Agroforestry Third stage

Forestry Department

**Types of Agroforestry**

**1- Silviculture (Silvoarable - Intercropping & Alley cropping)**

Silviculture system involves growing agricultural crops including legumes along with tree crops in the same piece of agricultural land simultaneously. Trees are grown in rows with wide alleys in-between for cultivating crops.

**Alley component:** Any arable or horticultural crop is possible. Over wintering crops (ie autumn-sown) are very efficient users of the almost full light available over the dormant season of deciduous trees, and may be the best choices for narrow alleys where trees are quite large. It is important that the alleys are physically cultivated (or at least ripped with deep tines) - horticultural no-dig raised beds are likely to fill with fine tree roots.

**Tree component:** may be timber or fuel wood trees, or a fruit or nut crop. Pollards and coppiced trees are both possible, the former interfering least with arable operations. Fruit crops can be used as the tree component. Apples, cider apples and plums are all possibilities.

**Nut crops:** can include walnuts, chestnuts and hazelnuts.

There are five subsystems in silviculture and they are:

**a. Tree gardens**

Growing fruit trees at specific distance in semiarid and sub humid regions is called as tree gardens and often in the first few years dry land crops are grown as inter crops.

**b. Hedge row inter cropping (alley cropping)**

Involving agricultural crops in alleys between hedges or in narrow long strips formed of vigorously coppicing fast growing leguminous crops is known as alley cropping. The hedges are regularly pruned; pruning may either be removed, as fodder and fuel wood, or retained on the soil. It is suitable for both high and low rainfall areas.

**c. Multipurpose trees and shrubs on farmlands**

Raising trees with systematic pattern on bunds, terraces or field boundaries along with agricultural crops is referred as multipurpose trees and shrubs on farmlands.

**d. Fuel wood planting on farmlands**

Planting of fuel wood tree species as monocrops or inter planting these species along or around field bunds for firewood is called as fuel wood tree planting.

**e. Shelter belts, windbreaks and soil conservation hedges**

Growing of several rows of one or many trees species at specified distance at right angle to the direction of heavy seasonal winds to counter their erosive force is known as shelterbelts or wind break. With the protection of the shelterbelts, annual crops are grown in the field.

**Design & establishment**

Tree rows are spaced at minimum of 10-14 m apart to allow enough room for cultivation operations. Usually whole number of cultivation equipment widths is chosen for efficient operations. Rows are best aligned North-South.

Both single and double rows of timber crop trees can be used; further alternative is triple row, with high-value timber crop trees sandwiched between rows of nurse trees (usually coniferous) which help train straight crop trees and are themselves thinned at later stage. Shrubs and other plants can also be planted to the side of main trees for better wind protection and other uses. Trees can be planted in the rows at final spacing or at closer spacing to allow for thinning at a later date. The latter allows for more selection of good quality timber trees.

Weed control is essential. Black plastic mulches give best tree establishment and growth, and will soon be covered with leaf mold. Cultivations up to a few inches of the plastic edge are possible. Yields (per unit area) of alley crops are not reduced by shading until the tree height reaches the alley width.

**Benefits**

1. Wood or tree products are produced in addition to agronomic crops, with no reduction in crop yields per unit area for many years.
2. Crop quality and yields can be increased by enhancing microclimatic conditions.
3. Diversify farm enterprise
4. Reduce erosion
5. Improve water quality
6. Protect crops
7. -Improve utilization of nutrients
8. Enhance wildlife habitat
9. Improve aesthetics
10. Store carbon

**Drawbacks**

1- Many high-value deciduous timber trees grow with poor (crooked) form without the sideways light pressure of forest. Correction pruning and/or the use of nurse trees can overcome some of this problem.

2- Arable farmers in particular often have an aversion to trees in arable fields, citing single trees which “get in the way”. Alleys, however, if properly designed, should present no problems with machinery and cultivations.