



FACULTY OF AGRICULTURAL SCIENCES & ALLIED INDUSTRIES

There are various types of orcharding

1. Orchard with single variety of a particular fruit crop.
2. Orchard with different variety of a fruit crop.
3. Mixed orchard with different fruit crops of almost equal life span.
4. Orchard with intercrops/intercropping.
5. Multistoried orchard.
6. High density orchard.
7. Dry land orchard.
8. Clonal orchards.
9. Nutrition /Kitchen garden.

Orcharding with a Particular Crop

Orcharding with single variety of a particular fruit crop

Eg: Mango orchard exclusively Alphonso variety.
Pomegranate orchard of Kesar variety.
Guava orchard of Sardar variety.

Advantages

1. Purity of the variety can be maintained.
2. Convenient for planning and management.
3. All the trees come to harvest at the same time.

Disadvantages

1. The variety may be incompatible (which leads to poor fruit set).
2. The variety may be susceptible to pest and diseases.
3. The variety may be irregular like Alphonso variety.
4. The variety may not satisfy all consumers.

Orchard with Different Varieties of a Fruit Crop

Orcharding with different variety of fruit crop

Eg: Mango orchard - Alphonso+ Kesar+Pari.
Sapota orchard - Cricket ball+ Kalipatti.

Grape - Thomson seedless+ Sonaka +Sharad seedless.

Advantages

1. If one variety fails for some reasons other variety will give some returns/income.
2. Problem of self incompatibility can be overcome.
3. It can help in supply variety of fruits during different periods and to cater the needs of different customers.

Disadvantages

1. Purity of variety may be affected.
2. Management and harvesting varies.
3. Mixed orchards with different fruits of equal life span.

Mixed Orchards

Mixed orchard with different fruit crops of almost equal life span.

Eg: Mango+Sapota+Guava.

Tamarind+Ber+Annona+Aonla.

Fig+Pomegrante+Ber+Lime.

Papaya+Banana+Pineapple.

Advantages

1. More than one crop may be available on the same piece of land.
2. If one crop fails other crop will come to rescue and maintains continuity of income.
3. Year round income.

Disadvantages

1. Management becomes very difficult.
2. Problems of pest and diseases.

Orcharding with Intercrops

1. This system involves incorporation of another species (fruit/vegetable) in between the interspaces of main crop.
2. This system uses the open space available during pre-bearing period of main crop.
3. The intercropping is discontinued once the main crop completely covers the canopy.
4. The intercrop selected should have the following characters.
5. Should be compatible with main crop in their water, nutrient and soil requirement.
6. Compact stature and should not compete with main crop.
7. Short duration when compared to other perennial crops.
8. Should not act as an alternate host for pest and diseases.

Advantages

1. Helps in getting additional income from the orchard during pre-bearing stage of main crop.
2. It also acts as a cover crop and prevents soil erosion.
3. Suppress the weed growth in open space.
4. Efficient land utilization.
Eg: Banana, Papaya, Pineapple, Guava, Phalsa, Fig, Beans, Cowpea, Dolichos, Marigold, Gaillardia, Aster etc.

Multi-Storied Orchard

Eg: Coconut+Black pepper+cocoa+pineapple, Arecanut+Vanilla+Banana+Pinapple.

- The principle involved in multistoried orchard is harvesting light at different height/story.
- The planting should be such that sunlight is harvested by different crops at different stories/levels/height and there won't be any competition for soil nutrients, moisture and sunlight because the spread and distribution of roots at different crop component is distributed in different layers of the soil profile.

High Density Orchard

- High density aims at increasing the productivity per unit area by increasing plant population/unit area by closer spacing.

- This has been successfully done in several temperate fruit crops like apple, pear, peach etc. where there is availability of dwarfing rootstocks and plant response for training and pruning and chemical regulation of size.

Eg: Apple 3X3 ---1111 plants.
3X2 ---1666 plants.

