



BOOK OF ABSTRACTS

1. SESSION DESCRIPTION

ID: T12

Title of session:

Enablers and boundary conditions for the implementation of ecosystem based disaster risk reduction (Eco-DRR) and climate change adaptation (EbA) measures

Hosts:

	Title	Name	Organisation	E-mail
Host:		Zita Sebesvari	United Nations University, Institute for Environment and Human Security (Germany)	sebesvari@ehs.unu.edu
Co-Host:		Fabrice G. Renaud	United Nations University, Institute for Environment and Human Security (Germany)	renaud@ehs.unu.edu
Co-host:		Joy M. Navarro	Biodiversity Management Bureau Department of Environment and Natural Resources (Philippines)	joynavarro930@yahoo.com



<p>Co-host:</p>		<p>David Vačkář</p>	<p>Global Change Research Institute – Department of Human Dimensions of Global Change (Czech Republic)</p>	<p>vackar.d@czechglobe.cz</p>
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Session description:

Ecosystems provide a large variety of services directly benefiting disaster risk reduction and ecosystem based adaptation. Examples include wave attenuation by sand dunes and coastal vegetation, flow regulation provided by forested hills which can contribute to the flood risk reduction and adaptation.

Ecosystem based and hybrid (combined structural and ecosystem based) measures are being considered in decision making and implemented increasingly to decrease hazard exposure, contribute to mitigation or to reducing the vulnerability of the social–ecological system. One of the remaining barriers for greater uptake is the limited body of knowledge regarding the enablers and boundary conditions (e.g. amount of biomass, width of a forest belt, density a forest, age structure of plants, species selection or composition, speed of recovery after disturbance and many others) under which the envisaged ecosystem based approach will deliver the required services. The session presents case studies where these boundary conditions have been explored using historical studies, modelling frameworks or have been empirically tested in the field or in the laboratory.



Goals and objectives of the session:

The session aims to contribute to the development of technical guidelines to be used when implementing ecosystem based measures for adaptation, mitigation and disaster risk reduction by collecting and providing more in-depth and structured knowledge of the boundary conditions for certain ecosystem based approaches. The lack of such guidelines currently still poses a barrier when deciding about the implementation of ecosystem based measures.

Planned output / Deliverables:

The session output will contribute to a review on boundary conditions available and applicable in different context when implementing ecosystem based measures.

Related to ESP Working Group or National Network:

[TWG 12 – ES & Disaster Risk reduction \(DRR\)](#)

2. SESSION PROGRAM

Date of session: 14 December 2017

Time of session: 10:30 – 12:30



Timetable speakers

Time	First name	Name	Organization	Title of presentation
10:30	Zita	Sebesvari	United Nations University, Institute for Environment and Human Security (Germany)	Introduction to the session
10:40	Wei	Qi	School of Environmental Science and Engineering, Southern University of Science and Technology, China	Ecosystem-based methods for mitigating extreme floods: relationships among forest coverage changes, land surface roughness and extreme floods
11:10	Gaius	Elenga	Ministry of Environment and Sustainable Management development, University of Kinshasa, The Democratic Republic of Congo	Improving the climate resilience of agricultural production systems by African rural populations: some lessons learned from the NAPA project in the Democratic Republic of Congo



ESP 9

WORLD CONFERENCE

● Shenzhen, China ● 11-15 Dec 2017

Ecosystem Services for Eco-civilization

Restoring connections between people & landscapes through nature-based solutions

Time	First name	Name	Organization	Title of presentation
11:25	Yitbarek	Tibebe Weldes-emaet	Environmental Society of Ethiopia, Ethiopia	An assessment towards building resilience through ecosystem based approaches
11:40	Zhan	Tian	Shanghai Climate Centre, China	Assessing future urban inundation risk under deep uncertainties: using RDM theory in central Shanghai
11:55	Discussion			



3. ABSTRACTS

Type of submission: Abstract

T. Thematic Working Group sessions: T12 Enablers and boundary conditions for the implementation of ecosystem based disaster risk reduction (Eco-DRR) and climate change adaptation (EbA) measures

Improving the climate resilience of agricultural production systems by African rural populations: some lessons learned from the NAPA project in the Democratic Republic of Congo

Author(s): Gaius Elenga, Jean Longo Ndembo

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Country: the Democratic Republic of Congo

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The project aims to strengthen the capacity to adapt and manage the impacts of climate change on agricultural production and food security. This project contributes to the restoration of the links between the rural populations and the agrarian systems through solutions based on nature.



This is because it enables rural communities and small-scale farmers to have:

- Locally produced resilient seeds and early warning mechanisms. These two tools allow them to predict drought, plan agricultural activities and plant in all seasons (rainy season and dry season) according to the crops and agro-meteorological information regularly received. It is therefore a continuous system of monitoring and improving resilience based on the two tools mentioned above.
- Ecological techniques and practices of agricultural production, water management and soil fertility. This would be a system for improving resilience based on sustainable management of land and water resources.

The tools mentioned above, in both cases, help restore ecosystem services and, in turn, restore the links between rural populations and agrarian systems. All this works thanks to a perfect multi-actor collaboration and participation (state and non-state services, academic institutions and research centers, local communities, farmers, national and international NGOs, media, technical support partners, etc.). By way of conclusion, the project represents a nature based solution because it uses ecological practices of agricultural production, water



management and soil fertility. And this by valuing the endogenous knowledge, to innovate, to train and to popularize.

