BOOK OF ABSTRACTS

I. SESSION DESCRIPTION

ID: T13b

Forest Landscape Restoration potential to restore Ecosystem services

Hosts:

	Title	Name	Organisation	E-mail
Hosts:		Ephrem Imanirareba	International Union for Conservation of Nature, Rwanda	Ephrem.Imanirareba@iucn.org
		Charles Karangwa	International Union for Conservation of Nature, Rwanda	charles.karangwa@iucn.org

Abstract:
Forest landscape restoration (FLR) is the ongoing process of regaining ecological functionality and enhancing human well-being across deforested or degraded forest landscapes. FLR focus on restoring a whole landscape to meet present and future needs and to offer multiple benefits and land uses over time rather than being considered as just "planting trees". It is a long-term process requiring multi-year version of ecological functions and benefits to human well-being to be produced. A successful FLR is a forwarding-looking and dynamic approach, focusing on strengthening the resilience of landscapes and creating future options to adjust and further optimize ecosystem goods and services as societal needs.

According to a global assessment of restoration potential, more than two billion hectares of deforested and degraded land worldwide offer opportunities for restoration. FLR can be implemented through different interventions such as: new tree plantings, managed natural regeneration, agroforestry, or improved land management to accommodate a mosaic of land uses, including agriculture, protected wildlife reserves, managed plantations, riverside plantings and more.

Restored lands support livelihoods and biodiversity by supplying clean water, reducing erosion, providing wildlife habitat, biofuel, and other forest products. Forests and trees mitigate climate change by sequestering carbon. Trees in agricultural landscapes can enhance soil fertility, conserve soil moisture, and boost food production. Restoring forests and forest landscapes is an important step in regaining the health and functionality of these ecosystem services.

IUCN has been collaborating with FLR partners to gather knowledge, develop and apply tools, and build capacity while supporting policy-makers, practitioners, researchers and landowners around the world to restore deforested and degraded lands. This session aims at sharing experience on

success story of Forest landscape restoration across the world. This will enable impactful restoration in the coming decade of ecosystem restoration declared by UN general assembly as resolution A/RES/73/284 on 1st March 2019.

Goals and objectives of the session:

This session aims at sharing knowledge between researcher and key stakeholders involved in restoration, sharing success story as well as discussion on tools and methodology to assess ecosystem services from restoration;

1. By discussing methods and tools for land degradation assessment and evaluation of restoration opportunities.
2. By discussing indicator framework to monitor FLR interventions and their impacts.
3. Presenting results from different studies/learning from successful FLR projects
4. Discussion on best tools for ecosystem service assessments

Planned output / Deliverables:

A joint discussion paper to be published in an international journal to support evidence based decision-making.

Related to ESP Working Group/National Network:

Thematic working group: TWG 13 – Role of ES in Ecosystem restoration

II. SESSION PROGRAM

Date of session: Wednesday, 8 June 2022

Time of session: 11:30–12:15

Timetable speakers

Time	First name	Surname	Organization	Title of presentation
11:30–11:45	Daniel	Aja	University of Cape Coast	Accurate Quantification of Mangrove Extent using a Combination of Optical and Radar Images in GEE Platform: The case of Anlo Beach Wetland Complex, Shama District, Western Region, Ghana
11:45–12:00	Mohammed Sghir	Taleb	Institut Scientifique, Mohammed V University in Rabat, Morocco	Nature based solutions (NbS): lever for the conservation of biodiversity and ecosystems for the human well-being
12:00–12:15	Saif	Shahrukh	University of Dhaka	Evaluation of Air Pollution Tolerance, Anticipated Performance, and Metal Accumulation Indices: Implications for

Time	First name	Surname	Organization	Title of presentation
				Roadside Planting for Improving the Quality of Urban Air

III. ABSTRACTS

Abstracts are ordered based on the session program. The first author is the presenting author unless indicated otherwise.

1. Type of submission: Abstract

T. Thematic Working Group sessions: T13b – Forest Landscape Restoration potentials to restore Ecosystem services

Nature based solutions (NbS): lever for the conservation of biodiversity and ecosystems for the human well-being

Presenting author: Mohammed Sghir TALEB

Affiliation: Institut Scientifique, Mohammed V University in Rabat, Morocco

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The concept of Nature based Solutions (NbS) emerged, spurred on by IUCN, at the Conference of the Parties to the United Nations Framework Convention on Climate Change (UNFCCC) in 2009 in Copenhagen. On this occasion, forests were put forward as one of the solutions for climate change mitigation with the establishment of the REDD program. As an extension of this mobilization, IUCN has included the development and promotion of this concept as the third axis of its global program since 2013.

