

3rd ESP Asia Conference

14-17 December 2021 | Nagasaki, Japan

Eco-health and ecosystem services in Asia:
Bottom-up aspects for planetary health

ONLINE

BOOK OF ABSTRACTS

- I. SESSION DESCRIPTION
- II. SESSION PROGRAM
- III. ABSTRACTS

I. SESSION DESCRIPTION

ID: T6

Integration of traditional and modern bioproduction systems for a sustainable and resilient future

Hosts:

	Title	Name	Organisation	Email
Host:	Dr	Osamu Saito	Institute for Global Environmental Strategies (IGES), Japan	o-saito@iges.or.jp
Co-host:	Prof	Juan Pulhin	University of the Philippines Los Baños, Department of Social Forestry and Forest Governance (DSFFG), Philippines	jmpulhin@up.edu.ph
Other organisers	Prof	Pampang Parikesit	Universitas Padjadjaran Bandung Indonesia, Center for Environment and Sustainability Science (CESS), Indonesia	parikesit@unpad.ac.id

Abstract:

This session will explore scenarios/pathways for a sustainable and resilient future under climate and ecosystem changes by focusing on integration of traditional and modern bioproduction systems such as homegarden, agroforestry, plantation, aquaculture, and urban agriculture in Asia. The project assesses various ecosystem services provided by the bioproduction systems under multiple future scenarios. The hosts of this session launched a new international project “Integration of traditional and modern bioproduction systems for a sustainable and resilient future under climate and ecosystem changes (ITMoB)”, which will assess various ecosystem services provided by the bioproduction systems under multiple future scenarios toward a sustainable and resilient future in Japan, Philippines and Indonesia. This session will share some initial research findings of the project

3rd ESP Asia Conference

14-17 December 2021 | Nagasaki, Japan

Eco-health and ecosystem services in Asia:
Bottom-up aspects for planetary health

ONLINE

as well as relevant research presentations beyond the project members.

Goals and objectives of the session:

The goal of this session is to determine which combinations of modern bioproduction systems and traditional bioproduction systems are most likely to lead to a sustainable and resilient future, various ecosystem services will be assessed under multiple future scenarios. These bioproduction systems include home gardens, agroforestry, plantations, aquaculture, and urban agriculture.

Planned output / Deliverables:

- Special feature/issue of the journal (Ecosystem services)
- eBook publication
- Policy brief

Voluntary contributions accepted:

Yes

Related to ESP Working Group/National Network:

TWG 6 – Integrated valuation of ES

3rd ESP Asia Conference

14-17 December 2021 | Nagasaki, Japan

Eco-health and ecosystem services in Asia:
Bottom-up aspects for planetary health

ONLINE

II. SESSION PROGRAM

Date of session: Friday, 17 December 2021

Time of session: 10:00 – 13:00

List of abstracts and speakers

First name	Last name	Title of presentation
Osamu	Saito	Session theme and background including introduction of e-Asia ITMoB project
Chihiro	Haga	Predicting and Assessing Natural Capital and Ecosystem Services (PANCES) project in Japan
Shruti Ashish	Lahoti	Browsing through solutions to enhance the sustainability of traditional bio-production systems in East Asia and South-East Asia
Nico	Almarines	Potential Impacts of Agricultural Production Systems on Ecosystem Services in the Pagsanjan-Lumban Watershed, Philippines
Pampang	Parikesit	Traditional Bioproduction System Called Kebun Campuran in the Humid Tropics of West Java Indonesia
Keiko	Hori	Development of Methodologies for Projecting Future Population at Community Scale Under the Constraints on Data Availability

3rd ESP Asia Conference

14-17 December 2021 | Nagasaki, Japan

Eco-health and ecosystem services in Asia:
Bottom-up aspects for planetary health

ONLINE

III. ABSTRACTS

Session theme and background including introduction of e-Asia ITMoB project

Presenting author: Osamu Saito

Contact: o-saito@iges.or.jp

Global Assessment of the International Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) highlights the fact that nature-based solutions and built infrastructure can contribute to climate change adaptation and mitigation efforts. The Intergovernmental Panel on Climate Change (IPCC) and IPBES (2019) both recognize that indigenous and local knowledge (ILK) systems and practices can contribute to climate change adaptation and the sustainable management of biodiversity and ecosystem services. ILK systems have, however, so far not been used consistently in either climate change adaptation or biodiversity conservation efforts. In 2021, we launched the ITMoB project, a 3-year cooperative research project (FY2021-23), aims to fill in this gap through exploring scenarios/pathways for a sustainable and resilient future under climate and ecosystem changes. The project will assess various ecosystem services provided by the bioproduction systems under multiple future scenarios by focusing on integration of traditional and modern bioproduction systems such as homegardens, agroforestry, plantation, aquaculture, and urban agriculture in Japan, the Philippines, and Indonesia. ITMoB's vision is to determine which combinations of modern bioproduction systems and traditional bioproduction systems are most likely to lead to a sustainable and resilient future. This opening presentation introduces background, approaches and framework of the project, and provides an overview of the session with preliminary research works in three countries.

