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# Module-8

# Introduction of Forest Trees



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## Trees for improving farm productivity

- With depletion of agricultural lands and lack of irrigation facilities, agriculture in arid and semiarid regions is becoming uneconomical.
- Agroforestry provides a viable solution for such problems. Promotion of afforestation should be based on well tested technical and economic data to guide the farmers and general public in the right direction.
- We need trees for our survival. Trees purify the atmosphere by converting carbon dioxide into oxygen, provide food, fodder, medicines, organic manure, fuel, timber and also improve the soil productivity, ground water table and the ecosystem.
- Thus, trees play a significant role in improving our quality of life. Among trees, there is a large number of species and a wide variation exists among them.



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- These variations may be due to their size, growth rate, and adaptability to various agro-climatic conditions, their ability to tolerate harsh weather conditions or their utility.
- By and large, every tree created by nature is good, although some are more useful than others. Some trees may not survive under certain soil and climatic conditions while some others may grow aggressively, suppressing other species.
- Hence, the success of tree planting depends on the choice of species.
- Trees have a significant role in keeping the environment clean, while supporting livelihoods.
- Over 43% of the cooking energy in the world is met from biomass.
- In rural areas where 65% of the population lives, biomass is the only accessible and affordable source of energy



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## **Social Forestry – A drive for people’s participation**

- With the aim of developing private and non-forest public wastelands under afforestation while protecting the natural forests, the Government of India introduced several people-oriented afforestation schemes from the early 1950s.
- Significant among them were decentralised plant nurseries for distributing among small farmers, cultivation of fodder, fuelwood and round timber species through Forest Development Corporations, fuelwood plantation on urban wastelands, production of industrial raw materials on Government-owned wastelands and leasing revenue wastelands to the poor for growing trees, etc.



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## Choice of tree species for farmers

- Based on various social forestry projects implemented over the last 2-3 decades, it is clear that choice of species is the key to the success of any afforestation programme.
- Profitability is the main factor for tree plantation on private lands, followed by other minor factors such as gestation period, demand for produce, level of investment, access to market, availability of planting material and specific local uses, which influence the farmers to select tree species for planting on their lands.
- The popularity of the species also varies from region to region, based on the value and demand for produce, marketing infrastructure, agro-climatic conditions, available inputs and publicity by the extension agencies.



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## Tree species for income generation

- A study in Maharashtra revealed that when different agencies were promoting tree planting, a majority of the farmers preferred to grow fruit, timber and round wood species on their marginal lands.
- This preference was based on the profitability, demand for the produce and field publicity.
- Selection of fruit species was dependent on the soil productivity, irrigation facility, availability of good quality planting material and profitability.
- Oil seed trees such as neem (*Azadirachta indica*), mahua (*Madhuca indica* and *Madhuca longifolia*), pongamia (*Derris indica*), undi (*Calophyllum inophyllum*) and jatropha (*Jatropha curcus*) are also gaining importance due to their use for bio-diesel production.
- Among these, jatropha and pongamia have received wider publicity, but farmers are yet to realise the advantages of these species. There are many other non-wood tree species having economic importance.





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## Trees for Agroforestry

- With depletion of agricultural lands and lack of irrigation facilities, agriculture in arid and semiarid regions is becoming uneconomical.
- Agroforestry provides a viable solution for such problems. Under this system, trees serve as wind breaks, source of organic matter, shade and soil binder to prevent soil erosion while generating additional income.
- Depending on the fertility and depth of soil and moisture availability, different tree species can be introduced. In areas receiving more than 800 mm annual rainfall, it is possible to introduce various fruit crops while planting multipurpose tree species on field bunds and borders.
- Agri-horti-forestry promoted by BAIF Development Research Foundation on degraded private lands particularly in hilly terrains for rehabilitation of tribals, is based on this concept



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## Planting trees for social causes

- People also want to plant certain tree species with religious sentiments or for beautification, but in small number.
- Many species of Ficus, Bael / Stone apple (*Aegle marmelos*) and Acacia are also considered holy trees and people generally do not cut them.
- However, they do not want to plant these plants in large number, without any tangible benefits. Many flowering trees are planted for beautification around residential or public places.
- Tall growing trees with wide branches to provide shade, such as mahogany (*Swientenia macrophylla*), raintree (*Samania saman*) and ficus trees can be planted to bring the open area under tree groves.
- Plants like bamboo, bottle brush (*Callistemon viminalis*) and weeping willow (*Saliz babylonica*) can be planted along lakes and canals.





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## Profitability of tree species

- A benefit-cost analysis of important fruit and round timber species based revealed that pole timber such as eucalyptus, bamboo, casuarina, melia and leucaena start generating income from the third year.
- As most of them coppice well, plantations can be maintained to harvest 3-4 crops. Drumstick (*Moringa oleifera*) and papaya (*Carica papaya*) start fruiting in the first year while other fruit trees like jujube (*Zizyphus mauritiana*), custard apple, pomegranate, guava, Indian gooseberry (*Emblica officinalis*), mango, citrus, sapota (*Manilkara zapota*) and cashew start fruiting from the third year.
- Farmers do not mind planting tree species of long gestation like teak (*Tectona grandis*), sandalwood (*Santalum album*), siris (*Albizia lebeck*), shishum (*Dalbergia sissoo*) and many non-wood product species useful for food, oil, gum, resin, wax, pesticides, tan, dyes, fibre, soap and medicines, in small number on the field boundary or backyard.



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## Preference for different tree species

While calculating the profitability of different tree species, it is necessary to take their entire life cycle and convert into annual returns. Most of the fruit trees start generating income from an early age and contribute to profit every year. In case of round wood and timber species, income is generated only when trees are cut, after a long gestation.

Looking to the present trend of tree planting on private lands, it can be concluded that farmers opt for different types of tree species in the following order of priority:

1. Fruits and nuts
2. Round wood species and plywood
3. Non-timber forest products and oil seeds
4. Paper and pulpwood
5. Fuelwood and forage



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- To ensure selection of suitable species, it is better to prepare a land use plan, based on the soil productivity of the site earmarked for tree planting.
- Fertile soil with assured soil moisture is highly productive, where fruit trees grow well and give high returns.
- Hence, such lands can be reserved for establishing fruit orchards, if farmers are not intending to grow arable crops of high value.
- There are shallow soils with moisture stress, where it is extremely difficult for tree species to survive. Such soils can be used for growing fodder shrubs and grasses.



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## **Strategy for solving fuelwood crisis**

- Promotion of commercial plantation, where only 40-50% wood is used for timber or industrial raw material and the rest is sold as fuelwood at a subsidised price.
- Planting fuelwood species of short gestation in fruit orchards or timber plantations is feasible.
- Selection of nitrogen-fixing tree species like leucaena, gliricidia, sesbania, acacia and albizia which are known for high calorific value can further benefit farmers by nursing the main tree species through soil enrichment.