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Module-3

Crop Planning and Management

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1. Crop Rotation

Crop rotation means changing the type of crops grown in the field each season or each year.

- It improves soil structure.
- It increases soil fertility.
- It helps control weeds, pests and diseases.
- It produces different types of output.
- In some ways, crop rotation takes the place of ploughing the soil.

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1. Criteria for Crop Rotation

a) Crop selection

- What to produce?
- Will it grow well?
- What are the roots like?
- Does it improve the soil fertility?
- Does it cover the soil well?
- Does it work with other crops?

b) Choosing the right varieties

c) Choosing a crop rotation

2. General Reccomendations

3. Night Shades (Tomatoes, Potatoes, Pepper and Eggplants)

4. Grasses, Corn and Grains

5. Lettuce and Crops in the Beet and SpinachFamily

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2. Intercropping

Intercropping refers to the practice of growing two or more crops in close proximity: growing two or more cash crops together, growing a cash crop with a cover crop, or other non-cash crop that provide benefits to the primary crop (Mohler and Johnson 2009).

1) Spatial arrangement

2) Plant density

3) Maturity dates of the crops being grown

4) Plant architecture.

There are at least four basic spatial arrangements used in intercropping. Most practical systems are variations of these

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- Row intercropping-—growing two or more crops at the same time with at least one crop planted in rows.
- Strip intercropping—growing two or more crops together in strips wide enough to permit separate crop production using machines but close enough for the crops to interact, for example, intercropping beans and maize.
- Relay intercropping—planting a second crop into a standing crop at a time when the standing crop is at its reproductive stage but before harvesting (e.g transplanting lettuce next to tomatoes plants).
- Mixed intercropping—growing two or more crops together in no distinct row arrangement (for further details of possible combination.

A crop mixture with different growth forms or development may make cultivation and use of mulches more difficult and less effective..

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3. Cover crops

The following characteristics make an ideal cover crop

- The seeds are cheap, easy to get, to harvest, to store and to propagate.
- Be of rapid rate of growth and be able to cover the soil in short time.
- Be resistant against pests and diseases.
- Produce large amounts of organic matter and dry material.
- Fix nitrogen from the air and provide it to the soil.
- Have a de-compacting root system and regenerate degraded soils
- Easy to sow and to manage as single crop or associated with other crops.
- Can be used as fodder, grains as food grains

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The example of Cowpea as a cover crop

Cowpea (Vigna unguiculata, French: Niébé) is an important grain legume throughout the tropics and subtropics. It has some properties which make it an ideal cover crop:

- It is drought tolerant and can grow with very little water.
- It can fix nitrogen and grows even in very poor soils.
- It is shade-tolerant and therefore compatible as an intercrop.
- It yields eatable grains and can be used as an animal fodder rich in protein.
- It is quite resistant to pest attack

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4. Crop-Animal Association

This practice integrates crop and livestock systems. In this case, cropping provides animals with fodder from grass and nitrogen-binding legumes, leys (improved fallow with sown legumes, grasses or trees), weeds and crop residues. Animals graze under trees or on stubble, they provide draught and manure for crops, while they also serve as a savings account (FAO, 2001).

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An experimental farm in Thailand maintains pigs and chickens, as well as a vegetable garden and a fish pond. Animal wastes are used for fertilizer, fish feed and biogas generation. Crop and human wastes are also added to the biogas unit. Liquid effluent from the biogas generator is used in the fishpond and solid residues on the garden. Periodically, the locations of the garden and the pond are reversed, so residues from one serve as nutrients for the other (Based on BOSTID, 1981; FAO 2001).

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5. Designing Cropping System

Cropping systems should be designed in such a way that the soil is almost permanently covered with plant canopy. In arable crops, careful timing of sowing and planting can help to avoid uncovered soil being washed away during the rainy season.

After the main crops are harvested, a green manure crop may be sown. On slopes, crops should be grown in lines across the slopes (along contour lines) rather than vertically. This can contribute enormously to reduce the speed of surface water, thus erosion

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In order to ensure a permanent plant cover it is important to consider the following aspects:

- Timing of soil cultivation.
- Timing of planting or sowing.
- Producing seedlings and transplanting them.
- Mixed cultivation o Intercropping.
- Cover crops.
- Mulching.
- Timing of weeding.
- Sowing of a green manure crop in the off-season.
- Expected effect on yields.
- Availability of suitable species.
- Costs of seed.
- Availability of water.
- Availability of labour.
- Additional use of side-crops.
- Reduction of the risk.
- Food security

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Record Keeping is Important

A well-kept field record book is a great help in remembering which crop has in the past been grown in a particular plot within the field or farm. This is useful especially if the records also show past incidents of plant pests or diseases in each plot in the farm.