

3rd ESP Asia Conference

14-17 December 2021 | Nagasaki, Japan

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

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BOOK OF ABSTRACTS

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I. SESSION DESCRIPTION

ID: B3

Ecosystem services from tropical Asian ecosystems: status, change and impacts

Hosts:

	Title	Name	Organisation	Email
Host:	Associate Professor	Alexandros Gasparatos	Institute for Future Initiatives, University of Tokyo	gasparatos@ifi.u-tokyo.ac.jp
Co-host:	Dr	Yayoi Takeuchi	Biodiversity Division, National Institute for Environmental Studies	takeuchi.yayoi@nies.go.jp

Abstract:

Asia contains large extents of tropical ecosystems with very varying characteristics, ranging from mountain ecosystems to coastal and marine ones. These ecosystems contain huge biological diversity that provides a wealth of ecosystem services for a large fraction of the region's population. However, many of these ecosystems experience significant change from various direct and indirect drivers. For example, significant portions of tropical forests face threats from commercial agriculture, logging, and mining. Mountain and marine tropical ecosystems face significant change through accelerated climate change. The degradation of these ecosystems and the loss of their biological diversity can have major ramifications for their ability to provide ecosystem services and ultimately for the wellbeing of local communities, as well as regional and global communities. This session will bring together diverse contributions that catalogue the status, impacts, and responses of change in Asian tropical ecosystems. The session will seek to bring together evidence from very diverse tropical landscapes throughout the region.

Goals and objectives of the session:

This session aims to understand the current status, change, and impacts of biodiversity and ecosystem services in the tropical forest, mountain, freshwater, coastal and/or marine landscapes in the Asian region. We also highlight the direct and indirect drivers which cause the change, and its

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interactions with human society. Potential topics include methodological development to monitor, measure and evaluate biodiversity and ecosystem services.

This session will be organized by 5-10 presentations of 10-15 min, followed by interactive discussions with participants for future directions on these topics.

We welcome proposals from anyone engaged in field survey, ecosystem monitoring, data analyzing, and/or modelling on biodiversity and ecosystem services in Asian tropics.

Planned output / Deliverables:

The expected outcome of this session is a collegial discussion and an exchange of ideas providing a range of perspectives and take-aways for participants. We might also write a collective opinion paper.

Voluntary contributions accepted:

Yes

Related to ESP Working Group/National Network:

BWG 3– Forests & Woodlands

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II. SESSION PROGRAM

Date of session: Thursday, 16 December 2021

Time of session: 14:00 – 17:00

List of abstracts and speakers

Time	First name	Last name	Title of presentation
<i>Sub-session 1: National & regional perspectives</i>			
14:00-14:20	Shankar Acharya	Kamarajugedda	Assessing agricultural production services for Southeast Asian urban clusters under future land cover change scenarios (2015 – 2050)
14:20-14:40	Bhuvan	Chopra	Research on Ecosystem Services and their valuation in India: A Review
14:40-15:00	Amelie	Robert	Changing forests, changing ecosystem services. Example in Vietnam
15:00-15:10	Discussion and supplementary questions		
15:10-15:20	Break		
<i>Sub-session 2: Local perspectives</i>			
15:20-15:40	T. E. Angela L.	Quiros	The role of women and socio-economic context in Mangrove Provisioning and Cultural Ecosystem Services
15:40-16:00	Jie	Su	Acceptability of mangrove restoration: A choice experiment approach in Xiamen Bay, China
16:00-16:20	Vinamra	Mathur	Change in ecosystem services provision from timber landscapes in Sarawak, Malaysian Borneo: implications for local communities
<i>* this presentation will be given by Alexandros Gasparatos</i>			
16:20-16:30	Discussion and supplementary questions		

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III. ABSTRACTS

Assessing agricultural production services for Southeast Asian urban clusters under future land cover change scenarios (2015 – 2050)

