



## AGROFORESTRY FOR AGRICULTURAL SUSTAINABILITY

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### ABSTRACT

*With the increasing world population, the need for more productive and sustainable use of the land becomes more essential. According to the United Nations, more than 7 billion people lived on the Earth in 2011 and this number is expected to go up to 9.3 billion by the mid-century. To meet the demand for food by 2050, food Production will have to be increase by over 60%. These figures, coupled with current problems rises out of past and existing non- sustainable land use practices. Provide the case for changing the way we manage lands and our production with practicing agroforestry. Agroforestry is part of the solution to addressing these issues, whether they are environmental, economic or social. Agroforestry systems include both traditional and modern land use systems where trees are managed together with crops and animal production. There are dynamic, ecologically based, natural resource management systems that diversity and sustain production in order to increase social, economic and environmental benefits for land users at all levels.*

### INTRODUCTION:

Agroforestry is the integration of trees, crops and livestock, on the same plot of land and can be an integral components of productive agriculture. The integration of farming with forestry originates from the realization that trees play a vital role in safeguarding the long range interests of agriculture including live stock. Agroforestry an old practice, has been recognized as a land use system which is capable of yielding wood, food, fuel , and medicine and at the same time conserving and rehabilitant the ecosystem vital for sustainable agriculture and environment. The national agriculture policy (2000) emphasis the role of agroforestry for efficient nutrient cycling, nitrojen fixation, addition of organic matter and for improving drainage. Agroforestry is helps to promoting diversification of agriculture and holistic development of rainfed areas.

### OBJECTIVES:

- 1) To understand the concept of agroforestry and benefits of agroforestry
- 2) To study the significance of agroforstry in sustainable development.

### Concept of Agroforestry:

Agroforestry, a combined agriculture and forest production system, has been recognized since time immemorial as an important system of cultivation in India". Agroforestry is a land use system that integrates trees, crops and animal in a way that is scientifically sound; ecologically desirable, practically feasible and socially acceptable to the farmers (Niar 1979) Agroforestry combine production of multiple outputs, with protection of resources base. The main objective of agroforestry are a) maximizing productivity multiplicity of output b) ensuring involving a sustainability; which impels the conservation



or improvement of soils. According to king and chandler (1978) “Agroforestry means a sustainable land management systems which increases the overall yield of the land, combines the production of crops and forest plants on same unit of land and applies management practices”. Hence agroforestry is a complex land use a technology intimately associated with factor like structural description (Tree /Crops or animals) combination. Production objectives and socio economic objectives which encompasses myriads of problems and need of the local community.

### **Need of Agroforestry:**

Agroforestry has great technical and economic potential to over come in the way of higher and sustained crop production and farm income. Agroforestry provides a different land use options. It makes us of the complementary between trees and crops, so that the available resources can be more effectively used. Agroforestry provides an alternative food sources at arid and semi arid lands. In Agroforestry system increases the per unit production of food, fodder, fuel and livestock. It reduces pressure on protective and productive forests for meeting the local demands of fuel wood, fodder and building material. The agroforestry remains productive for farmers and generates continuous revenue; agroforestry allows for the diversification of farms activity and makes better use of environmental resources. Agroforestry is useful for maintain the ecological balance. Agroforestry helps to check the soil erosion, conserve soil moisture and increase the soil fertility.

### **Benefits of Agroforestry:**

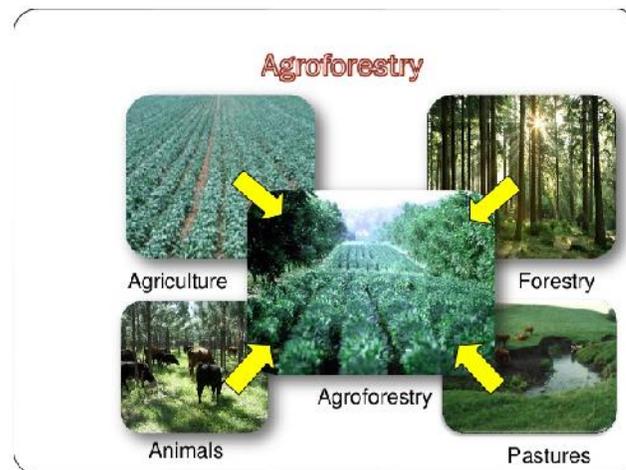
Agroforestry systems have been most advantages over conventional agricultural and forest production methods. It helps to increased productivity, economic benefits and more diversity in the ecological goods and services provided. Following are the major benefits of agroforestry.