Keywords: resilient seeds, agricultural drought, adaptation to climate change, smallholder farmers, restoration of agricultural production systems



Type of submission: Abstract

T. Thematic Working Group sessions: T12 Enablers and boundary conditions for the implementation of ecosystem based disaster risk reduction (Eco-DRR) and climate change adaptation (EbA) measures

Ecosystem-based methods for mitigating extreme floods: relationships among forest coverage changes, land surface roughness and extreme floods

Author(s): Wei Qi, Junguo Liu

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Extreme floods are devastating, and can cause huge casualties and economic losses. Different from traditional infrastructure-based approaches, ecosystem-based methods are eco-friendly and favorable to the environment for mitigating extreme floods. For the ecosystem-based methods, impacts of forest coverage changes on extreme



floods have drawn much attention around the world. Physically-based models are commonly utilized to investigate variations of extreme floods with forest coverage changes. However, few studies have carried out to study the influence of roughness changes resulting from forest coverage variations on extreme floods. The impacts of roughness changes should be addressed since a large proportion of the extreme flood peak comes from surface runoff, and the concentration time of surface runoff is mainly influenced by roughness of land surface. In this study, a physically based biosphere hydrological model with a dynamic vegetation module is introduced, and the roughness is taken into consideration with a kinematic wave routing approach. With this model, the extreme flood changes can be simulated in different forest coverage scenarios by changing the physically-based model parameters. We investigate the relationships among forest coverage changes, land surface roughness and extreme floods. This study provides a valuable attempt to develop ecosystem-based approaches to mitigate extreme flood risks.

Keywords: eco-friendly, ecosystem-based method,



extreme flood, forest coverage, roughness



Type of submission: Abstract

T. Thematic Working Group sessions: T12 Enablers and boundary conditions for the implementation of ecosystem based disaster risk reduction (Eco-DRR) and climate change adaptation (EbA) measures

Assessing future urban inundation risk under deep uncertainties: using RDM theory in central Shanghai

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Climate change induced hazard such as increasing frequency and intensity of rainstorms, the rising sea level, and extreme tide of storm surge, leading to an increasing risk of urban flooding and inundation in Shanghai. In Shanghai, previous studies seldom consider either the large numbers of scenarios to reduce the deep uncertainties under climate change background, or



quantitatively evaluating adaptation solutions in plausible futures. In this study, we aim to fill this extremely important niche with the guiding of the Robust Decision Making (RDM) theory. The RDM method is employed to evaluate the impact of the future urban inundation event that may occur in Shanghai, three factors, including precipitation, rain island spatial pattern and decrease of urban drainage capacity, are selected to build the future rainstorm scenarios using Latin Hyper Cube Sampling method. Inundation depth and area had been simulated; the direct physical loss is calculated based on the depth-damage curve. By implementing “scenario discovery”, we find out that the dominated factor is the decrease of drainage capacity which accordingly determines the vulnerabilities to address on. Three Levers, including increase of public green area and improved standard of urban drainage system and construction of deep tunnel (and their combinations), are alternately implemented to examine their performance in the 100 futures. Besides, the performance of each levers’ risk reduction are examined among levers (and their combinations) in different scenarios. The result shows that the mid-terms robust plan is the combination of increase of green area, and improved



drainage system and the deep tunnel with 30% runoff absorbed and it can reduce Shanghai's future inundation risk from 58% to 98%.

Keywords: robust decision making, climate change adaptation, urban inundation, risk assessment



Type of submission: Abstract

T. Thematic Working Group sessions: T12 Enablers and boundary conditions for the implementation of ecosystem based disaster risk reduction (Eco-DRR) and climate change adaptation (EbA) measures

An assessment towards building resilience through ecosystem based approaches

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The North-Eastern Ethiopia is a disaster prone area where droughts occur every decade jeopardising lives and livelihoods. The impact of these low rainfall droughts has increased, while the buffering capacity of the landscape has been lost to degradation. Prolongation of the dry season resulted in water shortages, while the short heavy rains caused catastrophic floods. The areas land degradation exacerbated by anthropogenic activity and failed



management practices are dwindling food natural resources of the landscape. In addition, several ecosystems are losing their services at an alarming rate; directly threatening the landscape and livelihood resilience.

In addressing such multifaceted problems, selecting appropriate integrated ecosystem restoration based conservation schemes, through a good understanding of the landscape is imperative. Accordingly, the major challenges and opportunities provided by the landscape were mapped based on biophysical and socio-economic, ecosystem service assessments. These assessments incorporated data from the literature, satellite imagery and GIS analyses, field investigation, and socio-economic surveys.

The findings indicated that a holistic view of the links between ecosystem services delivery and human needs because natural ecosystems can provide a wider range of services. Ecosystem restoration efforts, therefore, require greater integration of policies and planning for conservation areas. However, instead of initiating small-scale protected area limited restoration schemes, viable large-scale



landscape restoration initiatives mobilised by governments are superior. In order to make these large-scale efforts successful, the engagement of all stakeholders through collaborative planning for sustainable management of restoration schemes is imperative. Furthermore, implementing successful restoration requires thorough prior research on the legal, political, institutional, socio-economic and cultural landscape.

Keywords: resilience, ecosystems, restoration, disasters, Ethiopia