

Unlocking Agricultural Potential: The Essential Role of Forests

Donga A. R.¹, Patel P. C.², Soni N. V.² and Zala H. N.²

¹Ph.D. Scholar, Department of Genetics and Plant Breeding, C. P. College of Agriculture, S. D. Agricultural University, Sardarkrushinagar (Gujarat) – 388506

²Assistant Professor, Department of Genetics and Plant Breeding, C. P. College of Agriculture, S. D. Agricultural University, Sardarkrushinagar (Gujarat) – 388506

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A forest is a geographical region that is covered in trees, shrubs, herbs, and other types of vegetation. It does not come under the agricultural as well as urban utilization. It is not categorized under either agricultural or urban usage. Forests are essential to the existence of all living beings. Forests serve as vital for human survival, providing oxygen, food, shelter, fuel, and a source of income for local communities. More than 80 per cent of the biodiversity are protect in the forest area. It is self nourishing natural setup for the number of living entity which includes plants, trees, shrubs, vines, grasses, algae, fungi, insect, mammals, birds, animals, reptiles, amphibians and microorganisms. Forestry contributes in myriad of ways to sustainable agricultural production and food security. The greatest contribution is through its protective environmental functions such as the maintenance and restoration of soil fertility and soil improvement, erosion control and maintenance of biodiversity (Raj *et al.*, 2019). The forest additionally exerts an influence on the regional rainfall systems. Forestry also contributes in many other ways such as through the direct production of food, provision of rural employment and income. Trees are the world's greatest carbon repositories, which help to keep global temperatures stable. The major cause of global warming is an increase in CO₂ levels.

The present discussion is therefore aimed at highlighting the various ways forestry contributes in ensuring sustainable agricultural production and food security.

Maintenance of biodiversity

Biodiversity represents the wealth of live forms found on earth including millions of different plants, animals and micro-organisms and the genes they contain. A forest is one of the world's largest living genebanks. Maintenance of this diversity is an insurance and investment necessary to sustain and improve agriculture. This is because it is the sources of all our food. Existing wild species can provide useful features that can be integrated into their

cultivated counterparts to make them more resilient to disease, therefore offering much to be gained from them in terms of genetic advancement. Moreover, cross breeding of domestic crops with wild varieties can improve yields and produce new strains better adapted to growing conditions or more resistant to diseases and pests. The major store house of this genetic diversity is the forest. The forest systems of the world – particularly tropical forests - house a great portion of the planets plant and animal species. No doubt, forest ecosystems are very crucial for both the maintenance and expansion of food production. But as per today's scenario of next 50 years, deforestation may be the major factor causing the extinction of species if it is never stopped.



Trees provide a Natural Abode

Millions of living creatures, including snakes, turtles, crocodiles, insects, birds, butterflies, monkeys, and other wild animals, depend upon forests for their existence. It offers an ecology in which the animals can flourish. The forest floor also provides a rich environment for microbes, which are required for the breakdown of dead matter into nutrients in soil.

Prevent Soil Erosion

Soil erosion is a serious threat to continued agricultural productivity. Erosion whether by wind or water leads to the loss of top soil where soil nutrients are concentrated thus leading to the disruption of agricultural production and degradation of the soil. This situation can however be halted by the provision of vegetation cover. Trees conserve the soil by providing safeguard against rain and wind, reducing soil erosion to a minimum. The canopy of trees shelters the ground from the impact of heavy downpours. Planting trees as windbreaks and shelterbelts can reduce the velocity of the wind to a speed that is insufficient to move soil

particles. The reduction in wind speed leads to lower evaporation from both open water and soil surfaces, facilitating more water accessible for plant growth.



Bamboo is best soil erosion preventors

Control the Greenhouse Gases

Forests maintain ecosystems by capturing greenhouse gases such as carbon dioxide, which are thought to be the cause of climate change. Carbon is retained in the biomass of the forest. Forests store a massive quantity of carbon (about a quarter of a trillion tons), which might cause calamity if released into the environment.

Purify the Air

Food and energy are the essentials for the healthy lifestyle which is generated by the most censorious function of plants. Plants, bushes, and trees take carbon dioxide from the atmosphere throughout the day and emit oxygen. According to estimates, one acre of mature trees can offer oxygen to 18 people (McAliney, 1993). Trees functions as enormous lungs, cleansing the environment by eliminating carbon dioxide and maintaining the appropriate amount of oxygen that humans breathe every day. Trees also absorb odours and pollutants such as ammonia and sulphur dioxide from the atmosphere.