- Agroforestry can control runoff and soil erosion, thereby reducing losses of water, soil material, Organic matter and nutrients.
- Agroforestry can maintain soil organic matter and biological activity at levels of satisfactory for soil fertility. This depends on an adequate proportion of trees in the system normally at least 20% crown cover of trees to maintain organic matter over systems as a whole.
- Agroforestry can maintain more favorable soil physical properties than agriculture through organic matter maintained.
- Agroforestry can lead to more closed nutrient cycling than agriculture and hence to more efficient use of nutrients.
- Agroforestry can check the development of soil toxicities or reduce existing toxicities both soil acidification and salinization can be checked and trees can be employed in the reclamation of polluted soils.
- Agroforestry system can lead to reduced insect pests and associated diseases.
- Agroforestry can be employed to reclaim eroded and degraded land.
- Agro forestry can augment soil water availability to land use systems. In dry regions though competition between trees and crops is a major problem.

- Nitrogen – fixing trees and shrubs can substantially increase nitrogen inputs to agroforestry systems.
- Trees can probably increase nutrient inputs to agroforestry systems by retrieval from lower soil horizons and weathering rock.
- The decomposition of tree and pruning can substantially contribute to maintenance of soil fertility. The addition of high quality tree pruning's leads to large increase in crop yields.
- Agro forestry can provide a more diverse farm economy and stimulate the whole rural economy.
- Creation of original landscape that is attractive open and favor recreational activities. Agroforestry plots have a truly innovative landscaping potential, and would improve the public image of farmers to society.
- Reduced the greenhouse effect- agroforestry constitution of effective systems for carbon sequestration, by combining the maintenance of the stock of organic material in the soil.
- Improvement of biodiversity, especially by the abundance of “edge effects”. This in particular, permits a synergistic improvement, by favoring the habitat of game. The integrated protection of crops by their association with trees, chosen to stimulate the hyperparasites (parasites of parasites) population of crops, is promising way forwards.

### Types of Agroforestry

On the basis of the nature of components agroforestry can be classified in to –



1) **Agri – Silviculture Systems:** (crops and trees including shrubs/ vines) this system integrates agricultural crops and trees and involves systematic and deliberate use of land for the concurrent production of agriculture crops in the available space between trees or woody perennials.

### 2) Silvi – Pastoral Systems

Such systems integrate pasture and / or animals with trees, here, woody perennials, both timber yielding trees and fodder yielding trees plus grasses



are introduced deliberately and systematically and managed scientifically. Thus, Silvi-Pastoral practice including management of fodder grasses in natural forests or in plantations or in grasslands.

**3) Agri – Silvi pastoral Systems** (Trees + crops + pasture / animals) This system consists of following subsystems / practices:

i) Woody hedges for much, browse, green manure, soil conservation etc: in this subsystem, various woody hedge, especially fast-growing and coppicing fodder shrubs and trees are planted.

ii) Home gardens (multiple combination of trees, fruit trees, vegetables etc)- this subsystem is common in almost all areas. Many species of trees, bushes, vegetables and other herbaceous plants are grown in dense and apparently random arrangements, although some rational control over choice plants and their spatial and temporal arrangement may be exercised.



**4) Other Systems:-**

- a) Multipurpose woodlots
- b) Agri- Silvi- Fishery
- c) Agri with trees:
- d) Agri with sericulture etc.

**CONCLUSION:-**

Agroforestry is one of the important agriculture system which is useful for increasing agricultural production and productivity as well as increasing soil fertility and soil conservation. Agroforestry is economically and environmentally benefitted. In future agroforestry is most useful for sustainable agriculture and over all sustainable development.

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