 1) socio-economic conditions, which influence primary industries and rural livelihoods, and 2) the spatial distribution of renewable energy, which affects land use. The direct drivers comprised 3) farmland and 4) forest management. Farmland management considered cases where certified rice paddies were abandoned, maintained, or expanded, affecting agricultural production and habitat quality. Forest management included clear-cutting followed by either plantation or natural regeneration. Key indicators were selected to evaluate intrinsic, instrumental, and relational values in the Nature Futures Framework (NFF) framework: plant diversity, habitat quality for the crested ibis, rice paddy area, timber and biomass energy production, CO2 sequestration, landscape aesthetics, and volunteer participation in landscape management.

Preliminary results indicated that due to population decline, CO2 emissions decreased to a level comparable to forests' carbon sequestration capacity. A business-as-usual scenario resulted in the abandonment of 76.3% of farmland by 2050, which degraded the Crested ibis' habitat

suitability. However, maintaining certified rice paddies in mountainous regions preserved suitable habitats. This study highlights the importance of integrated scenario modeling to inform biodiversity conservation, climate change mitigation, and sustainable rural development in Japan.

7. Bottom-up scenario development and integrated modelling to inform landscape and seascape governance in Minami-Sanriku town, northern Japan

First authors(s): Yasuo Takahashi

Other author(s): Sawako Shigeto, Akihiro Dazai, Norie Tamura, Satomi Mitsui, Yusuke Yamada, Chihomi Shigematsu, Takahiro Yoshida, Osamu Saito

First author affiliation: Institute for Global Environmental Strategies

Contact: yasuo.takahashi@iges.or.jp

Keywords: the Nature Futures Framework, scenario workshop, biodiversity, ecosystem services, ridge to reef

We feature a bottom-up approach to the Nature Futures Framework (NFF)-based localized future scenario development and modelling to inform improved local landscape and seascape governance in Minami-Sanriku Town. The town is a small municipality of Northern Japan, facing the Pacific to the east and surrounded by a chain of ridges of the Kitakami Highlands from the north, west, to the south. The 2011 Great East Japan Earthquake Tsunami swept the entirety of the town's central area and devastated its economic foundations, particularly fishing ports and aquaculture rafts. The town had been leading nature-based sustainable development since before the earthquake, and even stepped up its efforts after the earthquake to build the town back better. These efforts include the Ramsar site designation of the Shizugawa Bay, ASC-certified oyster aquaculture, FSC-certified watershed forest management, as well as creating a circular economy by a biogas plant which convert municipal organic waste to fertilizer for rice production. Nevertheless, the Town is currently facing huge uncertainties, particularly unprecedented sea temperature rise causing serious losses in fisheries and aquaculture. In this context, we attempt a bottom-up approach to developing NFF-based localized future scenarios up to 2050 that

capture these local concerns and efforts. Our exercise started with interpreting the Ramsar Site Management Plan (2022) from the NFF lens, followed by a stakeholder workshop in 2024 to flesh out multiple future scenarios. A spatially-explicit presentation of each scenario is under preparation, which will then be used for modelling future biodiversity and ecosystem services up to 2050. Another key feature is a local stakeholder platform, where our research outcomes will be shared and stakeholder feedbacks will be used to further optimize scenarios and modelling. Through this feedback loop, we aim to inform stronger landscape and seascape governance from ridge to reef in Minami-Sanriku Town.

8. From Vision to Action: Co-Creating Nature-Positive Fisheries Futures in Timor-Leste

First authors(s): Rohit Ramachandran

Other author(s): Mario Marques Cabral, Osamu Saito

First author affiliation: Institute for Global Environmental Strategies (IGES)

Contact: ramachandran@iges.or.jp

Keywords: Nature futures framework, Nature-positive scenarios, Participatory research, Fisheries, Timor-Leste

Timor-Leste, one of the world's youngest nations, is also among the least developed countries, presenting unique challenges and opportunities for sustainable growth. Despite being surrounded by rich marine resources on three sides, its fisheries sector remains significantly underdeveloped. The advancement of this sector carries immense potential – not only for boosting economic growth but also for improving health, nutrition, and community livelihoods. However, it is crucial to ensure that risks associated with unplanned development, such as ecological degradation and cultural disruption, are avoided. This study addresses these considerations by exploring the co-creation of nature-positive future scenarios for the fisheries sector, employing the Nature Futures Framework (NFF) in collaboration with local stakeholders.

Using a participatory mixed-methods approach, the study first identified key challenges (e.g., illegal fishing, lack of infrastructure, and weak governance) and drivers (e.g., climate change, market demand, and cultural practices) through key informant interviews and focus group discussions with coastal communities. A participatory stakeholder workshop then refined these drivers using the NFF's three value perspectives: nature for nature, nature as culture, and nature for society. This process ensured that ecological, socio-economic, and cultural dimensions were equally considered. A second workshop enabled stakeholders to envision desirable futures, prioritize key actions (e.g., community-based fisheries management, additional marine protected areas, and policy reforms), and assess their feasibility.

