GUEST EDITORIAL

Sustainable Land Management Practices to Prevent Land Degradation

Land is a vital natural resource that provides food security, livelihood, and various ecosystem services to mankind. The global human population recently estimated at 7.7 billion is projected to increase to 8.6 billion by 2030, 9.7 billion by 2050, and 10.9 billion by 2100 (https://population.un.org/wpp/https://population.un.org/wpp/accessed on 11.02.2023). Food grain demands have witnessed an exponential increase in recent decades and are estimated to continue growing with increasing global population and expanding economic affluence. However, the foundation of a productive system i.e. healthy lands and soils and clean water supply are already under immense pressure.

Land degradation refers the decline in the productive capacity of the land including its major land uses (i.e. rainfed arable, irrigation, forests), farming systems (smallholder subsistence), and its value as an economic resource. More than 33% of the global land is degraded due to direct and indirect drivers of degradation (Larbodière, L. *et al.,* 2020,http://doi.org/10.2305/IUCN.CH. 202010.en), including rapid agriculture expansion (Dubey P. K. *et al.,* 2021, J Environ Manag, 280: 111798, doi: 10.1016/j.jenvman.2020.111798), urbanization, and industrialization, unsustainable land use practices (IPBES, 2018, IPBES secretariat, Bonn, Germany, pp. 44), deforestation, salinization (Edrisi S.A. *et al.,* 2021, Land Degrad. Dev., 32**:**123–138, doi:10.1002/ldr.3641), desertification, natural and human-induced fires, soil erosion, overexploitation of groundwater, mining activities, invasive alien plant species, climate change, poor land governance and policy measures, etc. (Abhilash, P.C., 2021, Land, 10:201, doi.org/10.3390/land10020201). Land degradation happening at an alarming rate is contributing to a dramatic decline in the productivity of croplands and rangelands worldwide. Climate change exacerbates variations in yields and income from agriculture, threatening the resilience of agro ecosystems and the stability of food production systems (Olsson *et al.,* 2019, an IPCC Special Report on Climate Change, Desertification, Land Degradation, Sustainable Land Management, Food Security, and Greenhouse Gas Fluxes in Terrestrial Ecosystems, 184 p.). The pressure on the global land resource is increasing due to other factors as well, such as agricultural production systems made less resilient by the loss of biodiversity, and natural factors such as climate variability and extreme weather events.

Globally, 3.2 billion people are affected by land degradation, especially rural communities, smallholder farmers, and the very poor. However, desertification which is defined by UN as “degradation of land in arid, semi-arid and dry sub-humid areas” is threatening the livelihoods of 1 billion people in over 100 countries, and each year 12 million hectares of arable land are lost due to drought. The economic costs of desertification and land degradation are estimated at USD 490 billion per year. Africa is particularly vulnerable to land degradation and desertification, and it is the most severely affected region in the world. Desertification affects around 45% of Africa's land area, with 55% of this area at high or very high risk of further degradation, while about 35% of the arable land in Asia has been influenced by desertification. Nearly 1.3 billion people or 39% of the total population in the Asian region are exposed to desertification and arid conditions (https://www.thegef.org).

Desertification, land degradation, climate change, and biodiversity loss were identified as the greatest challenges to sustainable development at the Rio Earth Summit in 1992. These global environmental issues pave the ways to adopt three Rio conventions i.e. United Nations Convention to Combat Desertification (UNCCD), United Nations Framework Convention on Climate Change (UNFCCC), and Convention on Biological Diversity (CBD). UNCCD adopted in 1994 is the sole legally binding international agreement linking environment and development to sustainable land management. It follows long-term integrated strategies in affected areas for improving the productivity of land, and rehabilitation, conservation, and sustainable management of land and water resources leading to improved living conditions of the ecosystems.

INDIAN FORESTER

The 2030 Agenda for Sustainable Development, adopted by all United Nations Member States in 2015, provides a shared blueprint for peace and prosperity for people and the planet, now and into the future. The 17 Sustainable Development Goals (SDGs) are the blueprint to achieve a better and more sustainable future for all. These SDGs address global challenges such as poverty, inequality, climate change, environmental degradation, prosperity, and peace and justice. SDG 15 urges countries to protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, halt and reverse land degradation and halt biodiversity loss. Target 15.3 of SDG 15 aims to combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strives to achieve a land degradation-neutral world by 2030. Land restoration creates sustainable livelihood opportunities for people (smallholder farmers, indigenous peoples and local communities, businesses and entrepreneurs, women and youths) to boost incomes, secure food and water supplies, and make individuals and communities less vulnerable.

Land Degradation Neutrality (LDN) is at the heart of the land restoration agenda, providing a practical framework and flexible planning tools for the sustainable management of our land and water systems. More than 130 countries have adopted LDN targets to avoid the future loss of land-based natural capital by scaling up sound stewardship and restoration practices. Achieving LDN by preventing land degradation and rehabilitating already degraded land, scaling up sustainable land management (SLM) practices and accelerating restoration initiatives is a pathway to greater resilience and security for all.

According to the definition developed at the 1992 Earth Summit, SLM refers to *"the use of land resources, including soils, water, animals and plants, for the production of goods to meet changing human needs, while simultaneously ensuring the long-term productive potential of these resources and the maintenance of their environmental functions".* The productivity and sustainability of a land-use system are determined by the interaction between land resources, climate, and human activities. Implementing SLM practices is essential for minimizing land degradation, rehabilitating degraded land, ensuring the sustainable use of land resources (i.e. soils, water, and biodiversity), and maximizing resilience. Successful restoration of degraded lands can happen through integrated land use planning, agroforestry, integrated farming system, farm diversification, organic farming, soil and water conservation measures and conservation agriculture.

Realizing the importance of achieving land degradation neutrality, sustainable management of land resources, and to promote South-South Cooperation, A Centre of Excellence on Sustainable Land Management has been established at the Indian Council of Forestry Research and Education, Dehradun to facilitate the induction of technology on land degradation issues. The Centre is engaged in capacity building and technical support, LDN target setting, capacity building for developing transformative projects, networking of national and international institutions working on sustainable land and ecosystem management for knowledge sharing, awareness and technical support for the implementation of sustainable land and ecosystem management projects. In light of the above, we bring a special issue on "Sustainable Land Management Practices to Prevent Land Degradation" covering sustainable land management practices and success stories of land improvement. The Special Issue encompasses a collection of research and review articles, case studies and views and expressions covering different facets of land degradation, LDN, and SLM practices. The collection of articles published in the special issue will certainly be helpful to gain meaningful insights into the scientific and traditional knowledge-based SLM practices to achieve LDN.

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