BOOK OF ABSTRACTS

I. SESSION DESCRIPTION

ID: T18

Conserving ecosystem services for sustainable recovery and sustainable development: Locking in opportunities from the COVID-19 pandemic

Hosts:

	Title	Name	Organisation	E-mail
Host:		Felix Donkor	University of South Africa (UNISA)	felixdonkor2002@yahoo.co.uk
Co-host:		Emuriat Julius Emmanuel	ASAF	emuriat25@yahoo.co.uk

Abstract:
The COVID-19 pandemic has resulted in severe disruptions in the daily activities of people globally. The pandemic has shown that progress made in tackling poverty, hunger, good health and well-being can be eroded unless the global community also urgently tackles the global environmental threats that have are capable of undermining the systems that enable humanity and the planet to survive and thrive. Human health and wellbeing was a key issue in the pandemic with ecosystem services given prominence as one of the solutions such as visits to parks etc. Moreover, strict laws were introduced to encourage responsible environmental behaviour as well as mediate human environment interactions. However, it has become clear that the destruction of wild habitats will result in increased animal-human interaction directly and thus the increases the chances of spread of zoonotic diseases such as the corona virus. This makes it necessary to consider how key stakeholders can build back by working with, not against the environment in order to manage and create resilience to future systemic threats and human wellbeing. This session will consider some of the opportunities that the corona pandemic highlighted for the management of environment and related ecosystem services. Sustainable recovery and sustainable development are viable when sound environmental measures, plans and policies are given priority and implemented by governments.

Goals and objectives of the session:

To consider how behavioural changes and sound environmental laws implemented during the pandemic can be maintained in a post-covid era for conserving ecosystem services and sustainability

Planned output / Deliverables:

- Blog post
- Policy brief

Related to ESP Working Group/National Network:
Thematic working group: TWG 18 – Governance & Institutional aspects

II. SESSION PROGRAM

Date of session: Wednesday, 8 June 2022

Time of session: 16:00–17:30

Timetable speakers

Time	First name	Surname	Organization	Title of presentation
16:00–16:15	Raviraja	Shetty G	Agricultural and Horticultural Research Station, Ullal, Mangalore (UAHS, Shivamogga, India)	Conservation, propagation and promotion of cultivation of endangered medicinal plants among farmers to improve livelihood and sustainability
16:15–16:30	James	Njuguna	Dedan Kimathi University of Technology	Determination of thermo-mechanical properties of recycled polyurethane from glycolysis polyol
16:30–16:45	Venant	Habimana	Rwanda Water Resources Board	Advanced CROM DSS for erosion control planning and monitoring in Rwanda
16:45–17:00	Sharon Rose	Tabugo	MSU–Iligan Institute of Technology	A Call for Conservation: Genetic Diversity of seahorses in Mindanao, Philippines
17:00–17:15	Jean de Dieu	Mucyo	University of Rwanda	The soil pollution and related prevention measures

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: T18 – Conserving ecosystem services for sustainable recovery and sustainable development: Locking in opportunities from the COVID-19 pandemic

Conservation, Propagation and Promotion of Cultivation of Endangered Medicinal Plants Among Farmers to Improve Livelihood And Sustainability

Presenting author: Raviraja Shetty G

Affiliation: Agricultural and Horticultural Research Station, Ullal, Mangalore (UAHS, Shivamogga, India)

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The Western Ghats of India is very rich in its medicinal wealth. The forests and hills of this region is a treasure house of about 2000 medicinal plants. Out of which many are used for traditional and folk medicinal practices. Many are exploited commercially for their active enzymes and their commercial value. It is being observed that many useful medicinal plants have become either endangered or becoming extinct due to over exploitation and in the absence of cultivation. It is apprehended that the modern allopathic system of medicine will suffer a serious setback if certain medicinal plant species go totally extinct. The uncontrolled collection and sale of large quantities of plant material from the forest leads to destruction of many forest plants. Local communities, traditional medicinal herbalists and herbal medicine vendors popularly collect roots, bark and whole shrubs. This is a serious problem. Moreover, the limited knowledge on the varied use of the medicinal plants, their availability and extent of distribution weakens the ways to utilize these resources efficiently. More over traditional knowledge associated with medicinal plants are also in the verge of extinction. Keeping these points in view efforts have been made to standardize the propagation protocols for medicinal plants of commercial value. These plants were multiplied in a large scale and distributed to farmers for commercial cultivation. Farmers have been educated to understand the importance of these medicinal plants and scientific way of cultivation of medicinal plants. This has

immensely helped in conservation and promotion of ayurvedic medicinal plants through demonstration, propagation, multiplication and through creation of awareness among public for its cultivation and sustainable usage.