- Limited success of high density is noticed in tropical and subtropical fruit crops because of
 1. Non availability of dwarfing rootstocks.
 2. Vigorous growth throughout the year.
 3. Poor response for training and pruning.
- High density orchard was tried in mango with dwarfing variety like Amrapali and with the use of dwarfing rootstock like Olur, Vellaikollamban.

Different types of high density planting followed in fruit crops

Bush orchard, Pyramid orchard, Tatura trellies, Meadow orchard, Hedge row system etc.

Advantages

1. High returns per unit area.
2. Maximum use of resources.
3. Possibility of adopting mechanization.

Disadvantages

1. Competition in later years.
2. Pest and disease problems.
3. Cultural operation is difficult.

Dry Land Orchard

1. Growing of fruit plants in drylands like arid and semiarid zones as rainfed crop.
2. This concept is gaining importance as several fruit crops have been identified for cultivation in arid and semi arid regions.

Eg: Ber, Aonla, Datepalm, Tamarind, Fig, Phalsa etc.

3. With the advancement of irrigation technology and efficient water harvesting and conservation some of high value fruit crops are also being grown in arid and semiarid/rainfed regions.

Eg: Mango, Grape, Pomegranate etc.

Clonal Orchard

- Orchard established from plants derived from single individual mother plants through vegetative means.

Eg: Clonal orchard of mango var. Alphonso.

Advantages

- Plants will be uniform in growth, bearing habit and management practices.

Guidelines/Principles in Planning Nutrition Garden

1. It is convenient to layout rectangular plot than a square plot.
2. Garden should be well protected with suitable fence.

3. Perennial vegetables like curry leaf, drumstick and quick growing fruits like papaya, banana and lime should be planted along the border.
4. Perennial vegetables like coccinia, chow-chow, etc., which require support should be planted at the rear end of the garden.
5. Long duration vegetables like tapioca, elephant foot yam, etc., may be planted together.
6. Suitable short duration companion crops such as radish, beetroot, carrot, etc., can be grown with the long duration crops. These crops can be grown on the bunds.
7. Crop rotation should be followed in such a way so that each plot will be planted with leguminous vegetable crop at least once in two years and also see that at least 4-6 kinds of vegetables are always available.
8. One plot should be kept reserved for raising nursery seedlings.
9. Knowledge of planting season is essential in planning the cropping pattern.
10. The entire plot should be divided into a number of small plots (sub plots). The size and number of sub plots can be decided based on area available (family size) and crops chosen with convenience.
11. One or two compost pits may be dug in the shady corner of the garden.
12. The plot should be provided according to convenience using minimum space.
13. Creeping vegetables like gourds and others may be trailed on the fence or erected pendals.
14. The area in between the perennial plants may be utilised for short duration shallow rooted annual vegetables or spices like garlic, coriander, etc.
15. If the land is limited preference can be given for growing those vegetables which are costly, highly perishable, not easily available in the market and which can produce maximum edible vegetables per unit area.
16. The irrigation channel from the water source and path should be so planned and prepared that it covers the whole area of the garden for easy operation

Resources for Better Comprehension of Orchard Management

1. Soil management
2. Water management\
3. Nutrition management
4. Pruning and training (Plant Management)
5. Weed management
6. Plant protection against insect pests and diseases.
7. Bearing, fruitfulness and causes of unfruitfulness.
8. Maturity and harvest.
9. Post harvest handling, utilization and marketing.

Soil Management/Floor Management

- Soil management aims at maintaining soil in good condition, or improving the condition if necessary.

- This includes protection from direct sunlight and from the impact of rainfall and wind erosion.
- In annual crops like vegetables and flowers which do not leave vacant space.
- There is no such problem except that one has to replenish nutrients harvested by crops and leached out but in tree crops, wherein, it is usually several years after planting before a tree which form such an extensive canopy that it can provide adequate protection to the soil, the vacant space needs to be productively utilized and protected through different management practices like intercropping, cover cropping, cultivation, sod culture, mulching, rotation, high density planting..

