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Organic Farming for Sustainable Agricultural Production

Dr. Dillip Kumar Swain, Associate Professor

Agriculture and Food Engineering Department

Lecture 03 : Organic Farming and its Components

ORGANIC FARMING

Organic farming is an ecological production management system that promotes and enhances biodiversity, biological cycles and soil biological activity. It is based on minimal use of off-farm inputs and on management practices that restore, maintain and enhance ecological harmony

or

Organic farming is a system which avoids or largely excludes the use of synthetic inputs (such as fertilizers, pesticides, hormones, feed additives etc) and to the maximum extent feasible rely upon crop rotations, crop residues, animal manures, off-farm organic waste, mineral grade rock additives and biological system of nutrient mobilization and plant protection.

Components



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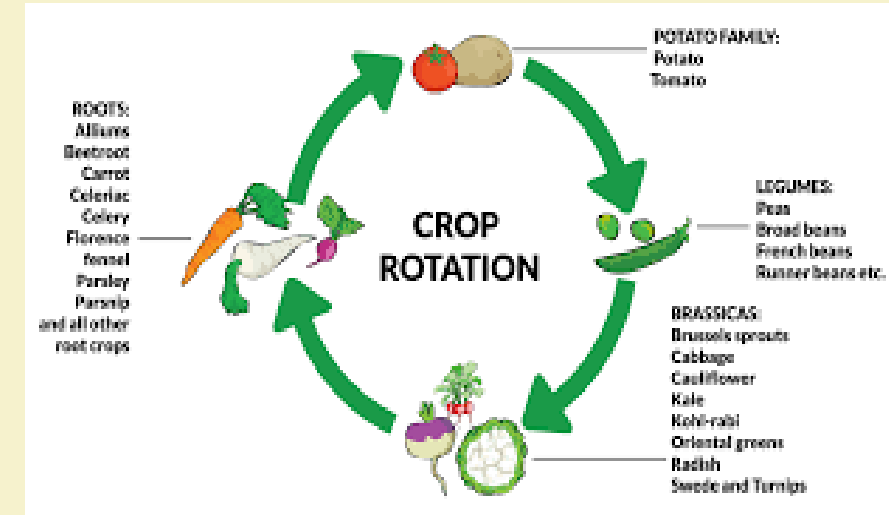
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1. Crop rotation:

- It is a systematic arrangement for the growing of different crops in a more or less regular sequence on the same land covering a period of two years or more.
- Soil fertility management, weed, insect and disease control.
- Legumes are essential in any rotation.

2. Crop Residue:

Incorporation of crop residues e.g. Wheat and Rice straw, as such or inoculated with fungal species has beneficial effects on crop yields and improvement in physico-chemical properties of soil.



3. Organic manure:

a) Bulky organic manure:

- **FYM:** well-decomposed mixture of dung, urine, farm litter and left over or used up materials from roughages or fodder fed to the cattle.
- **Compost:** waste material like vegetable refuse, farm litter, such as weeds, stubble, bhusa, sugarcane trash, Sewage sludge and animal waste in houses and in areas like human and industrial refuse can be converted into useful compost manure by anaerobic decomposition.
- **Green Manuring:** practice of ploughing and incorporation of undercomposed green plant tissues for the purpose of improving physical structure as well as fertility of the soil.

Examples: Sunhemp,
Dhaincha Clusterbean, Cowpea, Berseem



Farm yard manure



Dhaincha

b) Concentrated Organic Manure: Organic matter containing **higher percentage of essential plant nutrients** such as nitrogen, phosphorous and potash, as compared to bulky organic manures.

- Made from raw materials of animal or plant origin.
- Examples: oilcakes, blood meal, fishmeal, meat meal and horn and hoof meal.



BLOOD MEAL



BONE MEAL



HOOF MEAL

c. Vermicompost:

- The organic manure produced by the activity of earthworms.
- The worms
- ✓ **LIVE**
- ✓ **EAT**
- ✓ **EXCRETE**
- They live in the soil.
- Eat the biomass
- Excrete the valuable “Vermi-cast”
- The common worm species are *Eisania foetida*, *Dendrobaena spp.*



4. Biofertilizers:

- A **Bio fertilizer** (also *bio-fertilizer*) is a substance which contains living microorganisms which, when applied to seeds, plant surfaces, or soil, colonize the rhizosphere or the interior of the plant and promotes growth by increasing the supply or availability of primary nutrients to the host plant.
- They have the following advantages:
 - ✓ They help in establishment and growth of crop plants and trees.
 - ✓ They enhance biomass production and grain yields by 10-20%.
 - ✓ They are useful in sustainable agriculture.
 - ✓ They are suitable in organic farming.
 - ✓ They play an important role in Agroforestry / silvipastoral systems.



Types of Biofertilizers: There are two types of bio-fertilizers.

Symbiotic N-fixation:

- **Rhizobium:** It colonizes the roots of specific legumes to form tumours like growths called root nodules. The Rhizobium legume association can fix up to 100-300 kg N/ha in one crop season.
- **Mycorrhizae:** Mycorrhizae are the symbiotic association of fungi with roots of Vascular plants.

Asymbiotic N-fixation: .They grow on decomposing soil organic matter and produce nitrogen compounds for their own growth and development, besides that they leave behind a significant amount of N in surroundings.

- **Azotobacter**
- **Azospirillum**
- **Blue Green Algae**
- **Azolla**



ROOT NODULES



BLUE GREEN ALGAE



MYCORRHIZA

5. Bio-pesticide:

Bio-pesticides are natural plant products that belong to the so-called secondary metabolites, which include thousands of alkaloids, terpenoids, phenolics and minor secondary chemicals.

- These substances have usually no known function in photosynthesis, growth or other basic aspects of plant physiology.
- Botanical insecticides are ecologically and environmentally safer
- Examples: Nicotine, Pyrethrum, Rotenone, Subabilla, Ryanin, Quassia, Margosa, Acorus etc.