Presenting author: Shankar Acharya Kamarajugedda

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Land-use land-cover (LULC) changes are occurring rapidly in Southeast Asia (SEA), generally associated with population growth, economic development and competing demands for land. Studies also indicate that SEA is a hotspot of tropical deforestation for agriculture. While urban expansion often occurs on croplands, there is little scientific understanding of how patterns of future urban expansion and associated LULC transitions will affect SEA's cultivated areas, forest cover and associated ecosystem services. We present a fine-scale urban cluster level assessment for SEA of current (2015) and future (2050) scenarios for cropland changes and agricultural potential. We identified 956 urban clusters distributed across 11 countries of SEA. We found that all the six shared socio-economic pathway (SSP) scenarios examined (SSP1-RCP 2.6, SSP2-RCP 4.5, SSP3-RCP 7.0, SSP4-RCP 3.4, SSP4-RCP 6.0 and SSP5-RCP8.5) have additional urban areas in the year 2050, with SSP1 being the highest. Results indicate that most scenarios show a reduction in cropland area between 2015 and 2050 within the SEA urban clusters. Rice has been the major crop produced in recent years for most of the SEA nations and it roughly occupies 20% of the total production in each of these nations. Considering the future LULC transitions (2015 – 2050) under various SSP scenarios, the production yield trends of the major crops in the urban clusters are assessed. Since, most 2050 scenarios are indicating a reduction in cropland areas within the SEA urban clusters, there could be a potential threat to the existing agriculture driven ecosystem services and a need for agricultural intensification or alternative sustainable strategies to compensate the rising demand. Hence, documenting the plausible LULC transitions and the associated impacts gains significance in SEA as the results can be useful for informing policy and sustainable land management.

Research on Ecosystem Services and their valuation in India: A Review

Presenting author: Bhuvan Chopra

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The concept of ecosystem services has now gained global limelight as they cater to the human welfare directly or indirectly. However, degradation of ecosystems can end in potential irretrievable loss of ecosystem health and processes linked to generation of these services. Administrators and policy makers are now increasingly realizing the imperativeness of valuation of ecosystem services in strategizing nature centric policies. Likewise, in India too there is a growing scholarly interest to capture the values of various benefits derived from ecosystems. In this paper, we have reviewed the

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93 research articles/ reports from existing literature base regarding studies conducted in India regarding ecosystem services and their valuation process. They ranged from valuation of services from specific ecosystems to the pan country evaluation of ecosystem services involving various methodologies.

However, there is still dearth of empirical studies showing cause effect relationship on how environmental challenges such as population explosion, biodiversity loss, unplanned urbanization and climate change can impact ecosystem services of the country over short term and long-term basis, which needs to be critically examined. This paper suggests that traditional knowledge must be strongly integrated with the environment management practices. This helps in preserving and maintaining the vital ecosystem services in the country in sustainable manner.

Changing forests, changing ecosystem services. Example in Vietnam

Presenting author: Amelie Robert

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Like other countries in Asia, Vietnam knew a decline of its forests during the XXth century. The war is often mentioned as an original driver, above all due to herbicides spraying by the American army. But the analysis of remote sensing data (aerial photographs and satellite images) reveals an acceleration of the forest decline after the war: forest exploitation and progression of the sedentary agriculture are the main reasons. The underlying causes are population growth, the sedentarization of minority ethnic groups and the migration of the majority ethnic group, mostly organized, to create new economic areas. Forests have been gradually replaced by cultivated land and savannahs. This landscape dynamic has led to an erosion of biodiversity, changes in soil properties, climatic changes...: all biophysical parameters were affected. Since the 1990s, a new dynamic has been initiated: the forest area is increasing but it is no longer the same forests. Vietnam has launched a vast reforestation program. Acacia plantations are replacing savannahs over large areas. Without being comparable to spontaneous forests, these new “forests” offer ecosystem services, first of all provisioning services. They can also contribute to climate change mitigation, restore the nitrogen content of the soil. However, they are more fragile in the face of fires and insect outbreaks, which will increase with climate change, and the possibility of cultural services remains to be questioned. The presentation will thus be an opportunity to question the evolution of ecosystem services in relation to the dynamics affecting forests, given that current services are also influenced by past services.

