

## CHAPTER IV

### MODELS OF SOCIAL FORESTRY

In order to decide production and management systems or models of social forestry, it may be necessary to study socio-demographic characteristics of the area, land capability, tenancy, capital investment, local requirements, socio-economic conditions of the local population, agricultural practices, availability of labour, level of education, etc. Present level and pattern of forest produce consumption will also help in indentifying suitable production and management systems. The following systems or models have been identified in social forestry.

- (i) Multiple product forestry
- (ii) Small scale forestry
- (iii) Arboriculture
- (iv) Agrisilviculture
- (v) Agro-forestry
- (vi) Silvipasture
- (vii) Strip system forestry
- (viii) Farm forestry on Bunds
- (ix) River, stream bank farm forestry
- (x) Hill slope farm forestry

#### MULTIPLE PRODUCT FORESTRY

This system aims at producing forests with a view of obtaining multiple produce benefits. The system is particularly suitable where

local population is basically forest community with a tradition of obtaining a variety of products from the forests. The system will be more useful if the past management of the forests has aimed at producing exclusively timber. The selection of species, has to be done keeping people's requirements in view.

There are examples that people have reacted against taking up plantations of timber species. In Madhya Pradesh, under economic plantation schemes, mixed miscellaneous forest were being clearfelled for planting of teak. People in tribal areas (Jhabua, Shabdol, etc.) opposed the felling of Mahua as the seeds are eaten by the tribals. It may be therefore necessary to adopt a system which may aim at producing multiple benefit products. For example Akharot (for timber and fruit), Mahua (for timber, flower and seeds), Anla (for wood, fruit and tannin), Saja (for timber tasar silk and oxalic acid) and Mango (for fruit and wood). The system is suitable for areas such as wastelands, degraded forests and other forest areas near habitations. The species for timber, fruits, fuel wood and others be inter-mixed in plantations.

#### **SMALL SCALE FORESTRY OF VILLAGE WOODLOTS**

This may be considered as a suitable system aimed at achieving self reliance. The selection of species and management will depend upon local demand and availability of suitable land. The system may aim at producing firewood, fruits, edible nuts, small timber for construction of houses and agricultural implements, formation of shelter belts, etc.

The system can be adopted by the farmers in their own land, intermarginal ridges of the fields, along village roads, paths, around buildings, wells, on panchayat lands, etc. The primary aim of this system is to produce enough firewood, small timber and other forest produce by individual cultivator or by panchayats so as to achieve self reliance in forest produce consumption. Selection of species has to be done carefully so that it may meet people's requirements. Line plantations along roads, canal banks and railway lines form an important sub-class of this system.

#### **ARBORICULTURE OR TREE FARMING**

The word Arboriculture is used to signify the intensive cultivation of trees individually or in a small group or orchards. The object of the system is to put an area under intensive cultivation of trees. There are many examples of this system. Many tree farms in Gujarat eg. tree farm of Ramdas Bhai Patel, about 20 Km. from Ahmedabad, have adopted intensive cultivation of eucalyptus and other tree species.

In some parts, cultivators have taken up plantation of industrially important species with a view of supplying raw materials to the industries. Industries can enter into long term contracts with cultivators for ensuring sustained supplies. Quick growing species such as, *Gmelina arborea*, *Albizia falcata*, *Eucalyptus*, etc., can be regarded as cash crops. A plantation of these species after 8 to 10

years can yield about  $300\text{m}^3/\text{ha}$  which may give a return as much as that from several agricultural crops.

Arboriculture in many areas can be more paying than agriculture, horticulture, etc. Important points are to identify such areas and to propagate the technical and economical aspects in order to motivate people to take up this system.

### **AGRISILVICULTURE**

This term is used to cover all systems in which land is used to produce both agriculture and forestry crops either simultaneously or alternatively. Several sub-systems are recognised (2). Agriculture with tree fallow is a sub-system like traditional shifting cultivation. In this, the trees in the fallow land, being valuable species are planted, sown and the seeds of other species are allowed to spring up simultaneously. In Southern Iraq tamarix trees are planted on land which was once used for growing vegetables and was later abandoned after the well water had become very saline. The sub-system in its true sense is not practised in India. It is also advisable to propagate particularly when efforts are being made to control the shifting cultivation.

Afforestation with agriculture inter-cropping is another sub-system. This system consists of inter-cropping of a forest plantation with agricultural crops during initial areas, until, the canopy of forest trees closes. The system is well known as taungya

system and is being adopted since middle of nineteenth century in India and other countries. In this system forest plantations have been raised using the labour of land-hungry cultivators who are allowed to raise agricultural crops for initial period of 2 to 3 years and in return they have to raise tree plantations. The details of the system being followed in India is discussed in later chapters.

### **AGRO-FORESTRY**

Agro-forestry has been defined as a sustainable land management system which increases the overall yield of the land, combines with production of crops (including tree crops) and forest plants and/or animals simultaneously or sequentially on the same unit of land. The management practices adopted should be compatible with agricultural practices of the local population.