To balance global temperature

Forests offer green cover, which absorbs radiation from the sun and maintains the temperature down. They control air temperature via evapotranspiration and wind. The forest additionally boost ups the rainfall, which helps to maintain the level of the groundwater table and a mild climate.

To improve the soil fertility

The decomposition process turns dead leaves and broken branches into soil, which feeds the soil with nutrients. The biodegradable components are transformed into organic substances by soil microorganisms so that the plant may use them again.

To maintain the water cycle

An essential part of the water cycle is the forest. They control the water's evaporation, condensation, and precipitation. They also restore groundwater resources by nourishing the aquifers. By allowing rainwater to percolate down the trunk and into the soil, trees stop contaminants from being carried by stormwater into the ocean. They function as enormous sponges, recharging the water table and filtering water. (Mátyás and Sun, 2014)

Importance of forest in human life

The forest has a wealth of medicinal plants, herbs, and trees. Although these trees and plants are not harmful to humans, their extracts, seeds, leaves, and bark are used to cure a variety of illnesses. Willow tree extract, calabar bean, quinine, curare, rose periwinkle, and wild yams are a few examples. (Smith, 2006)

Source of Food

The variety and importance of food that people especially in the rural areas obtain either directly from the forest, or produce in an environment sustained and protected by trees are enormous. Forests and trees provide food sources in a variety of forms which include edible leaves, fruits, seeds, nuts, roots, tubers, sap, bark, mushroom, honey, game, snails and insects. In certain seasons of the year, when stored food resources are running low and the next crop is not yet readily available food from the forests is frequently used to help bridge "hunger periods" and supplement diets (Sunderland and Rowland, 2019). In addition, these products feature prominently during emergency periods such as floods, droughts, famine, wars, economic and social disasters when nutrition, fuel for cooking and heating and timber for the reconstruction of homes and animal shelters become critical.

Source of wood

A vast variety and amounts of forest and tree products also support the major productive activities of farming including livestock production, fishing and hunting. Forest is the good source of timber and non timber wood. Non- timber forest products (NTFPs) provide materials for supporting crops (e.g. yam and pumpkin stakes), as well as materials for making farm tools. NTFPs also provide materials for making baskets used in carrying and marketing produce, racks for crop drying and storage (e.g., yam barns and maize cribs), pestle and mortars used for pounding the staple food, and sieves for crop processing (e.g., garri making). Forest also provides fuel wood needed for the processing of farm produce and also for cooking of food (Tewari, 1998) Fuel wood is also needed in such agriculturally based industries as fish-smoking, tea and tobacco curing, bakeries, brick- making and pottery. Apart from that, Forests are probably the primary source of monetary income for those living in remote areas, particularly those who own little or no property. This revenue is derived from more than just gathering wood. When compared to agricultural or logging, non-wood forest resources may frequently produce higher and more stable profits from the same area. For example, the yearly value of global commerce in rattan is US\$2,000 million. Forest-based enterprises employ thirty million people in India alone. (FAO, 2019)



NTFP Collection in the BR Hills, Karnataka retrieve from

Source of fodder

Many species of trees in the tropics are used for fodder either for browse or stall feeding. Fodder trees contribute in several ways to the overall food security of households. They make

a significant contribution to domestic livestock production which in turn influence milk and meat supply. Moreover, grass on drying loose much of its energy, protein, vitamin and mineral values hence animals have to depend on fodder from trees for their survival during the dry season. In addition, fodder trees contribute to maintaining drought animals and producing manure for organic fertilizer thereby supporting agricultural production

Employment and income generation

Forest also contributes indirectly to household food security, through the generation of employment and income from the sale and exchange of gathered and processed forest products. A wide range of forest products which rural people gather, produce and trade in order to derive income. These products include fuel wood, dyes, rattan, fibres, fruits, nuts, leaves, mushrooms, bamboo, medicines, gums, and forest game. In many countries, forestry – based activities are a major source of off-farm employment in rural areas. Small forest based gathering and processing enterprises provide one of the largest source of non-agricultural employment and income to rural people at a time when rural households have to look to non-farm employment and income for a growing share of their total livelihood (Paudel and Paudel, 2021)

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