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A COMMUNICATION STRATEGY FOR THE SOIL BIODIVERSITY

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INTRODUCTION

Soil is a complex ecosystem inhabited by a highly diverse biotic community that uses soil either as a permanent or temporary habitat. The organisms that inhabit the soil range in size from invisible microbiota (*e.g.* bacteria, fungi and protozoa) to more conspicuous mesofauna (*e.g.* mites, collembolāns, enchytraeids and nematodes) and macrofauna (*e.g.* earthworms, termites, millipedes, scorpions, snails, slugs, insects and their larvae and burrowing vertebrates).

As the knowledge on soil biology increases, it becomes increasingly evident that there are many indirect and direct threats to the soil biodiversity. The indirect effects include structural decay, erosion and decline of organic matter. The direct impacts on soil biodiversity include compaction, acidification, salinization and contamination of soils by agro-chemicals and industrial pollutants. Most of these threats are due to human activities such as agriculture, land conversion, deforestation *etc.*, and contribute to an overall decline in soil biodiversity.(Kunast, 2010) Further, climate change will also have impacts on soil communities as there is a strong connection between soil formation, soil structure and climate. However, unlike the changes in above ground communities that are easily detected, these changes that take place below ground escape detection as they are not directly visible. Further, the intricate relationship between above and below ground communities are poorly understood at present. Available research data indicate that above ground communities depend heavily on the ecological processes that take place below ground such as recycling of material, water storing capacity, absorption of nutrients, *etc.*, (Turbe, 2010)

IMPORTANCE OF CREATING AWARENESS ON SOIL BIODIVERSITY

There is an increasing body of research evidence to support the fact that sustainability of agricultural production depends on the optimal use of natural soil capital including the soil biotic community (Stockdale, 2006). However, the current agriculture practices have many negative impacts on the physical and chemical properties of soil. This in turn will have an impact on the organisms that inhabit the soil, leading to a reduction in soil biodiversity and therefore, loss of services rendered by them. Thus, there is a pressing need to create wide scale awareness about the influence of agricultural practices on the soil communities and their functions as well as the value of maintaining a diverse soil biota to enhance agricultural productivity. The adaptation of proper soil management practices can minimize the negative impacts of agriculture on soil biological populations and diversity and can maximize the positive effects of soil biota on agricultural productivity. Creating awareness not only contributes to better soil management but also provides an opportunity to get local communities involved in monitoring the changes in soil biodiversity. This type of citizen science programmes are widely used in the conservation of above ground biodiversity.

PRESENT STATUS IN TERMS OF AWARENESS ABOUT SOIL BIODIVERSITY

In Sri Lanka, traditionally, the subject of soil has been dealt with by geographers and chemists and therefore, the emphasis is mostly on physical and chemical properties of soil. The biotic aspect of soil has been largely neglected and most of the below ground biodiversity remains undiscovered. This does not come as a surprise, since only a fraction of the above ground biodiversity, which is much more amenable to study, has been documented to date. Since very little is known about below ground biodiversity, much of the awareness work, both formal and informal, have a heavy emphasis on the physical and chemical aspects of soil with little attention been given to the biotic component of soil. This could be attributed to the low level of scientific knowledge and understanding regarding soil biodiversity, especially with respect to ecosystem processes and functions.

NEED FOR A COMPREHENSIVE COMMUNICATION STRATEGY FOR SOIL BIODIVERSITY

As soil biota can have both positive and negative effects on agricultural production, it is necessary to be able to measure or assess the impacts of individual soil management practices on soil biodiversity. If agricultural production systems are to be made sustainable, there should be clear understanding as to how changes in land management practices impact both short and long-term functioning of soil ecosystems. Increased attention been given to establish holistic and a systemic approach towards soil management, especially in developed countries, has resulted in a wealth of information on the effects of changing land use and management practices on soil biological diversity. This knowledge needs to be made available for use by various actors (policy-makers, technical support personnel, farmers and other land managers) through targeted materials, case studies and through capacity-building processes.

OBJECTIVES OF THE COMMUNICATION STRATEGY

- Promote awareness, knowledge and understanding about the major functional groups of soil biodiversity, the key roles they play in the soil ecosystems, essential ecosystem services provided by them and the positive and negative impacts of land management on soil biodiversity
- Building capacity to promote the adoption of an integrated approach towards the sustainable use of soil biodiversity and thereby, enhancing agro-ecosystem functions
- Promote awareness about the need to conduct research on soil biodiversity and establish protocols to monitor long term changes in it
- Enhance the capacity to provide extension services by public sector institutions on sustainable use of soil biodiversity resources
- Promote awareness about use of agro-chemicals in a sustainable manner

KEY STAKEHOLDERS

To assist in the effective implementation of the communication strategy on soil biodiversity, the target audience could be grouped in to four major stakeholder groups.