Keywords: Conservation, propagation, promotion, cultivation and medicinal plants

2.Type of submission: Abstract

T. Thematic Working Group sessions: T18 - Conserving ecosystem services for sustainable recovery and sustainable development: Locking in opportunities from the COVID-19 pandemic

A Call for Conservation: Genetic Diversity of seahorses in Mindanao, Philippines

Presenting author: Sharon Rose Tabugo

Affiliation: MSU-Iligan Institute of Technology

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Seahorses have been extensively harvested because of the demand for Traditional Chinese Medicine (TCM). They are a flagship species of the marine environment since they are found in various habitats. Thus, this study used molecular data to understand nature of populations of seahorses in selected areas in Mindanao, Philippines, for management and conservation efforts. Portion of the mitochondrial control region (CR) was utilized as molecular marker for DNA barcoding. The number of polymorphic sites, population diversity indices such as number of segregating sites, haplotype number and diversity, nucleotide diversity and average number of pairwise nucleotide difference were determined. Maximum likelihood (ML) tree indicated that species were clustered in appropriate branches but noteworthy, Hippocampus kuda formed three (3) clusters, having 18 haplotypes indicating H. kuda as a species complex. Based on molecular data, this is the first time H. capensis and H. casscsio were recorded in the Philippines. Polymorphism, for seahorses, was observed to be of high haplotype diversity (h=28; Hd=0.943) yet low nucleotide diversity value (Pi:0.18095) which suggest small differences among haplotypes. Neutrality indices calculated by Tajima's D (-2.00774), was significant with $P<0.05$ and Fu's Fs (-11.645), tests were both negative for this population. Thus, imply a signature of rapid population expansion from a small effective population size. In the past, there was heavy incidental and by-catch harvest of seahorses that somehow,

pushed the seahorses' population to the brink of being vulnerable however, adding seahorses to the Appendix II of CITES and in the IUCN Red List of Threatened Species had somehow educated communities to conserve populations and existing habitats. Thus, alleviate the pressure on seahorses and allowing populations to slowly recuperate in the wild. Understanding the nature of populations is vital for conservation genetics and developing effective management strategies. Saving the seahorses means saving the seas.

Keywords: seahorse, conservation, genetic diversity, haplotypes, polymorphism

3. Type of submission: Abstract

T. Thematic Working Group sessions: T18 - Conserving ecosystem services for sustainable recovery and sustainable development: Locking in opportunities from the COVID-19 pandemic

Determination of thermo-mechanical properties of recycled polyurethane from glycolysis polyol

Presenting author: James Njuguna

Other author(s): Nancy

Affiliation: Dedan Kimathi University of Technology

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Polyurethane foam is one of the most versatile polymers widely used in the automotive industry. However, due to the rising amount of polyurethane foam waste in the environment, there is growing research attention focusing on circular economy solutions to closing the material loop. This study aimed to determine the possible changes in thermo-mechanical properties between rigid polyurethane prepared using polyols derived from depolymerization of commercial polyurethane foam with benchmark rigid polyurethane (Ben PU). Polyurethane foams containing dispersion polyol were reacted with dipropylene glycol (DPG) and diethylene glycol (DEG) with a ratio of DPG: DEG of 1:1 in the presence of a consumable catalyst (Di-n-butyl amine). The recovered polyol was used as a raw material replacing 100% benchmark rigid polyurethane petroleum-based polyester polyol to produce the recycled polyurethane (Rec PU). Thermal analysis was conducted to measure the recycled polyurethane's glass transition

