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24AG201

CROP PRODUCTION TECHNOLOGY

UNIT II – Crop Selection And Establishment

- Preference by the farmer, community, locality determines the crop selection

SYSTEMS OF CROP PRODUCTION

Crop system: An arrangement of crop populations that transform solar energy, nutrients, water and other inputs into useful biomass ie. food, feed, fuel and fibre.

Crop system comprised of soils, crop, weed, pathogen and insect subsystems. The crop can be of different species and variety, but they only constitute one crop system if they are managed as a single unit. The crop system is a subsystem of cropping system.

Cropping Systems: Cropping systems, an important component of a farming system, represents a cropping pattern used on a farm and their interaction with farm resources, other farm enterprises and available technology, which determine their make up.

It is defined, as the order in which the crops are cultivated on a piece of land over a fixed period or cropping system is the way in which different crops are grown. In the cropping systems, sometimes a numberof crops are grown together or they are grown separately at short intervals in the same field.

***Cropping Pattern**:*

It is the pattern of crops for a given piece of land or cropping pattern means the proportion of area under various crops at a point of time in a unit area or it indicated the yearly sequence and spatial arrangements of crops and follows in an area.

Difference between cropping pattern and cropping system

Cropping pattern	Cropping system
Type and management of crops in time and space.	An important component of a farming system, represents a cropping pattern used on a farm and their interaction with farm resources
The proportion of area under various crops at a point of time in a unit area	Pattern of crops taken up for a given piece of land, or order in which crops are cultivated on a piece of land over a fixed period.

Classifications of Cropping System:

Depending on there sources and technology available, different types of cropping systems are adopted on farms, which are as below.

1. <u>Mono-cropping or Single Cropping</u>:

- Mono-cropping refers to growing only one crop on a year Particular land after year.

Practice of grow in only one crop in a piece of land year after year e.g. growing only rabi crops in dry lands.

Monoculture: Practice of repetitive growing only crop irrespective of its intensity as rice-rice-rice in Kerala, West Bengal and Orissa.

Sole Cropping:

- One crop variety grown alone in pure stand at normal density.

2. Multiple Cropping or Polycropping:

- It is a cropping system where two or three crops are gown annually on the same piece of land using high input without affecting basic fertility of the soil.
- Growing two or more crops on the same piece of land in one calendar year is known as multiple cropping.
- i.e. more number of crops within a year and more number of crops on the same piece of land at any given period. It cropping, mixed cropping and sequence cropping includes.

Polyculture: Cultivation of more than two types of crops grown together on a piece of land in a crop season. e.g.

1)Mango + Pineapple + Turmeric

3. Relay Cropping:

- Growing the succeeding crop when previous crop is at its maturity stage- or- sowing of the next crop immediately after the harvest of the standing crops. Or it is a system of cropping where one crop stands over land to the crop in quick succession.
- e.g.
  1) Paddy- pulses
  2)Rice–Cauliflower– Onion

4. **Over lapping Cropping:**
   - In this system, the succeeding crop is sown in the standing crop before harvesting. Thus, in this system, one crop is sown before the harvesting of preceding crops.

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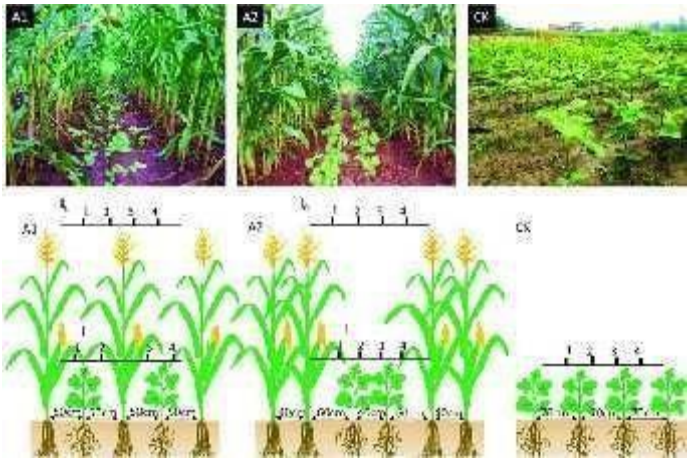
5. ***Inter cropping***

Growing of two or more crops simultaneously on the same piece of land with a definite row pattern e.g. growing setaria + red gram in 5:1 ratio i.e. after every 5 rows of setaria one row of red gram is sown. Thus, cropping intensity in space dimension is achieved.



Advantage of Intercropping:

- Inter cropping gives additional yield and income/unit are a than sole cropping.
- Reduction in soil run off and controls weeds.
- Intercrops provide shade and support to the other crop.

Disadvantages of intercropping:

- Yield decreases as the crops differ in their competitive abilities.
- Management of intercrops having different cultural practices seems to be difficult task.
- Harvesting is difficult.

6. **Crop Rotation:**
   - Growing of different crops on a piece of land is a pre planned succession. Crop rotation is also called sequential cropping.
   - Selection of crop should be based on need or demand
   - The selection of crops should suit farmers financial conditions
   - The crop selected should also suit to the soil and climatic condition
   - An ideal crop rotation must provide maximum employment to the farm family and labour, permits farm mechanization to ensure timely operations besides

COMPETITION AMONG CROP PLANTS

Competition

Competition is generally understood to refer to the negative effects on plant growth or fitness caused by the presence of neighbors, usually by reducing the availability of resources.

- Is more powerful when resources are limited
  - a situation where two or more crops are trying to get the same thing

Components of competitive effect

- Competition occurs *within* the species of the same community (intra) and *among* the species of different communities (inter)

Competition for resources

- It occurs within species and among the crop plants
- Intra specific competition between the species of the same crop then Optimum spacing is the solution
- Inter specific population if there are cultivated then:
  - Arrangement in rows and column–as intercrop/strip/relay crop community becomes inevitable
- Inter specific competition between plant and weed
  - Need removal/ control in favour of cultivated species is needed
  - Critical period for crop weed competition

List of Characteristics associated Competitive plants

- Shoot characteristics:
  - Rapid expansion of foliage
  - Leaf shape and arrangements
  - High allocation photosynthesis to stem for rapid growth
  - Rapid extension in response to shading
- Root characteristics:
  - Early and fast root penetration
  - High root-shoot ratio
  - High root length per root weight
  - High uptake potential for water and nutrients

CROP WEED COMPETITION

Weeds appear much more adapted to agro-ecosystems than our crop plants. Without interference by man, weeds would easily wipe out the crop plants. This is because of their competition for nutrients, moisture, light andspace which are the principle factors of production of crop. Generally, an increase in on kilogram of weed growth will decrease one kilogram of crop growth.

1. Competition for Nutrients

Weeds usually absorb mineral nutrients faster than many crop plants and

S.No	Species	N	P2O5	K2O
1.	*Achyranthusaspera*	2.21	1.63	1.32
2.	*Amaranthusviridis*	3.16	0.06	4.51
3.	*Chenapodiumalbum*	2.59	0.37	4.34
4.	*Cynodon dactylan*	1.72	0.25	1.75
5.	*Cyperusrotundus*	2.17	0.26	2.73
Crop plants				
1.	Rice	1.13	0.34	1.10
2.	Sugarcane	0.33	0.19	0.67
3.	Wheat	1.33	0.59	1.44