NbS invites us to rely more on natural processes, and not only on technological means, to respond to societal challenges (climate change, human health and well-being or even food security). NbS are seen as solutions that can help achieve the Sustainable Development Goals (SDGs), and thus represent an environmentally sustainable, socially equitable and economically

viable alternative. They are "without regrets" because they have no negative impact on territories and human activities.

NbS contribute and support actions and strategies related to the conservation of biodiversity and ecosystem services. This presentation will give an overview of the different actions inspired from Nature based Solutions to achieve human well-being.

Keywords: Nature based Solutions, biodiversity, ecosystem services, conservation, human well-being

2. Type of submission: Abstract

T. Thematic Working Group sessions: T13b - Forest Landscape Restoration potentials to restore Ecosystem services

Evaluation of Air Pollution Tolerance, Anticipated Performance, and Metal Accumulation Indices: Implications for Roadside Planting for Improving the Quality of Urban Air

Presenting author: Saif Shahrukh

Other author(s): Muhammad Nurul Huda, Md. Mominul Islam, Shahid Akhtar Hossain, Mohammad Enayet Hossain

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In cities, roadside vegetation is exposed to air pollutants, including a wide variety of particulates-borne toxic compounds. An investigation was undertaken to assess the tolerance or sensitivity of four roadside trees (Ficus benghalensis, Ficus religiosa, Mangifera indica, and Polyalthia longifolia) towards air pollutants, including particulates. The four species were sampled from four different locations of Dhaka, Bangladesh. Air pollution tolerance index (APTI) was assessed using the total chlorophyll content, ascorbic acid content, relative water content, and the pH of the extract from the leaves of the studied plants. The results were compared with similar species at a non-polluted site in a nearby area having a similar soil-climate complex. The total chlorophyll content decreased with the increasing particulate matter loads. APTI of the investigated plants ranged from 10.31 to 12.51 meaning they were either sensitive or

intermediately tolerant. M. indica was found to be intermediately tolerant in three sampling sites. The results indicated that these evergreen species are good indicators of air pollution and can be used as an early warning tool for air pollution level that is harmful to human health. Anticipated performance index (API) was also calculated to assess the overall performance of a plant in a particular region where some socioeconomic and biological characteristics were taken into consideration. From the API, M. indica was judged as good performer maintaining the highest score (68.75%) amongst the selected plant species irrespective of different sites. The accumulation of heavy metals (Cd, Cr, Pb, and Ni) on leaves of four tree species were investigated, and a predictive foliar metal accumulation index (MAI) was developed. F. benghalensis was found to have the highest MAI value (13.60). Based on these three indices, the most suitable plant species for green belt development in urban areas were identified and recommended for long-term air pollution management.

Keywords: Air pollution, Particulate matter, Air pollution tolerance index, Anticipated performance index, Metal accumulation index machine learning

3. Type of submission: Abstract

T. Thematic Working Group sessions: T13b - Forest Landscape Restoration potentials to restore Ecosystem services

Accurate Quantification of Mangrove Extent using a Combination of Optical and Radar Images in GEE Platform: The case of Anlo Beach Wetland Complex, Shama District, Western Region, Ghana

Presenting author: Daniel Aja
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Mangrove Forest classification in tropical coastal regions based on only Passive remote sensing approaches is hampered by Mangrove complexity, topographic considerations and cloud cover effects among other things. This paper reports on a novel approach that combines Optical Satellite images and Synthetic Aperture Radar alongside their derived parameters to overcome the challenges of distinguishing Mangrove stand in cloud prone regions. Google Earth Engine cloud-based geospatial processing platform was used to extract several scenes of Landsat

Surface Reflectance Tier1 and synthetic aperture radar (C-band and L-band). The imageries were enhanced by creating a function that masks out clouds from the optical satellite image and by using speckle filter to remove noise from the radar data. The random forest algorithm proved to be a robust and accurate machine learning approach for mangrove classification and assessment. Our result show that about 16% of the mangrove extent was lost in the last decade or so. The accuracy was assessed based on three classification scenarios: classification of optical data only, classification of SAR data only, and combination of both optical and SAR data. The overall accuracy were 99.1% (Kappa Coefficient =0.797), 84.6% (Kappa Coefficient = 0.687) and 98.9% (Kappa Coefficient = 0.828) respectively. This case study demonstrates how mangrove mapping can help focus conservation practices locally in climate change setting and to track progress in the sustainable development goals (SDG).

Keywords: Algorithm, Decision Trees, Cloud Cover, NDMI, Wetland Complex, Ghana