The findings highlight trade-offs and synergies between development and conservation, emphasizing the need for inclusive governance and locally adapted solutions. The NFF proved instrumental in bridging diverse viewpoints, fostering co-ownership of strategies, and grounding discussions in the plural values of nature. By integrating participatory foresight with the NFF, this study offers a replicable model for nature-positive development in small-scale fisheries globally. Ultimately, it demonstrates that collaborative, value-based planning can transform Timor-Leste's fisheries into a sustainable and equitable sector while preserving marine biodiversity and cultural heritage.

9. Comprehensive Inventory and Policy Support Tool for Biodiversity and Ecosystem Services

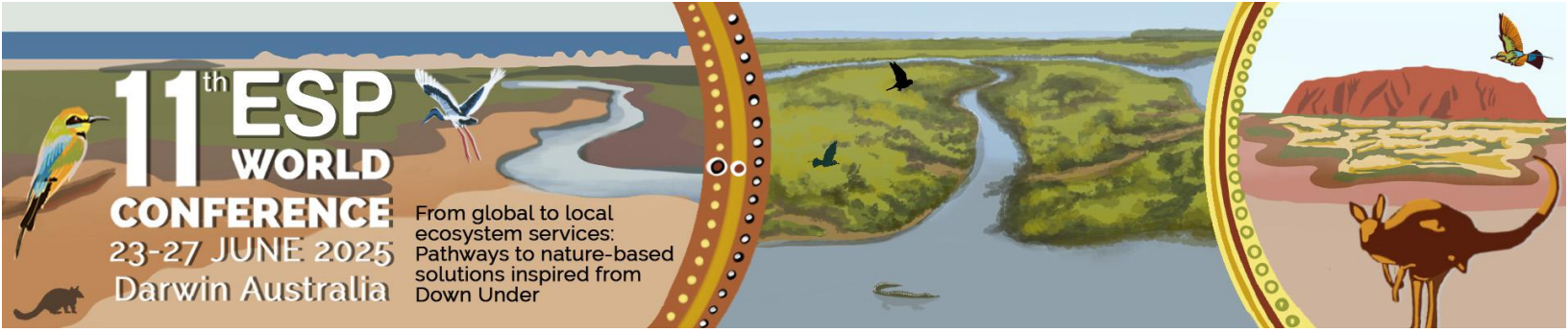
First authors(s): Osamu Saito

First author affiliation: Institute for Global Environmental Strategies (IGES)

Other author(s): Yasuo Takahashi, Chihomi Shigematsu, Xiaoyang Tan, Naoyuki Okano, Koji Miwa, Chiho Kamiyama

Presenting Author: Yasuo Takahashi

Presenting author affiliation: Institute for Global Environmental Strategies (IGES)



Contact presenting author: o-saito@iges.or.jp

Contact: yasuo.takahashi@iges.or.jp

Keywords: Nature Futures Framework, policy support tool, KM-GBF, response options

Japan's National Biodiversity Strategy and Action Plan (NBSAP) was revised in 2023 to meet the goals and targets of the Kunming-Montreal Global Biodiversity Framework (KM-GBF). Meanwhile, other new strategies and plans across sectors have been introduced to realize a nature-positive economy and society. This study aims to develop a comprehensive inventory as a database of various policies, and design a policy support tool which can facilitate the planning of nature-positive actions at both local and national scales not only for policy makers but also for business sectors toward a sustainable society in harmony with nature. Beyond the sectional boundary of the Ministry of the Environment, Japan, the study collects more than 400 response options (ROs) from eight governmental planning documents to develop a comprehensive policy inventory of biodiversity and ecosystem services. Each RO in the inventory contains attribute information such as target ecosystem services, as well as the direct and indirect drivers of biodiversity loss that the RO aims to tackle. In addition, the study uses the Nature Futures Framework (NFF) to link each RO with NFF's three value perspectives: Nature for nature (NN), Nature as culture (NC), and Nature for society (NS). Among over 400 ROs reviewed, there are more ROs associated with NN and NS than those associated with NC, which implies a potential weakness in current nature-positive strategies and plans in terms of cultural aspects which capture relational values of nature. Based on the inventory dataset, the study proposes a preliminary design of a new policy support tool which can facilitate biodiversity planning and implementation of the KM-GBF and SDGs at national and local levels. This tool can be used to search and screen various ROs depending on user needs/challenges, as well as to visualize ROs in relation to NFF, SDGs and KM-GBF targets.