The importance of agro-forestry has increased in recent years with a view of optimising land use potential particularly in tropical countries. This is a management system of land resources aiming at fullest utilization of potential productivity. The system may involve growing of agricultural, forestry crops including grasses, for obtaining maximum possible returns. The selection of crops will depend upon many factors, such as climatic, edaphic, socio-economic, etc. The system may also involve cropping patterns which may meet the demands of local population for food, fodder, fuel, timber, etc.

## SILVIPASTURE

The silvipastoral system is a practice of growing trees of economic importance along with forage crops. Agronomically it is a kind of intercropping system which included growing of more than one crop to take advantage of natural resources. The practice is better than monoculture. It is an integrated approach towards soil and water management.

Increase in poorly fed livestock population and availability of sufficient wastelands particularly in drier areas lead to adoption of this system which aims at producing maximum forage by selecting suitable species of grasses and trees to be grown together. Tree species, having deep root systems and grasses with surface feeding habits can be a suitable combination. The system can help in conserving soil and moisture, using moisture at various depths and producing nutritious fodder. The wastelands can be utilised by growing fodder trees, for example *Hardwickiabinata*, *Acacia senegal*, *Acacia tortilis*, *Azadirachta indica*, *Albizia lebbek*, *Sesbania* spp., *Leucaena leucocephala*, *Prosopis juliflora* along with fodder grasses such as *marbal pavana*, *rodos cenchrus*, *stylo*, *sirato*, etc.

Selection of suitable tree and pasture species is an important factor. In Sholapur and Ahmednagar districts of Maharashtra, pasture species such as *Schima*, *Chrysopogon*, *Dicanthium*, *Andropogon*, *Digitaria*, *Bothriochloa*, etc., have been successful. Introduction of exotic legumes such as *Stylosanthes hamata*, *Sirato* and *Dolichos* species have also

shown success in many areas (3). In hilly areas, species such as *Grewia oppositifolia*, *Bauhinia* species and many others can be grown along with fodder grasses on steep slopes.

### **STRIP SYSTEM FORESTRY**

In the strip system forestry the distance between the two rows or lines is deliberately kept wider in order to have intercropping. The lines or rows of trees stand East West so that the crops in between rows will get sunlight. The species of trees which grow straight, fast growing and having low shade will have to be selected.

Strip system or model in case of *Eucalyptus*, *Leucaena* and *Casuarina* has been proved to be successful. Distance of 5 to 10 meters between two lines has yielded good results. Crops are meant for short term income and trees are meant for long term income.

### **FARM FORESTRY ON BUNDS**

The farmers who have very limited land at their disposal cannot resort to farm forestry. But in order to satisfy their want for tree products they can grow trees on the bunds or boundaries. Fruit, fodder and fuel trees of different species can be grown on bunds. It is generally known that one acre of land can have 832 feet long bund. If proper selection is made the trees on bunds will not adversely affect the crops on the farm. It is a common experience that the trees grow well on the bunds in due course.

The trees on bunds have three advantages :

- (1) They preserve moisture for a long time.
- (2) They create humus when leaves of trees fall on the land.
- (3) Shelter belt is created.

### **RIVER, STREAM, BANK FARM FORESTRY**

We have a large number of rivers and streams in India. But the banks of rivers and streams have been unproductive. If trees are planted on the banks of rivers and streams, they will fetch good returns to the individuals and to the nation.

The trees like Tamarindus, Syzygium, Eucalyptus, Bamboo and Arjuna can be grown on the banks.

The plantation of Aghave is very useful on the banks of the streams and rivers. This model has the following advantages.

- (i) Soil conservation is made possible and the top soil is not wasted.
- (ii) Siltation of dams and lakes is reduced.

### **HILL SLOPE FARM FORESTRY**

The small and big hills have different types of slopes which have not been utilised. If no systematic tree plantation is possible, at



least contour lines on the hill slope can be drawn and planted. The model has the following advantages.

- (i) Soil conservation is made possible and the top soil is not wasted.
- (ii) Different kinds of trees can be grown.

The Gram panchayat may adopt the hills for such plantation.

#### **SELECTION OF SPECIES AND TECHNIQUE**

In order to ensure success in the social forestry programmes, it is necessary to select suitable species and proper plantation technique, keeping in view, the various factors such as site conditions, silvicultural requirements of the species, socio-economic conditions, system and pattern of consumption of local population, aesthetic and environmental effects, etc.

A species selected for social forestry should be of proven qualities so that farmers may adopt it easily. A species selected for planting should possess the following characteristics.

- (i) Ability to survive and grow healthily under difficult soil and edaphic conditions.
- (ii) It should be fast growing and capable of yielding useful produce comparatively in shorter duration.

- (iii) Resistance to local hazards, including pests, diseases, fire, grazing and browsing, etc.
- (iv) Ease of seed procurement, handling, storage, etc. Easy techniques of nursery and regeneration.
- (v) Tree species must be so selected that these do not have an adverse effect shade or competition on other crops with which these are grown.
- (vi) The species should not produce side effects, such as harbouring agricultural pests and diseases.
- (vii) The species selected for soil and water conservation should have proper root system, similarly trees for shelter belt should have good crowns. Trees must be beautiful which are selected for bioaesthetic plantations.