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CONTRIBUTION OF AGROFORESTRY TO THE ENVIRONMENT

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INTRODUCTION

Agroforestry is the combined management of traditional land-use systems, forest resources, and agricultural crops and animals, that uses technology and expertise to reach the goal of contributing to ecology and economy. Agroforestry is proving to be a sustainable way of increasing food, fiber and fodder production along with having positive effects on the environment and ecosystems.

There are a number of agroforestry systems that are adopted by farmers like agri-silvi pasture, silvi-pasture, forest farming, home gardens, windbreaks and riparian buffer-strip systems.
The article brings to light many positive roles that an agroforestry system plays.

AGROFORESTRY ENHANCING BIODIVERSITY

According to the latest IUCN Red List 2021, there are more than 37,400 species threatened with extinction. Preservation of biodiversity is emphasized everywhere along with sustainable use of biological diversity components and agroforestry answers this challenge. Agroforestry systems harbor diverse species of insects and birds. While on one hand where agroforestry systems provide habitat for these organisms, these organisms too contribute to the success of the farm.

Insects, which can be used as bioindicators, tell a lot about ecosystem health and environmental changes. Among insects, pollinators are the most crucial group for the fruiting, propagation and yield generation of crops. Birds also aid in pollination.

AGROFORESTRY WITH VARIOUS FARMING SYSTEMS

Agroforestry is not confined to a particular set of farming systems and can easily go along with any system irrespective of it being intensive, extensive, organic, conventional or integrated. Agroforestry has led to an increased sustainability of organic farming. Since mineral fertilizers and synthetic pesticides are not readily available in tropical regions, agroforestry has proved analogous to organic farming there.

ENVIRONMENTAL MANAGEMENT WITH AGROFORESTRY TREES

There are a number of trees like *Moringa oleifera*, *Gliricidia sepium* etc. which are considered as "wonder trees" for yielding various products and playing many environmental roles. For instance, *Moringa oleifera* works on rehabilitating and enhancing soil quality in arid zones along with maintaining sufficient root and foliar growth despite severe water stress conditions.

Trees also act as windbreaks which have been an indispensable part of agricultural landscapes. They protect the crops from high winds, prevent soil erosion, provide habitat to birds and create a microclimate that mitigates extreme weather events.

AGROFORESTRY REDUCING WILDFIRE INCIDENTS

Based on average fire incidents, Grasslands (11.2%) and agroforestry (20.2%) showed least incidents of wildfire while forests (31.9%) and shrublands (36.7%) topped the list.

Although wildfires have been an integral part of many terrestrial systems, soaring temperatures and dry summers have been followed by elevated risk of devastating wildfires. Large scale rural abandonment and migration of people to cities leaving surplus of flammable biomass in forests, along with changes in land-use pattern are the main causes behind it.

CARBON SEQUESTRATION BY AGROFORESTRY

Agroforestry is involved in carbon sequestration by storing large amounts of carbon in the soil and also acts as a sink for atmospheric CO2. In this way agroforestry can help reverse the adverse effects on soil caused by water erosion, depositions of air pollutants and nitrogen, natural disturbances like storms and wildfires, or compacting and help promote soil health.

NUTRIENT AND WATER ECONOMY IN AGROFORESTRY SYSTEMS

Silvi-pasture is a promising agroforestry land use pattern but a competition is established between trees and pasture for nutrients and water during the initial growth. Agroforestry counters this competition by providing different root depths of trees and pasture. Since the root zones are different, water and nutrient uptake are from different zones, thus reducing competition and preventing exhaustion of a particle soil zone and proper growth of both the parties.

POLICY AND MANAGEMENT OF AGROFORESTRY

The faith of promotion of agroforestry also lies in policy making. It could either support it or suppress it. Although there are some countries like the USA, India and France where promotion of agroforestry is addressed, it is lacking in many other regions.

Immediate actions need to be taken and various systems need to be precisely studied before making policies. It is also important to work individually with every farmer to understand and suggest the agroforestry practices for their farm.

CONCLUSION

Currently, agriculture is the major net producer of greenhouse gases which are causing a major biodiversity crisis. Agroforestry is a tool that along with benefitting the farm land economically and ecologically, also enhances carbon sequestration and compensates the biodiversity loss. Incorporating trees in crop cultivations/animal livestock is not only a sensible but also a sustainable way forward.