Objectives of Soil Management

1. To create favourable conditions for moisture supply and proper drainage.\
2. To maintain high fertility level and replenishment against losses.
3. To provide proper soil conditions for gaseous exchange and microbial activities through addition of organic matter.
4. To check or reduce soil erosion.
5. To ensure supply of nutrients for growth and development of plants.
6. To utilize vacant land for additional income because such a loss is inconceivable for small holders.
7. To reduce the cost of cultivation with high economic returns.
8. To suppress weed population.

Definitions of terms to be used in management of soil

Intercrop: Any crop other than main crop grown between the rows of perennial tree crops is known as intercrop and the cultivation there of is intercropping.

Green Manure Crop: The crop other than main crop grown for the purpose of enriching the soil for organic matter is called green manure crop.

Cover Crop: The crop grown to provide a cover to soil to protect it from erosion. It may be green manure crop also.

Methods of Soil Management

- Appropriate soil management method is important for the control of weeds, incorporation of organic and inorganic fertilizers and to facilitate absorption of water in soil.

Common soil management practices are

1. Cultivation
2. Sod culture
3. Mulching and
4. Rotation.

Choice of the system is determined by many factors as mentioned below:

1. Crop
2. Rooting depth of the crop
3. Slope of the soil
4. Rainfall of the area

5. Climatic condition of the place
6. Economic condition of the farmer

Cultivation

- Cultivation in context with soil management refers to working of the soil by ploughing, harrowing, disking or hoeing. It is essential for removal of weeds, incorporation of manures and fertilizers, green manuring and to facilitate water and nutrient absorption through better aeration.
- Depth of tillage and areas are determined by root depth and spread of the canopy of the tree.
- In cultivation different modifications are made under specific conditions.

Clean cultivation: In this method of soil management the space between plants is kept clean by tillage and removal of weeds.

Advantages

1. Removes competition of weeds for light, water and nutrients from crop and avoidance of alternate host for pests and diseases.
2. Improves soil physical condition through better aeration by breaking clods.
3. Helps in breaking hard top and obstructions in the infiltration of water.
4. Improves soil biological activities through better aeration.

Disadvantages

1. Loss of organic matter.
 2. Loss of soil through erosion even on flat lands through water and wind.
 3. Loss of nutrient through excessive leaching.
 4. Injury to roots and creation of entry points for pathogens.
 5. Due to several such disadvantages, clean cultivation is not advisable in fruit farming, perhaps just before planting.
- Even so, it will seem inconceivable to most small holders not to use good land whenever possible and intercrops involving short duration crops and nitrogen fixing annual crops are preferred.
 - If it should be, cultivation should be shallow and infrequent and should be stopped at flowering time.
 - **Cultivation and Cover Crops:** In areas where soil is eroded during rains and drainage is poor, soil is cultivated and cover crops are grown between the rows during rains. The crop may and may not be turned into soil. These crops not only increase water retaining capacity of soil and biological complex of the soil but also add organic matter when ploughed in besides checking erosion. As cover crops, legumes should be preferred because they add extra N in soil through fixation of atmospheric-N in their nodules. They also suppress weeds during rainy season. Crops like greengram, blackgram, cowpea, cluster bean, soybean should be preferred during kharif season while pea, fenugreek, broad bean and lentil can be preferred in winter season as cover crops.

Advantages

1. Adds organic matter in soil.
2. Improves soil condition.
3. Improves soil fertility.
4. Increases water retention capacity of soil.
5. Increases biological complexes of soil.
6. Checks soil erosion.
7. Checks nutrient losses through soil erosion.

Cultivation and Intercropping

In this case of orchard soil management, cultivation is done for the purpose of raising intercrops. Intercropping is growing of two or more crops simultaneously on the same field so that crop intensification occurs in both time and space dimensions, and there is intercrop competition during all or part of crop growth. This can be mixed strip or relay cropping. In context of an orchard or a plantation of perennial fruit trees, however, the practices of growing annuals or relatively short duration crop in the interspace during their formative years is referred to as intercropping and the growing of perennial in the interspace of perennials is called mixed cropping. The term multistorey cropping refers to a multispecies crop combination involving both annuals and perennials with an existing stand of perennials.\

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