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Sustainability in Agriculture through Organic Farming

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ARTICLE ID: 60

Introduction

Organic farming is a production system which avoids or largely excludes the use of synthetically compounded fertilizers, pesticides, growth regulators, and livestock feed additives. To the maximum extent feasible, organic farming systems rely upon crop rotations, crop residues, animal manures, legumes, green manures, off-farm organic wastes, mechanical cultivation, mineral-bearing rocks, and aspects of biological pest control to maintain soil productivity and tilth, to supply plant nutrients, and to control insects, weeds, and other pests (USDA,1980). Organic agriculture is a unique production management system which promotes and enhances agro-ecosystem health, including biodiversity, biological cycles and soil biological activity, and this is accomplished by using on-farm agronomic, biological and mechanical methods in exclusion of all synthetic off-farm inputs.

Fig. Components of Organic Farming

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Organic Farming Principles

The four principles of organic agriculture are as follows:

1. Organic agriculture should sustain and enhance the health of soil, plant, animal and human as one and indivisible.
2. Organic agriculture should be based on living ecological systems and cycles, work with them, emulate them and help to sustain them.
3. Organic agriculture should build on relationships that ensure fairness with regard to the common environment and life opportunities.
4. Organic agriculture should be managed in a precautionary and responsible manner to protect the health and wellbeing of current and future generations and the environment.

Benefits of Organic Farming

1. It helps in maintaining environment health by reducing the level of pollution.
2. It reduces human and animal health hazards by reducing the level of residue in the product.
3. It helps in keeping agricultural production at a higher level and makes it sustainable.
4. It reduces the cost of agricultural production and also improves the soil health
5. It ensures optimum utilization of natural resources for short-term benefit and helps in conserving them for future generation.
6. It not only saves energy for both animal and machine, but also reduces risk of crop failure.
7. It improves the soil physical properties such as granulation, and good tilth, giving good aeration, easy root penetration and improves water-holding capacity.
8. It improves the soil's chemical properties such as supply and retention of soil nutrients, and promotes favourable chemical reactions.

Basic Steps of Organic Farming

Organic farming approach involves following five steps:

1. Conversion of land from conventional management to organic management.
2. Management of the entire surrounding system to ensure biodiversity and sustainability of the system.
3. Crop production with the use of alternative sources of nutrients such as crop rotation, residue management, organic manures and biological inputs.

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4. Management of weeds and pests by better management practices, physical and cultural means and by biological control system.
5. Maintenance of livestock in tandem with organic concept and make them an integral part of the entire system.

Components of Organic Farming

Manures: In India the use of organic manures in subsistence forming is an age-old practice. For substituting the chemical fertilizers various forms of organic manures and bio-fertilizers are explained below:

1. **Farm Yard Manure (FYM)** is an important source of plant nutrients. FYM is composed of dung, urine, bedding and straw. FYM contains approximately 0.5%Nitrogen, 0.2% Phosphorus and 0.5% Potash. It builds up soil health considerably.
2. **Green manures:** It is considered a good source of 'N' and it increases the availability of P, K and secondary and trace elements in the soil. Sunhemp (*Crotolaria juncea*) is a most important green manure crop which are fixed 134 kg nitrogen/ha.
3. **Composted Coir Pith:** The annual production of coir pith in India is about 7.5million tonnes. Preferably biodegraded and amended coir pith can serve as a substitute for FYM or similar organic manures. *Pleurotus sajorcaju*, Aspergillus and Trichoderma are found to be potential degraders of coir pith.
4. **Vermicompost:** The compost prepared by using earthworms is called vermicompost. It is 5 times richer in N, 7 times in P, 11 times in K, 2 times in Mg, 2 times in Ca and 7 times in actinomycetes than ordinary soil. It is a rich source of vitamins and growth hormones like gibberellic acid which regulate the growth of plant and microbes.
5. **Biofertilizers:** These are living cells of different types of microorganisms which have the ability to mobilize nutritionally important elements from non-usable to usable form. They influence the availability of major nutrients like nitrogen, phosphorus, potassium and sulphur to the plants. Rhizobium, Azotobacter, Azospirillum, Blue green algae, Azolla, Mycorrhizae and Phosphate solublisers like phosphobacteria can be used as biofertilizers to increase the crop production.
6. **Biological pesticides:** Many of the pesticide applications are unnecessary and economically unsound. A range of alternative methods of pest control to be used in organic farming are detailed below:

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- Deep ploughing the fields during summer season help in killing pests, larval and eggs
- Clean cultivation by destruction of weeds and other alternate hosts
- Adopting crop rotation
- Use of resistant varieties
- Growing of trap crops
- Release of parasites and predators
- Use of pheromone traps and light traps
- Use of biological insecticides and mechanical weed control
- Cover cropping to control weed seed germination.

Conclusion

Organic manures improve soil physico-chemical and biological properties and produces optimal condition in the soil for high yields and good quality crops. Reduces cost of purchased inputs. Farm wastes and residues are effectively recycled thus reducing environmental pollution and can be used to regenerate degraded areas. Organic farming allows bio diversity which is vital for ecological balance and helps to prevent environmental degradation.