BOOK OF ABSTRACTS

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I. SESSION DESCRIPTION

ID: **T8**

Approaches for assessing cultural ecosystem services and their sustainability

Hosts:

	Title	Name	Organisation	Email
Host:	Dr	Toshiya Matsuura	Forestry and Forest Products Research Institute	matsuu50@affrc.go.jp
Co-host:	Dr	Ronald C Estoque	Forestry and Forest Products Research Institute	estoquerc21@affrc.go.jp
Other organiser	Prof	Tomoyo F Koyanagi	Tokyo Gakugei University	koya23jp@ugakugei.ac.jp
Other organiser	Dr	Takuya Furukawa	Forestry and Forest Products Research Institute	tfurukawa@affrc.go.jp

Abstract:

Various cultural ecosystem services (e.g., tourism, health, education, local cuisine, etc.) are found in different socio-ecological conditions. However, most of these services have not been well quantified and are often underestimated. Moreover, these services are changing and become vulnerable due to changes in social factors (e.g., changes in demand of the service, demographic structure, and lifestyle) and landscape changes due to both land development and abandonment.

Therefore, it is necessary to assess their current status, such as spatial distribution, supply, demand, etc. It is also essential to understand the factors that need to be considered to improve and sustain these services for future projection based on possible scenarios. A wide range of methodologies, tools, and techniques are available; they might help assess the status of these services for their promotion and sustainability. These include, but are not limited to, the use of geographic information systems (GIS), statistical models, artificial intelligence (AI), and social networking services (SNS). This session will explore such methodologies, tools, and techniques through presentations of case studies, especially in the Asian region, and share knowledge and experiences among the participants.

Goals and objectives of the session:

To explore the current state of knowledge in assessing cultural ecosystem services and their promotion and sustainability through case studies and sharing of experiences in the Asian region.

Planned output / Deliverables:

Proceedings of abstracts

Voluntary contributions accepted:

Yes

Related to ESP Working Group/National Network:

TWG 8 – Cultural services & Values

II. SESSION PROGRAM

Date of session: Friday, 17 December 2021

Time of session: 10:00 – 13:00

List of abstracts and speakers

Time	First name	Last name	Title of presentation
10:00-10:10			Introduction
10:10-10:25	Toshiya	Matsuura	Forest recreational potential mapping in central Japan using GIS and multi-criteria evaluation
10:25-10:40	Linwei	Han	The mediation effect of accessibility on the potential health benefits of Urban Parks to Beijing's residents
10:40-10:55	Fanny	Châles	A systematic review of coastal ecosystem services in Pacific Island Countries
10:55-11:10	Thi Mai Anh	Nguyen	Willingness to pay for marine ecosystems conservation in the context of tourism development in Cat Ba Islands, Vietnam
11:10-11:20	**1st discussion and short break**		
11:20-11:35	Takuya	Furukawa	Intergenerational differences in local knowledge about wild edible plants in a rural mountainous village in Japan
11:35-11:50	Kensuke	Kodama	Flood Control Functions of the Historical Channel Network in the Castle Town of Akizuki
11:50-12:05	Yueru	Zhou	Biodiversity Mainstreaming: An International Comparative Investigation of Concerns Toward Biodiversity in Chinese and Japanese-speaking Communities
12:05-12:20	Jinxi	Zhang	Evaluating cultural ecosystem services supply and demand in the Tibetan Plateau
12:20-12:35	Hongpeng	Fu	An innovative process to assess cultural ecosystem services for future improvement based upon social media data and survey data
12:35-12:45	**2nd discussion and short break**		
12:45-13:00	**Summary and overall discussion**		

III. ABSTRACTS

Forest recreational potential mapping in central Japan using GIS and multi-criteria evaluation

Presenting author: Toshiya Matsuura
Contact: matsuu50@affrc.go.jp

Demand for recreational use of paths and trails in forests and grasslands has increased with people's growing interest in nature and health. Outdoor recreational activities in forests and grasslands are getting diverse, such as strolling, hiking, trekking, collection of edible-wild plants and mushrooms, nature observation, trail running, mountain biking, etc. Under such a situation, conflicts often arise among different activities, particularly in suburban areas where more people would like to enjoy these activities. Some recreational activities, particularly the newer ones (e.g., trail running and mountain biking), are often banned in some areas due to conflicts with other conventional activities (e.g., hiking) or their physical impacts (e.g., soil erosion on paths and trails). Besides, these recreational activities are generally less prioritized because forests and grasslands used for these activities are mainly managed for other purposes, such as forestry and agriculture, and are vulnerable to other land development. To avoid these various conflicts and improve cultural (i.e., recreational) services, it is necessary to know the geospatial distribution of suitable areas for these various recreational activities. This study investigates the environmental characteristics of paths and trails in forests and grasslands in hilly and mountainous regions of central Japan, using geographic information systems (GIS) and multi-criteria evaluation (MCE). Various geospatial data are used in the analysis, such as land cover, vegetation, forest age, terrain features, population distribution, tourism resources distribution, and proximity to roads and streams.

