



Role of Agroforestry in Diversification and Livelihood Security

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Editorial

The process of growing big trees along with shrubs, crops and livestock is called Agroforestry. It is a botanical term that signifies a practice where a vast piece of land is converted into farmlands but has everything ranging from big perennials, shrubs, and animals reared at the same time. Agroforestry has been recognised as a land use system capable of yielding both food and wood besides conserving and rehabilitating the ecosystem. Trees play dominant role in all agroforestry systems for sustainable agriculture and environmental protection. In agroforestry systems there are both ecological and socio economic interactions between different components. The cycle of an agroforestry system is always more than one year and even the simplest agroforestry system is structurally, functionally and socio-economically more complex than a monocropping system. The benefit of agro forestry system includes provision of food, fuel, timber and various agricultural products in addition to restoring the equilibrium in the ecosystem and contributing to agricultural conservation.

What is Diversification: Crop diversification refers to the addition of new crops or cropping systems to agricultural production on a particular farm taking into account the different returns from value-added crops with complementary marketing opportunities. The introduction of high value crops replacing low value crop is the main principle of crop diversification. Agriculture diversification refers to either a change in cropping pattern or the farmers opting for other non-farming options like poultry farming, animal husbandry, etc. Diversification helps in reducing risk

of agriculturist and enables them to get various opportunities productive sustainable livelihood options. Diversification is essential to provide supplementary gainful employment and realising higher levels of income for rural people to overcome poverty. Crop diversification is a strategy applied to grow more diverse crops from shrinking land resources with an increase in productivity in the same arable land.

Agroforestry on Diversification

Agroforestry can generate food, feed, fruits, fibre, fuel, fodder, fish gum and resins as well as other non-wood products for food and nutritional security. It can also support livelihoods and promote productive, resilient agricultural environments in all ecologies. Agroforestry systems can provide small-holder farmers with various income-generating opportunities such as the sale of timber, fruits, nuts and other non-timber forest products. It can help to reduce the farmers' dependency on a single crop and provide a more stable source of income.

Agroforestry is looked upon as a solution to the challenges faced by the Indian agriculture and the farmers for increasing overall productivity from limited available natural resources. For more than five decades, Indian agriculture has been facing severe problems related to an increase in input cost to increase productivity. Trees can improve the physical properties by adding organic matter like soil structure, porosity, and water holding capacity, modify the temperature by shading and litter cover and tree species enrich the soil by adding both above and below-ground biomass into the soil system. Agroforestry can be established to meet local needs while also protecting the environment.

In our country agriculture is livelihood or subsistence for most farmers, not business. Breaking the mono-cropping

pattern by the introduction of diverse crops and cropping patterns helps in reviving the soil health and increasing the resource-use efficiency. Therefore, there is an urgent need to change the crops and cropping pattern that is crop diversification. It is important by way of addition of new crops as intercrop and or predecessor or successor crops, changing numbers of the crop (multi-cropping), modified cropping system and adopting a new, integrated cropping pattern with changing agronomical practices.

In this way, integration of trees in the cropping system known as agroforestry, plays a significant role in sustaining crop diversification. It is a part of primitive and tribal agriculture nourished with indigenous technical knowledge. Agroforestry is an important land-use system for diversification around the world in different spheres of biological, ecological, economical and sociological considerations. Globally, different agroforestry practices have played a key role in crop diversification. In North America, for instance, farmers preferred agroforestry over agriculture to improve their economic gain and natural resource conservation. The home gardens of the southern part of India are a classic example of maintaining temporal and spatial arrangement for crop diversity, with trees resulting in sustainable productivity from the unit area. Agroforestry contributes to a multifunctional production system which enhances biodiversity due to the creation of diverse habitat for macro- and micro-organisms and maintaining landforms for future generations. It provides opportunities to integrate traditionally grown crops with other commercial crops such as cereals, oilseeds, pulses, vegetables, fruits in agri-horticulture, horti-silviculture, silviculture, silvifloriculture, silvimedical, agri-horti-silviculture, aquaforestry, silvipasture, hortipasture etc.