Predicting and Assessing Natural Capital and Ecosystem Services (PANCES) project in Japan

Presenting author: Chihiro Haga

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

Renewable energy introduction in harmony with nature is essential for building a sustainable society. However, the unplanned introduction of renewable energies, such as solar power and woody biomass energy, can cause conflicts among energy production, biodiversity, and ecosystem services (ESs). In this study, a scenario analysis was conducted to evaluate the potential conflicts among energy-ecosystem nexuses using the LANDIS-II model.

The case study area was the Bekambeushi River Watershed in northeastern Japan. The expansion of abandoned pastureland is an important issue and one of the great sources of uncertainty in this region. Two alternative renewable energy sources were selected to utilize those abandoned pasture lands according to the regional energy plans. One is promoting the introduction of solar power plants

3rd ESP Asia Conference

14-17 December 2021 | Nagasaki, Japan

Eco-health and ecosystem services in Asia:
Bottom-up aspects for planetary health

ONLINE

on the abandoned pasturelands. The other is utilizing the woody biomass of pioneer species, which established on the abandoned pasturelands. The LANDIS-II v7.0 with NECN succession extension v6.1.1 was used to simulate the plausible scenarios. The simulation duration was from 2016 to 2100.

Our results suggested the potential conflicts between the amount of renewable energy production and ecological indicators. In scenarios that highly depended on solar power plants showed high energy provision potential while landscape diversity and habitat suitability indices of two rare bird species were decreased. The introduction of biomass energy use on the abandoned pastureland increased the carbon sequestration service, DSI, and habitat suitability indices. Our result also showed that the remaining pastureland contributes to habitat suitability by supplying feeding ground for *Spizaetus nipalensis orientalis*.

Using those results, we discussed the best mix of renewable energy sources under a shrinking society considering regional potential energy demand. Therefore, local stakeholders should carefully select their future land-use options by accounting for diverse values of nature, such as for society, for nature's self, or as culture considering energy-ecosystem nexus.

Browsing through solutions to enhance the sustainability of traditional bio-production systems in East Asia and South-East Asia

Presenting author: Shruti Ashish Lahoti

Contact: shruti.ashish.lahoti@mx.iges.or.jp

Traditional bio-production systems in East and South-East Asia are under threat; in addition to climate and ecosystem changes, external drivers like modernization of agricultural systems, overexploitation or underutilization of bio-production system, industrialization, and urbanization adversely impact the biodiversity and ecosystem service (BES) provisions of the traditional land-use systems. In response to the current challenges, the local social actors are working with different stakeholders to create and implement solutions to enhance the overall productivity of traditional land-use systems while maintaining the BES provisions. The study aims to review such local solutions implemented at local and regional scales for revival and revitalization of the traditional systems while managing the sustainable use of natural resources. The study browses through the solutions applied to the bio-production landscape, considering cases listed either as “The Globally Important Agricultural Heritage Systems (GIAHS)” sites and from “The International Partnership for the Satoyama Initiative (IPSI)” network from Japan, Philippines, and Indonesia. Following the solution scanning approach, the study identifies solutions that address BES efforts at local scales and categorizes them as solution types. The preference of local social actors is towards solution types that can reverse the loss of BES functions while embracing solutions across ecosystems. Few preliminary results indicate a preference towards technological solutions in Japan, with emphasis on accommodating agroecological practices. In contrast, the preference of the Philippines and Indonesia is towards knowledge and cognitive type solutions focusing on capacity building, monitoring and evaluation systems, and knowledge integration. Understanding local solution types in different bio-

3rd ESP Asia Conference

14-17 December 2021 | Nagasaki, Japan

Eco-health and ecosystem services in Asia:
Bottom-up aspects for planetary health

ONLINE

production systems helps local social actors make an informed decision and weigh the appropriateness of solutions to attain multiple benefits.