The role of women and socio-economic context in Mangrove Provisioning and Cultural Ecosystem Services

Presenting author: T. E. Angela L. Quiros

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Ecosystem services (ES) are benefits that nature provides to humans; these services change in space and time and are largely dependent on context. Here, we study mangrove provisioning and cultural services through a close look at mangrove small-scale fisheries and the communities that utilize them. Using a mixed-methods approach with on the ground landing surveys, household interviews, community perception surveys, and in-depth interviews with key informants, we overlay biophysical variables with social data from 9 communities in Busuanga Island, Philippines. We found mangrove fisheries were pervasive in our study sites, but individual reliance (home consumption versus bringing to market) on those fisheries changed, based on unique social and ecological contexts. Non-material benefits from mangrove cultural services were equally important to provisioning services. Female fishers in some communities had a disproportionately large impact and benefited greatly from mangrove fisheries. This work has the potential to inform management of mangrove resources, applicable to other locations in the coral triangle.

Acceptability of mangrove restoration: A choice experiment approach in Xiamen Bay, China

Presenting author: Jie Su

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Mangrove forests are tidal wetlands located in tropical and subtropical regions. They are characterised by high biodiversity and productivity, and as a result, they provide multiple ecosystem services to local and global communities. Their rapid loss, fragmentation and degradation offer compelling reasons for restoring mangroves and their ecosystem services worldwide. However, we do not know the acceptability of mangrove restoration among coastal communities. In this study, we employ a discrete choice experiment in the Large Xiamen Bay, a coastal bay in Southeastern China to elicit residents' willingness to pay (WTP) for mangrove restoration. During the first round of the survey, the attributes of the choice experiment are selected using the Analytic Hierarchy Process that identifies the ecosystem services that coastal residents prioritize from mangrove forests. During the second round of surveys, we conduct a choice experiment with 1600 respondents scattered across the bay. Results from the random parameter logit models suggest a positive and significant WTP for mangrove restoration (USD 6.34 per m² per year). The welfare impact on the coastal community who live within 15 minutes distance to the seashore by vehicle is twice of those who live further away (USD 0.04 vs. 0.02 per ha per household per year). The household WTP in each administrative district has a positive and significant correlation with the extent of existing mangroves and the development level of the agriculture and fishery sector, but surprisingly not with the Per capita income. Moreover, the fact that respondents from different administrative districts place a different value on different ecosystem services reflects their rather different interests and expectations for mangrove restoration. The findings suggest a high prospective demand for mangrove restoration and contribute to the evidence for function-based mangrove restoration decision-making in China and beyond.

Change in ecosystem services provision from timber landscapes in Sarawak, Malaysian Borneo: implications for local communities

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Presenting author: Vinamra Mathur

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The loss of tropical forests remains among the most pressing environmental issues today in Asia. While deforestation can occur for a series of reasons due to land-use change (e.g. mining, conversion to agriculture), forest degradation is usually the result of poor management and a poor chain of custody (CoC). Among all of the activities related to forest management, the most significant for forest degradation is the harvesting of timber, as it can affect the flow of multiple provisioning, regulating, and cultural ecosystem services. This study identifies how logging activities can affect different ecosystem services within and around three forest management units in Sarawak, Malaysian Borneo. During this study, we conducted 280 household surveys with local communities around the three forest management units to determine how land-use change associated with logging can affect ecosystem services specifically in relation to non-timber forest products, water quality, and cultural dynamics. The interviews indicated that changes in these ecosystem services, combined with changes in crop yield and outmigration had a substantial effect on the well-being of local communities in terms of changing social relations and good health. The interviews also indicated a high community awareness of the negative environmental impacts of deforestation, showing a particular concern over the growing lack of access to timber, NTFP, and clean water sources. This study is unique due to its geographic location as well as having been conducted within active operating long-term timber licenses, which allows us to explore these phenomena over several decades. Our findings point that timber certification can help ensure sustainable forest management practices as well as have a positive impact on the long-term sustainability of the tropical forests of Sarawak, and possibly other tropical areas of Asia.