The integrated farming system is an offshoot of agroforestry advocating the diversification of the agri-production with other associated secondary and tertiary agriculture practices. The role of micro-organisms, nitrogen-fixing trees, leaf litter decomposition, forest hydrology and nutrient fluxes in agroforestry is well known to promote the crop diversification with various underutilized and wild crops. The role of trees on a farm directly and indirectly envisages the resiliency in the cropping system.. Thus, it can be said that the tree diversity on a farm is a prerequisite solution for the promotion of crop diversity, not only at the farm level but also at the agricultural landscape level in different ecologies. Agroforestry will play a serious role in bringing the required level of diversification together with sustainability.

Livelihood Security: In its simplest form, livelihood security is the ability of a household to meet its basic needs. These needs include adequate food, health, and shelter, minimal levels

of income, basic education and community participation. Livelihood refers to adequate stock and flow of food and cash with an individual to meet their basic needs and livelihood security means secured ownership of the resources and income earning activities. Agroforestry supports food and nutritional security through the direct provision of tree foods like fruits and leafy vegetables.

Household livelihood security is defined as adequate and sustainable access to income and resources to meet basic needs including food, water, health facilities, educational opportunities, housing, time for community participation and social integration.. Forests are a stabilising force for the climate. They regulate ecosystems, protect biodiversity and play an integral part in the carbon cycle, support livelihoods, and supply goods and services that can drive sustainable growth. Livelihoods can be made up of a range of on farm and off farm activities which together provide a variety of procurement strategies for food and cash.

Agriculture, an important base for the rural livelihoods of India but it is under serious threats. For decades, food insecurity, poverty and climatic adversity have complimented each other hampering livelihoods of the rural poor, destabilizing sustainable development of this country. Over the last four decades agricultural production has come under increasing risk due to the adverse climate changes, land and soil degradation. Over 70% of the rural households depend on agriculture as their principal means of livelihood. Small holder agriculture faces many challenges including low productivity, high dependence on rainfed agriculture, insecurity of the traditional land tenure system and environmental degradation due to unsustainable agricultural practices.. The demand and supply gaps of agricultural produce promote deforestation and depletion of forests for sustenance, generating detrimental poverty-resources

Agroforestry on sustainable livelihood

Agroforestry has been used as a major strategy to enjoin forest occupants to become partners in rehabilitating degraded forestlands. Agro forestry is a dynamic, ecologically based natural resource management system through which the integration of trees/woody perennials in farm and rangelands, diversifies and sustains production for increased social, economic and environmental. Different patterns of agroforestry systems are practiced in different agro-ecological regions of India which reflects biophysical and social variations. Trees are planted on the borders or within the field, systemically or at irregular intervals, usually with crops such as rice, wheat, pulse, jute, oilseed, sugarcane, vegetables etc. and farmers grow shade-tolerant crops such

as turmeric, ginger and aroid when trees have high canopy coverage like jackfruit, mahogany etc. Trees in crop fields work as insurance in case of sudden crop failure or to support crops against environmental hazards and also provide extra income from trees. Moreover, if there is a failure in one crop, the other crops would supplement the deficit. So agroforestry is largely evolved with resiliency, diversity and sustainable land use, which will permit maintenance of productivity combined with conservation of the resources. Agroforestry might be the best land-use system for sustainable livelihood in India to cope with the present situation. It is a land based production system that is directly related to food security, employment, income opportunities and environmental issues.

Conclusion

The natural forest resource continues to play a major role in improving the livelihood of rural communities because of the rich biodiversity in forests. Thus, natural forests are able to provide for energy, food, nutrition and health. However, the current levels of deforestation causing land degradation, soil nutrient depletion, loss of natural habitats and also changing composition of the natural woodlands. An improved agroforestry system brings significant change in the agricultural farming systems among farming communities and affects farming households. Agroforestry also have potential to contribute to the maintenance of biodiversity in natural systems due to the reduction in overreliance of rural communities on natural forest resources.