The mediation effect of accessibility on the potential health benefits of Urban Parks to Beijing's residents

Presenting author: Linwei Han
Contact: lwhannk@163.com

green spaces (UGSs) are the main places for urban residents to connect with nature and can provide amounts of cultural ecosystem services (recreation, aesthetic, inspiration, etc.), which have positive impacts on the physical and mental health of urban residents. However, there is still no unified conclusion on which planning could meet most residents' needs for UGSs. There have been different criterions on the UGSs planning. For example, the European WHO Office suggested that there should be 1-hectare UGSs in the area 300m from residents; China has proposed that the service radius of park more than 5000 m2 is 500m. However, they only considered distance other than accessibility including transportation and time. In this study, we calculated the availability of park greenspace in Beijing build-up areas to explore the impact of accessibility on the service scope of park greenspace

based on the above criterions. The network analysis method was used to calculate the service area of park greenspace in 3 modes of transportations (walking, biking, and driving). The major findings were that within 15 minutes, the service area of park green space by walking, cycling, and driving accounted for 4.25%, 12.30% and 42.50% of the built-up area in Beijing respectively. According to the results, Beijing build-up areas could meet the criterions in China when residents go to the park greenspace by more than 10 min-walk or driving, and the criterions proposed by the European WHO office only when residents go to the park greenspace by more than 10 mins-bike or driving. It can be concluded that transportation and time costs could reduce the opportunity for residents to UGSs, and the existing criterions should increase the proportion of UGSs in urban areas based on the reactive availability.

A systematic review of coastal ecosystem services in Pacific Island Countries

Presenting author: Fanny Châles
Contact: fanny.chales@hotmail.fr

Coastal ecosystems such as coral reefs, mangroves and seagrasses provide a wide range of services to people, from coastal protection to climate regulation and food security. This is particularly the case for the Pacific Island countries, which strongly depend on coastal ecosystems for livelihoods and income. Although the types of services provided by coastal ecosystem are well-known, their contribution to local livelihoods and well-being at the local scale remains poorly understood. Assessing ecosystem services (ES) at the local scale could better support informed decision-making processes, through a more comprehensive assessment of trade-offs between conservation goals and the development of human activities, by combining bottom-up community needs and top-down government commitments. In this context, we conducted a systematic review of coastal ecosystem services in the Pacific Small Island Developing States, in the peer-reviewed and grey literature between 1990 and 2021. We focused on coastal cultural services, as they are often overlooked in the literature due to challenges involved in valuing them monetarily, or lack of indicators to adequately evaluate them. We identified and classified cultural services indicators from the literature into three categories: a) quantified monetarily, b) quantified non-monetarily, and c) qualitatively assessed. We found disparities of contributions of ES to livelihoods across regions, ecosystems, and types of ecosystem services. Literature on coastal ES was more extensive for Melanesia compared to Micronesia and Polynesia, and ES provided by coral reefs were more often assessed than those related to mangroves and seagrasses. We conclude by providing recommendations on where efforts should be directed to assess coastal ecosystem services, and discuss how this study can contribute to methods used to better account for coastal ecosystem services in environmental management. Lessons learned from this study in the Pacific could also support research methods anywhere, including Asia.