Potential Impacts of Agricultural Production Systems on Ecosystem Services in the Pagsanjan-Lumban Watershed, Philippines

Presenting author: Nico Almarines

Contact: nralmarines@up.edu.ph

Agricultural expansion and urbanization often occur at the expense of natural ecosystems and the ecosystem services they provide. Similarly, the type of agricultural production system could also influence the ecosystem services supplied by a watershed. This study aims to assess how agricultural production systems affect ecosystem services at a watershed level under two exploratory scenarios: 1) prioritization and expansion of traditional agriculture, and 2) prioritization and expansion of modern agriculture. The Integrated Valuation of Ecosystem Services and Trade-offs (InVEST) Rule Based Scenario Generator was used to determine the possible changes in land cover, and the type and extent of agricultural production systems for each scenario. The generated scenarios were used to model the resulting changes in sediment retention and water yield in the Pagsanjan-Lumban watershed. In scenario 1, traditional annual crops expanded by 11% and traditional perennial crops expanded by 36%, each covering 12% and 67% of the watershed respectively. Built-up areas also expanded 112%, to cover 6% of the watershed. These expansions were fueled by the conversion of modern agricultural production systems, grasslands, and brushlands, most of which were depleted. Furthermore, scenario 2 had an 11-fold increase in modern annual crops and a 26-fold increase in modern perennial crops which had expanded to cover 29% and 22% of the watershed respectively. These were mostly converted from traditional agriculture and brushlands, although traditional perennial crops still cover 27% of the watershed – albeit a 45% decrease. Built-up areas also expanded by 138% by converting traditional agriculture and grasslands. In terms of ecosystem services, scenario 1 had resulted in a decrease in the watershed sediment retention by 137,000 t yr⁻¹ and an increase in water yield by 2.5 MCM yr⁻¹ compared to the baseline. Conversely, scenario 2 had increased sediment retention and decreased water yield by 150,000 t yr⁻¹ and 15.2 MCM yr⁻¹ respectively. Hence, this demonstrates the trade-off in ecosystem services when one type of agricultural production system is prioritized over another. Such insight will enable institutions to better craft strategies and policies on agricultural production systems that would aid in management and planning of more sustainable watersheds in the country.

Traditional Bioproduction System Called Kebun Campuran in the Humid Tropics of West Java Indonesia

Presenting author: Pampang Parikesit

Contact: parikesit@unpad.ac.id

3rd ESP Asia Conference

14-17 December 2021 | Nagasaki, Japan

Eco-health and ecosystem services in Asia:
Bottom-up aspects for planetary health

ONLINE

Traditional agroforestry was developed by humans under the influence of biophysical and social conditions at local level resulted in heterogeneous landscape. Kebun campuran is one of the agroforestry forms that has been in occurrence for centuries in the humid tropics of West Java Indonesia. Its physiognomic appearance is the most distinct among the existing components in the agricultural landscape of West Java. The multi-layered vegetation patches of kebun campuran scattered within the matrix of agricultural land has made the landscape heterogeneous. The structural complexity of kebun campuran suggests that it has multi functions, socio-economically as well as ecologically. Apart from that, the multi-layered structure of vegetation and its rooting system has made this type of land-use very potential in the prevention of soil erosion. To date, socio-ecological information of this man-made vegetation and its multidimensional functions are still interesting to be elucidated due to their site-specific characteristics. Despite its beneficial values, kebun campuran was not intensively managed. On the other hand, the structural vegetation pattern of kebun campuran was the result of various practices performed by the owners through the processes of introduction, domestication, and selection of plant species. Maintaining kebun campuran in the humid tropics of West java might ensure the landscape productivity and integrity for the sake of food security purpose and biodiversity conservation.

Development of Methodologies for Projecting Future Population at Community Scale Under the Constraints on Data Availability

Presenting author: Keiko Hori

Contact: keiko.hori@ifi.u-tokyo.ac.jp

Population change is a significant indirect driver of ecosystem change, impacting the ecosystem through changes in local land use patterns. Therefore, for the appropriate management strategies to maintain sustainable socio-ecological systems, projections of future population with high spatial resolution are essential. This study explored the projection methodologies of future population at community scale by utilizing the limited available data set. The presentation shows two cases of demographic analysis at Sado island of Japan and Sumedang prefecture of Indonesia. The validity and the possibility of further development of the proposed methodologies will be discussed at the presentation.