temperatures (Tg) using differential scanning calorimetry (DSC). Tensile strength, elastic modulus, toughness, and hardness test of the recycled polyurethane were conducted under three different temperatures; 24°C, 40°C, and 60°C. From the DSC results, the glass transition temperatures for the recycled and the benchmark rigid polyurethane occurred at 43°C and 50.4°C, respectively. Both polymers showed the brittle-ductile transition from 24°C to 40°C. Tensile strength for recycled polyurethane was lower than that of benchmark rigid polyurethane by 29-43% and a corresponding 24-50% decrease in elastic modulus. Recycled polyurethane recorded lower toughness than petroleum-based pure polyurethane by 13-16%. However, the recycled polymer recorded high shored D values than the benchmark rigid polyurethane by 9-29%. This study reveals that recycled polyol could be used as feedstock for polyurethane production with applications tailored to its mechanical properties.

Keywords: polyurethane foam, recycling, glycolysis, rigid polyurethane, thermo-mechanical properties, circular economy.

4. Type of submission: Abstract

T. Thematic Working Group sessions: T18 - Conserving ecosystem services for sustainable recovery and sustainable development: Locking in opportunities from the COVID-19 pandemic

The soil pollution and related prevention measures

Presenting author: Jean de Dieu Mucyo

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As fertilizers continue to be used in modern agriculture, the soil layers continue to be polluted by pesticides, and chemical products including heavy metals which are harmful to human life and the environment. The latter will also affect crop production and have a considerable footprint in the climate change in different ways; such as significant yield reduction caused by soil get pollution and it will lead to drought and famine in in the country. Moreover, not only famine and drought rise but also the climate changes due to the greenhouse gases emitted by polluted environment and therefore, resulting in global warming. The advocacy of using additives Ecological Engineering-based solutions such as using phytoremediation techniques to

restore the soil structure and sanitized feaces from Eco-latrines via fossils decomposition and Manuel composition. As a results soil productivity and cleanness restoration will be improved.

Keywords: Soil pollution,famine and drought, pytoremediation, soil restoration, sustainable management

5.Type of submission: Abstract

T. Thematic Working Group sessions: T18 - Conserving ecosystem services for sustainable recovery and sustainable development: Locking in opportunities from the COVID-19 pandemic

Advanced CROM DSS for erosion control planning and monitoring in Rwanda

Presenting author: Venant Habimana
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Soil erosion is the most serious environmental problem in many catchments of Rwanda. The main factors affecting the amount of soil eroded include land use and vegetation cover, topography, soil and climate. Catchment Restoration Opportunity Mapping (CROM)" is a GIS-based soil erosion predicting model developed based on the Universal Soil Loss model originally introduced by Wischimeier and Smith in 1978 and adapted for Rwanda using Catchment approach. The result of CROM version 1 was a potential soil erosion map, however this map did not neither show areas already protected against erosion nor indicate the location of erosion footprints. This makes it hard to assess the progress made on erosion control and to estimate the needs for further actions. Hence, CROM Version 1 was upgraded to a high resolution advanced CROM DSS which integrates a result-based performance module for multi-level planning and monitoring, making CROM outputs spatially explicit and user friendly for real-time decisions. Advanced CROM outputs showed that Rwanda has made progress on erosion control. Of 2,531,308 hectares' total country land, 1,081,692 hectares (42.7%) are at erosion risk and only 294,079 hectares (27.2%) are protected against erosion following the baseline 2020. Because soil erosion itself is a symptom of poor land management, erosion control

measures alone will remain insufficient to improve the management of land and water resources given the current agricultural land uses. There should be a switch of emphasis to focus on the promotion of a high quality integrated soil management system rather than stand-alone erosion control measures. Rainwater harvesting in settlements and storm-water infrastructure in urban areas also has the potential to address accelerated erosion resulting from rainfall run-off. Advanced CROM DSS dashboard is also developed as a communication tool with user communities, multilevel planners, academic researchers and practitioners for real-time monitoring of erosion control in Rwanda.

Keywords: Soil, erosion control, CROM, Decision Support System (DSS), Rwanda