Willingness to pay for marine ecosystems conservation in the context of tourism development in Cat Ba Islands, Vietnam

Presenting author: Thi Mai Anh Nguyen
Contact: ngmaianh1312@gmail.com

Recent tourism development in Cat Ba Islands, located in the north of Vietnam, has significantly contributed to the local economy but has caused severe pressures on the marine ecosystems. The social benefits from the efforts of marine ecosystems conservation have been little studied particularly in the context of balancing ecosystem conservation and tourism development. The present study aimed to estimate the conservation value of marine ecosystems in Cat Ba Islands based on willingness to pay (WTP) among local stakeholders and explore how their WTP can be predicted by demographic and psychological factors. Data were collected based on questionnaire surveys on local tourism operators (n = 100) and tourists (n = 150) in an on-site and online format respectively in summer 2021. The contingent valuation method with the single bounded dichotomous choice question was applied to estimate the respondent's WTP for a hypothetical marine ecosystems conservation program. Respondent's business or tourism experiences, perceived importance and vulnerability of marine ecosystems in Cat Ba Islands, personal norms about environmental issues, and demographic information were also asked and entered into the regression analysis to examine how these factors are related to WTP. Nearly three quarters (71%) of the local tourism operators agreed to pay for the hypothetical conservation program. WTP of this respondent group as annual donation was estimated as 1.264 million VND (approximately 55.58 USD) based on probit model. Perceived effectiveness of coral and mangrove conservation components of the proposed program ($\beta = 0.03$, $p<0.05$) and personal norms (e.g., $\beta = 0.01$, $p < 0.05$) were found positively associated with WTP. In conclusion, this study provides evidence of economic values of marine ecosystems conservation in Cat Ba Islands and suggests several psychological factors could influence the estimated values, which would facilitate decision-making process for a better balance between ecosystem conservation and tourism development.

Intergenerational differences in local knowledge about wild edible plants in a rural mountainous village in Japan

Presenting author: Takuya Furukawa
Contact: tfurukawa@affrc.go.jp

Local knowledge accumulated over the years by local communities to sustainably use natural resources is essential for sustainable ecosystem management and conservation of biocultural diversity. However, the "extinction" of local knowledge has been accelerating worldwide, and understanding how and why the loss occurs is imperative for revitalizing intergenerational knowledge transfer. Here, we evaluated the intergenerational differences in local knowledge about wild edible plants and analyzed the factors behind the loss in a rural mountainous village, Tadami,

Japan. We contacted elementary schools in the study area and recruited children (10-12 years old, n=56), one of their family members (elder sibling, parent, or grandparent, n=57), and schoolteachers and staff (n=41). Our questionnaire asked about their family structure, nature experience during childhood, frequency of collecting/eating wild species in daily lives, and whether they knew the names and usage of each plant (wild vegetables: 37 species, fruits and nuts: 26 species, including overlaps). The amount of knowledge (measured by the number of species the respondent knew) was significantly positively correlated with the age of the person. The average amount of knowledge was significantly lower in children than their family members but not different between children and schoolteachers/staff. The family structure (living with or without grandparent(s)) and frequency of collecting/eating wild plants were also significantly correlated with the amount of knowledge, but nature experience during childhood showed no correlation. Many schoolteachers showed high interest in developing new educational programs on wild edible plants, but the teacher's lack of local knowledge might be a challenge. Therefore, collaboration and participation of knowledgeable elders in the community might be the key to developing effective educational programs for the intergenerational transfer of local knowledge to the children.

Flood Control Functions of the Historical Channel Network in the Castle Town of Akizuki

Presenting author: Kensuke Kodama
Contact: kodamaken.river@gmail.com

Nature-based Solutions (NbS) has been advocated by the International Union for Conservation of Nature (IUCN) against the background of social problems such as climate change, decrease in biodiversity, and increasing disasters. In terms of flood control, Natural Flood Management (NFM), a concept that is related to NbS, is based on the principle of using nature to disperse and slow down the flow of water. In Japan, the historical channel network developed in the castle towns of the Edo period (1603-1868) was constructed using only the dry masonry method and is considered to have functions consistent with NbS and NFM. However, no study evaluates the flood control function of the historical channel network. In Japan, the Akizuki district of Asakura City, Fukuoka Prefecture, is a historical castle town where the channel network developed during the Edo period is still well preserved. The area experienced heavy rainfall of 586 mm in 24 hours in July 2017, and there is concern about the possibility of more heavy rainfall disasters in the future. The purpose of this study is to evaluate the flood control function of the existing channel network in the Akizuki district by conducting flood inundation analysis. Clarification of the flood control function of the channel network will lead to the improvement of flood safety in the region. The analysis will be conducted for multiple cases with different cross-sections of the channel for the heavy rainfall in July 2017. From the result, stormwater control effect, peak flow reduction effect of the main river, and inundation area reduction effect of the channel network were verified.

