Organic crop production practices

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Outline

1. Understand the principles and practices of organic crop production system
2. Practices of organic crop production

- crop rotation
- Multiple cropping
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- Companion cropping
- Diversification of plant species
- Buffer zoning
- Questions for discussion
- List of references

Organic agriculture employs friendly farming techniques that help rehabilitate and sustain the environment. Emphasis is on natural ways of soil fertility management such as use of manures, composts, mulches and agro-forestry techniques wherever possible. First and foremost is to encourage natural ways of fertilization and soil protection in order to assure product quality and a sustainable environment.

The principles and methods employed result in practices which :-

- Coexist with, rather than dominate, natural systems;
- Sustain or build soil fertility;
- Good organic matter management as a basis for plant nutrition and sustainable land use;
- Minimise pollution and damage to the environment;
- Minimise the use of non-renewable resources;
- Protect and enhance the farm environment with particular regard to conservation and wildlife;
- Consider the wider social and ecological impact of agricultural systems.

The basic characteristics of organic farming are :-

- The enhancement of biological cycles, involving micro-organisms, soil fauna, plants and animals;
- Sustainable crop rotations;
- The extensive and rational use of manure and vegetable wastes;
- The use of appropriate cultivation techniques;
- Synthetic fertilizers and chemical pesticides are not applied in the farm
- Crop diversity- The diversity of local crops and their wild relatives plays a significant role in the livelihoods of many smallholder farming communities.

Crop rotations:

Rotations must be as varied as possible and aim to :-

- Maintain soil fertility,
- reduce nitrate leaching,
- reduce weed, pest and disease problem*s,*
- Minimize the time that the soil is left uncovered, by means of maximum use of green manure where appropriate
- Maintain or increase the organic levels in the soil
- Vary weed susceptible crops with weed suppressing crops

Whilst there cannot be a definitive rotation, the following guidelines should be observed in line with good agricultural practice :-

- A balance should be achieved between fertility building and exploitative cropping.
- Crops with differing root systems should be included.
- Rotations should include a leguminous crop at least once in every four crops to provide a balance of nitrogen in the soil for use by subsequent crops.
- Plants with similar pest and disease susceptibility should not be grown consecutively.

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Rotation guidelines:

- Choice of species and varieties for organic farming should be adapted to the soil and climatic conditions and resistant to pests and diseases.
- The records must be kept of previous crop, type of seed used, variety and source and date of planting,
- Things to consider in rotation are:- i) the plants should be of different family; ii) plants should be of different rooting depth; iii)plants should be of different rooting depth; iv) rotate leafy and bulb plants

- A balance should be achieved between fertility building and exploitative cropping
- Rotation should include a leguminous crop at least once in every four crops to provide a balance of nitrogen in the soil for use by subsequent crops
- Plants with similar pest and disease susceptibility should not be grown consecutively
- Horticultural crops should make a maximum use of legumes and green manure catch crops

Multiple cropping

- Multiple cropping is the practice of planting several different crops on the same plot of land at the same time. It is common among small-scale farmers . Crops, livestock and trees can all be integrated into a small farm, making it much more productive. Such integrated farming is particularly relevant for small farms or fields
- The integration of many farm enterprises gives farm families several advantages. More crops can be planted in a small space. The production of crops is usually spread over a longer period of the year, allowing for better vegetative cover to protect the soil, but also spreading out the harvest throughout the year.

Different forms of cropping:-e.g

- Inte-crop- growing two or more species simultaneously in the same field for at least part of the life of each species
- Mixed intercrop- growing two or more species simultaneously one the same piece of land with no distinct row arrangement
- Companion cropping- Companion planting is the establishment of two or more species in close proximity so that some benefit, such as pest control or increased yield, may be achieved.

The appropriated crops, crop combinations, planting times and planting patterns will vary from place to place, depending on the local climate, soils, topography, water availability, pests and diseases, socio-economic conditions, and other factors. An example of a typical combination of five to twelve different crops:

- **Cereals:** Sorghum, millet, maize
- **Legumes**: beans, pigeon peas and cowpeas
- **Root crops**: cassava, potatoes
- **Trees for forage, fallow and construction:** Calliadra, Luceana, Sesban , Gravillea

Advantages

- Multiple cropping reduces the risk of total loss form drought, pests and diseases. Usually at least some of the crops can escape disaster and produce a yield
- It optimizes production from small plots, so can help farmers cope with land shortages
- Including legumes in the cropping pattern helps maintain soil fertility by fixing nitrogen in the soil
- Multiple cropping yields different types of produce, resulting in a balanced diet for the family
- It suppresses weeds. As the planting density is high, weeds cannot compete with the crops
- Different types of crops can be planted to take advantage of different seasons. For example, crops that require a lot of water can be grown in the wet season, intercropped with drought-resistant crops that can be harvested in the following dry season

Disadvantages

- The presence of crops in the field throughout the year allows crop pests to survive more easily. Some pests can shift from one crop to another, for example aphids can move to cotton during dry season
- The large number of different crops in the field makes it difficulty to weed
- It may be difficult to introduce new technologies such as row planting, modern weeding tools, and improved varieties

Buffer zones:

a buffer zone is “an area located between a certified production operation or portion of a production operation and an adjacent land area that is not maintained under organic management”

- Buffer zones are important components of a farm’s organic system plan. Buffer zones are put in place to make sure that prohibited substances do not contaminate organic crops
- Many certifying agents use 50 feet as a common starting buffer width between organically managed crops and potential sources of contamination.

- Crops may be grown in a buffer zone but they may not be sold or represented as organic.
- Grass, permanent tree s or shrubs may also be grown in the buffer zone , which can create a habitat for birds, wildlife, and beneficial insects. Significant height in a buffer could offer the added benefit of protecting fields and organic crops from contamination by aerial pesticides.
- Cover crops are planted between growing seasons to help replenish the soil with nutrients and prevent soil erosion. They also help maintain populations of beneficial insects. Cover crops can control weeds by smothering and shading them and outcompeting them for nutrients.

Benefits of buffer zoning:

- Reducing contamination risk
- Hedges and trees support beneficial insects (predators, parasites and pollinators) by providing flowers of a range of shapes and sizes, with different bloom times and bloom durations.
- used as wind-breaks and road dust barriers,

Questions for discussion

- Why should you rotate your crops?
- What are the rotation guidelines that you should follow?
- What are multiple cropping?
- What are the best combinations of crops?
- What are the advantages
- What are the disadvantages?
- What are buffer zones and why does my farm need them?
- Discuss the benefits of buffer zoning?

References

IFOAM 2003. Training manual for organic agriculture in the tropics. Edited by F. Eyhorn, Marlene Heeb, Giles Weidmann

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Thank you