**Laying out an orchard and systems of planting**

**Layout**

The marking of position of the plant in the field is referred as “**layout”**.

**Layout plan**

The layout plan of the orchard should be prepared carefully, preferably in consultation with horticultural experts. The orchard layout plan includes the system of planning provision for orchard paths, roads, water channels and farm building. A sketch of the proposed orchard should be prepared before the actual planting is taken up.

**Inputs:** Rope, poles, pegs, cross sraff, measuring tape and planting board are required for laying out an orchard.

**Method of layout**

For laying out an orchard, according to square system, a base line is first established and position of the trees is marked along this line by laying wooden stakes in the ground. Another base line at right angle to the first base line, is then marked along with the other edge of the field with the help of a carpenter square or a cross staff.

The right angle can also be drawn with the help of measuring tape. One end of this tape is fixed at three metre distance from the corner along the first line and the tape is then stretched along the second base line for a distance of four metre. The diagonal distance between these two points should be five metre. The wooden stakes are put in the ground at the desired distance along the second line. All the four rows are thus established and staked. Three men, one putting the peg in the field and others correcting alignment while moving along the base line, can easily stake the whole field.

**Aims:**

1) To provide adequate space to plants.

2) To accommodate more number of plants.

3) Easy intercultural operations.

4) System of planting

**Systems of planting**

The following are the important systems of planting generally followed on the basis of agro climatic conditions to improve aesthetic view of the land: Square, Rectangular, Hexagonal, Triangular, Quincunx, and Contour.

**Number of plants per hectares**¬ These can be calculated according to different methods of layout using the following formulas:

1. **Square and rectangular system**

Area (sq. m)

**Number of fruit plants =**

Row to row distance (m) x plant to plant distance (m)

1. **Quincunx:**

Number of plants in square system plus (+) one row less and one plant less in each row than the square system.

1. **Triangular:**

Number of plants in square system minus (-) one plant less in every second row.

1. **Hexagonal:**

Number of plants in a square system plus (+) 15 per cent more than the square system.

* **Planting systems-**

**Square system**

It is the most commonly used method and easy to layout in the field. In this system, plant

to plant and row to row distance is the same. The plants are at the right angle to each other, every unit of four plants forming a square. This system facilitates the interculture in two directions after the orchard is planted.

**Advantage:**

1) Most easy and popular one.

2) In this row to row and plant to plant distance is kept similar.

3) Plants are exactly at right angle to each other.

4) Interculture operations can be done in both the directions.

5) Adequate space for inter-cultivation of remunerative crops like vegetables.

**2. Rectangular system**

In this system, the plot is divided into rectangles instead of squares and trees are planted at the four corners of the rectangle in straight rows running at right angles. Like square system, this system also facilitates the interculture in two directions. The only difference is that in this system more plants can be accommodated in the row keeping more space between the rows.

**Advantages:**

1) Lay out in rectangular shape.

2) More space between row to row.

3) Inter-cultural operations can be done in both the ways.

4) Plants get proper space and sunlight.

**3. Hexagonal system**

In hexagonal system, the trees are planted in the corners of equilateral triangles. Six trees

thus form a hexagon with another tree at its centre. This system, though a little difficult for execution but accommodates 15 percent more plants. Cultivation of land between the tree rows is possible in three directions with this system. This system is generally followed where the land costly and very fertile with ample provision of irrigation water.

**Advantages:**

1) Accommodates 15 % more plants than the square system.

2) Plants are planted at the corner of equilateral triangle.

3) Six trees are planted making a hexagon.

4) The seventh tree is planted in the centre and called septule.

5) This requires fertile land.

**Disadvantage:**

* Lay out is difficult and cumbersome.

**4. Quincunx system**

It is laid out exactly like square system except that a fifth temporary tree known as the “filler” is planted in the centre of every unit of four permanent plants. The number of plants per acre by this system is almost doubled than the square system. Fruit trees like papaya, kinnow, phalsa, guava, peach, plum etc. can be planted as fillers in the permanent trees provides an additional income to the grower in the early life of the orchard. The filler trees are uprooted when the main orchard trees start commercial fruiting.

**5. Contour system**

This system is usually followed in the hilly areas with high slopes but it is very much similar to the square/rectangular system. Under such circumstances, the trees may be well planted in lines following the contour of the soil with only a slight slope. Irrigation and cultivation are then practiced only across the slope of the land as this practice reduces the chances of soil erosion. In this system layout is done as in square/rectangular system, first by

establishing the base line at the lowest level and then marking for the trees should be done from the base to the top. Bench terraces are used where the slope is greater than 10 per cent.

**6. Triangular system**

In this system, trees are planted as in the square system but the plants in the 2nd, 4th, 6th and such other alternate rows are planted midway between the 1st, 3rd, 5th and such other alternative rows. This system provides more open space for the trees and for intercrop.

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