Biodiversity Mainstreaming: An International Comparative Investigation of Concerns Toward Biodiversity in Chinese and Japanese-speaking Communities

Presenting author: Yueru Zhou
Contact: ruffiewithshion@gmail.com

At the personal level, biodiversity mainstreaming is essential for diversity conservation and the achievement of a sustainable society. However, attitude toward biodiversity is mainly dependent on cultural ethics and social context. Thus, investigating and deepening a mutual understanding of diverse values is indispensable. To address this concern, this study employed text mining to analyze various concerns about biodiversity in Chinese- and Japanese-speaking communities.

The target data were Chinese and Japanese tweets collected using Twitter API. Notably, China is one of the 17 mega-biodiversity countries in the world. The keywords were set as biodiversity (Chinese: “生态,” “生態”; Japanese: “生物多様性”). A total of 294,245 and 304,662 tweets were collected in Chinese and Japanese, respectively. The study then employed the Jieba Text Segmentation module on Python to tokenize and analyze the texts in the tweets. Lastly, tendencies in tweets were visualized using the Wordcloud and Networkx modules.

The results suggested that the main topics within the Japanese community (i.e., “conference,” “COP,” “convention,” “international,” and “hold”) are related to the international conferences and policies claimed by the Japanese government. Alternatively, the main topics of the Chinese community (i.e., “guesthouse,” “wardrobe,” “block chain,” and “ecological civilization”) are related to ecological tourism, commercial promotion, and a combination of natural and digital ecosystems. Furthermore, the results suggest that stakeholder participation differs between the two communities.

In summary, the concept of biodiversity and its related concerns differ across countries and cultures. Thus, a unified understanding is essential to the achievement of a sustainable society.

Evaluating cultural ecosystem services supply and demand in the Tibetan Plateau

Presenting author: Jinxi Zhang
Contact: 982253038@qq.com

In the Tibetan Plateau (TP), the supply of cultural ecosystem services (CESs) is unique, and the demand for CESs is gradually increasing with rapid urbanization. Evaluating the relationship between the supply of and demand for CESs in the TP is critical for regional sustainable development. However, due to the high altitude and complex topography of the TP, it is difficult to obtain empirical data, and relevant research is still lacking. In our study, taking the Qinghaihu-Huangshui basin as an example, we combined SolVES model and social media data to evaluate the supply and demand for

CESs in the TP, China. The results showed that the method of combining SolVES model and social media data can effectively evaluate the supply and demand for CESs in the basin, and is popularized. The supply and demand for CESs in the basin exhibited obvious spatial mismatch, and more than a quarter of the basin area showed mismatch. Among the two types of mismatch, high supply and low demand for CESs had a greater impact on subjective well-being (SWB) than low supply and high demand. In areas with high supply and low demand for CESs, the SWB of residents was significantly lower, which was mainly manifested in the two essential elements of necessary material for a good life and health. Being far away from central city was the main reason for the high supply and low demand of CESs. Therefore, establishing a modern comprehensive transportation system with central cities as the core is an effective means to develop rich cultural and tourism resources, enhance the SWB, and promote regional sustainable development.

An innovative process to assess cultural ecosystem services for future improvement based upon social media data and survey data

Presenting author: Hongpeng Fu
Contact: fuhppku@163.com

Cultural ecosystem services (CES) provided by urban parks are critically important for urban sustainability. Most of these services have not been well quantified and are often underestimated, and it is essential to enhance performance assessment to better improve and sustain these services. The recent upsurge of social media data provides potentially higher data range and dimensions for the extraction and assessment of CES. Importance-performance analysis (IPA) offers a nonlinear insight for cost-effective CES performance assessment. Most of the studies with IPA are primarily based on survey data with limited scalability. However, there is a prominent research gap on how to combine different data sources for better CES assessment, since both social media data and survey data have their advantages and limitations. Based on Pearl River Park and Yunxi Ecological Park in Guangzhou, China, this study proposes a supervised machine learning approach to CES extraction and evaluation, and explores the similarities and differences in IPA results of perceived CES based on social media data and survey data. This study found consistent IPA results for all CES relevant to public welfare through both data sources. CES relevant to personal welfare, including recreational services, social interaction, and education, demonstrate differences in IPA results. Aesthetic services, physical and mental recovery, and religion are relevant to personal welfare and generate similar results through the two data sources. The consistency is mainly because some CES have similar experiences by most users, while the difference is affected primarily by user groups. Social media data directly reflects users' feedback, while survey data can incorporate more extensive user groups, but they need detailed classification for analysis. This study offers methodological insights for CES extraction, quantization, and assessment on a larger scale, and has practical and methodological significance for urban sustainability and human well-being.