Farmers and other land managers: The focus here will be to build on the previous experience and traditional knowledge through combining the skills and wisdom of farmers and modern scientific knowledge. This could be achieved through enhancing their knowledge and understanding about the major functional groups of soil biodiversity, the key roles they play in agroecosystems, the positive and negative impacts of the diverse farming practices on soil biodiversity and the principles of integrated soil biological management.

Students starting from primary school to postgraduate level: Here, the emphasis will be to provide a holistic understanding about soil ecosystems as well as to emphasise the need to conduct more research on soil biodiversity, especially at the postgraduate level.

Public Sector agencies involved in soil management: Here, the focus is going to be providing focused education and training on aspects such as integrated soil management, effective communication, monitoring techniques *etc.*,

Private sector organizations that market agrochemicals: The emphasis here will be to create awareness about actions that should be taken to minimize the impacts on soil biodiversity in their respective trade activities.

KEY TOOLS

The following communication tools could be used to ensure effective internal and external communication.

Media - Printed and electronic media can be used to reach a broader audience to create general awareness about soil biodiversity as well as to deliver key messages on sustainable use of soil biodiversity.

Seminars or Workshops - can be used to reach specific stakeholder groups such as farmers, plantation industries, extension officers, agro-chemical distributors, scientists and students conducting research on soil, education sector, media, and agencies that are indirectly linked to soil management such as the Central Enviornemental Authority, Geological Survey and Mines Bureau *etc.*, The idea will be to develop a dialogue on sector specific issues and workout methods and mechanisms to address these issues

Website - will function as an interactive information portal which can be accessed by a wider stakeholder community from general public to research scientists. The site will have different access levels where access to information will be controlled through a password system which will enable the user to access and download or upload information to the portal

Specialized training - will be provided to key stakeholders involved in soil management such as farmers, planters, agriculture extension officers *etc.*,. The training modules will impart specific skills and knowledge with respect to management of soil biodiversity with the aim of building capacity to adopt an integrated approach towards sustainable use of soil biodiversity.

Merchandise and promotional materials - These will include posters, brochures, booklets, bill boards, stickers *etc.*, to promote broader public awareness to be used in places where large number of general pubic gather or for creating awareness about specific issues such as wise use of agro chemicals, organic farming practices and land management practices that enhance soil biodiversity.

Academic publications - The focus here is to document technical information arising from research in the field of soil biodiversity periodically

Curriculum reforms -The focus here will be to develop a curriculum with the relevant stakeholders to ensure that soil biodiversity is included in the curriculum from primary to postgraduate education and that the curriculum is designed in a way that will provide a incremental amount of information.

ANTICIPATED OUTCOMES

The following outcomes are anticipated through the implementation of the communication strategy on soil biodiversity of Sri Lanka.

- Increased public awareness of the value of soil biological resources and the need to use it in a sustainable manner
- Enhanced capacity to promote integrated agro-ecosystem approaches and thereby, achieve conservation, sustainable use and enhancement of soil biological functions.
- A mechanism established for the flow of information and better cooperation among different actors, institutions and development organizations such as farmers, extension officers, researchers, policy-makers and environment specialists. This should provide the basis for promoting improved soil biological management and thereby, achieving more productive and sustainable agricultural systems.
- A set of case studies made available on sustainable management of soil biodiversity in specific agricultural systems
- Adoption of proven practices for the management of soil ecosystems which contribute to productive and sustainable agriculture and the restoration of degraded lands.

REFERENCES

Künast, C., Riffel, M., Whitmore, G. and Schiansky, J. (2010). Soil biodiversity and agriculture, Publication of the European Crop Protection Association. pp. 52.

Stockdale, E. A., Watson, C.A., Black, H. I. J. and Philipps, L. (2006). Do farm management practices alter below-ground biodiversity and ecosystem function? Implications for sustainable land management. *JNCC report* no. 364. pp. 144.

Turbē, A., De Toni, A., Benito, P., Larelle, P., Ruiz, N., Van der Putten, W. H., Labouze, E., and Mudgal, S. (2010), Soil biodiversity; functions, threats and tools for policy makers, Bio Inetelligence Service, IRD, and NIOO, Report for European Commission (DG Environment). pp. 254.