What is a cropping system?

- **A cropping system** refers to growing a combination of crops in space and time.

- It comprises all cropping patterns grown on the farm and their interaction with farm resources, other household enterprises and the physical, biological, technological and sociological factors or environments".
• An ideal cropping system should:
  • use natural resources efficiently
  • provide stable and high returns
  • do not damage the environment.
Commonly practiced cropping systems

- Crop rotation practices
- Intercropping systems
- Mixed cropping systems
- Ratoon cropping
• **Crop Rotation**

• It is a cycle of growing different crops in the same area.

• This is a traditional method used to cleanse, protect and replenish the soil.
Advantages of Crop Rotation

1. Soil fertility & nutrient replacement - as the nutrients in the soil are slowly released, each plant uses them at a different rate, and with more demanding plants or ‘heavy feeders’ (eg corn) in a crop rotation, the soil has time to build up its nutrient store again.

This prevents ‘soil exhaustion’, otherwise resulting in ‘crop starvation’, reduced yield and as poor food value.
2. **Pest & disease management** – disrupts disease life cycles and the build-up of insect populations.

These generally depend upon a specific host plant family to live on and reproduce eg cabbage maggot, carrot wireworm, brassica club-root, potato root eelworm/nematode
• **Weed control** – different species germinate at different times of the year, and the variation in crop depth and surface area covered, as well as bed treatments, can prevent weeds from getting a hold.
A Recommended 4-Year Crop Rotation

<table>
<thead>
<tr>
<th></th>
<th>Plot A</th>
<th>Plot B</th>
<th>Plot C</th>
<th>Plot D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 1</td>
<td>Root Crops</td>
<td>Potatoes</td>
<td>Legumes</td>
<td>Leafy Vegetable</td>
</tr>
<tr>
<td>Year 2</td>
<td>Potatoes</td>
<td>Legumes</td>
<td>Leafy vegetable</td>
<td>Root Crops</td>
</tr>
<tr>
<td>Year 3</td>
<td>Legumes</td>
<td>Leafy vegetable</td>
<td>Root Crops</td>
<td>Potatoes</td>
</tr>
<tr>
<td>Year 4</td>
<td>Leafy vegetable</td>
<td>Root Crops</td>
<td>Potatoes</td>
<td>Legumes</td>
</tr>
</tbody>
</table>
Corn and Soya bean Rotation
• **Interplanting or Intercropping**
  • This is the practice of planting two crops together either in blocks, rows or spaces.
  
  • It uses all of the available space in the garden at all times.
• **Catch cropping**
  • This *is* a small, quick maturing crop among or alongside main crops which take longer to develop.

• It is an aspect of interplanting. Some vegetables most effective for catch-cropping are: lettuce, dwarf bean, cress, mustard, chives, celeriac, radish, turnip, corn salad, early carrots.
• **Mixed cropping**
  
  • It is growing of two or more crops simultaneously on the same piece of land.
  
  • It is also known as *multiple cropping*.
  
  • This type of cropping leads to an improvement in the fertility of the soil and hence, increase in crop yield because when the two crops are properly chosen the products and refuse from one crop plant help in the growth of the other crop plant and vice-versa.
  
  • Mixed cropping is an insurance against crop failure due to abnormal weather conditions.
Advantages of mixed cropping

1. No risk of crop failure
   • The risk of total crop failure due to uncertain monsoon is reduced if two crops of different nature are grown simultaneously as a mixed crop.

2. Variety of Produce
   • A variety of produce could be produced from a single crop to meet the varying requirements of the family like cereals, pulses, vegetables etc.

3. Increase in yield
   • Component crops have a complimentary effect on one another. For example, legume crops have a beneficial effect on cereal or non-legume crops as they help in fixing nitrogen in the soil. There is higher yield by this method.
4. **Improvement in soil fertility**

- The growth of cereal crops depletes the soil of nutrients. Growing legumes will help increase the nitrogen content in the soil. Thus, by the right choice of component crops soil fertility is improved.

5. **Minimizing pest damage**

- Crops of a particular species are more prone to a particular type of pest (weed, insects, diseases) infestation. When different types of crops are grown together chances of pest infestations are reduced or diluted.
Mixed cropping

Coconut

Pineapple
Oil Palm and cover crop
Ratooning

- **Ratooning** is a technique where the rice stubbles after harvest are allowed to produce new growth that will bear new panicles that are harvestable in just 45 to 60 days later.

- This is an inexpensive way of producing a second harvest of rice from the same plants because there’s no need to plow the land, no need to plant new seedlings and only one sack of fertilizer is applied per hectare.

- There’s less likelihood that the crop will be damaged by pests and diseases or by inclement weather because the growing period is very short.
Ratooning
Aquaponics

This is a system of agriculture involves the simultaneous cultivation of plants and aquatic animals such as fish in a symbiotic environment.

In a traditional aquaculture, animal effluents accumulate in the water, increasing toxicity for the fish.

This water is then led to a hydroponic system where the by-products from the aquaculture are filtered out by the plants as vital nutrients, after which the clean water is re-circulated back to the fish.

Fish such as Tilapia and Yellow Perch are raised in a large tank of water to fertilize the crops.
• **Hydroponics**

  • Hydroponics is a method of growing crops without the use of soil.

  • It's a technology that dates back to the Roman Empire.

  • Hydroponics is a technology for growing plants in nutrient solutions (water containing fertilizers) with or without the use of an artificial medium (sand, gravel, vermiculite, rockwool, perlite, peatmoss, sawdust) to provide mechanical support.
• **Hydroseeding**
  
  • The process begins by mixing mulch (woody fibrous material or recycled paper), seed, fertilizer, and water in the tank of a hydro-mulching machine.

  • The mixed material is then pumped from the tank and sprayed onto the ground, especially steep land.

  • Once applied to the soil, the material enhances initial growth by providing a micro-environment beneficial to seed germination.

  • The seeds will germinate within 7 – 14 days. The mulch will decompose and enrich the soil and it promotes quick germination and inhibits soil erosion.
Sustainable agriculture involves farming systems that are environmentally sound, profitable, productive, and compatible with socioeconomic conditions.

Sustainable agriculture refers both to economic and ecological sustainability.
1. The need to maintain or improve soil quality and fertility. This is often attained by increasing the organic matter content of the soil, and by minimizing losses from soil erosion.

2. Production programs are designed to improve the efficiency of resource utilization. This will result in the most cost-effective use of water, fertilizers, and pesticides.
3. An attempt is made to improve internal nutrient cycles on the farm, which will reduce the dependence on external fertilizers.

4. Efforts are made to improve biological diversity on the farm. This will result in improved natural suppression of pests, and may also help to improve internal nutrient cycling within the farm.

5. Farm management and marketing programs are designed to minimize overhead costs and to increase returns, often by following alternative marketing schemes.