

# ORGANIC FARMING FOR SUSTAINABLE AGRICULTURE DEVELOPMENT

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## **Introduction**

Organic farming is the system of farming that promotes environmentally, socially and economically sound products of food and fibers. As the awareness about the harmful effect of chemicals on health, soil, environment etc., is increasing; that's why inorganic farming is shifting its way towards organic farming. India with diverse agro climatic conditions has great potential for organic farming and many products are produced organically in India. High price for organic products and lack of proper marketing functions within domestic markets are the major constraints in organic farming in India. As the demand for organic products is increasing over years with people becoming more conscious about the quality of the food stuffs and awareness about the environmental effects due to overuse of chemicals in agriculture. They also opined that if the organic products have a well-defined marketing channel and ensured premium price the likeliness to increases the area under organic farming is wider.

Organic farming through sustainable agriculture meets not only the food requirements of present generation in an environment friendly way but also the requirements of future generations and maintains our environment. Modern agriculture involving use of pesticides and fertilizers have caused negative impact on environment by affecting soil fertility, water hardness, development of insect resistance, genetic variation in plants, increase in toxic residue through food chain and animal feed thus increasing health problems and many more serious health concerns and degradation of environment. Organic farming provides macronutrients and micronutrients to the plants and also improves soil physical, chemical and biological characteristics of soil. On the other hand, organic farmers in developing countries need to access international markets; they require often costly certification and have increased demand

for labour. Overall, organic agriculture thus provides promises for sustainable agricultural development, but its shortcomings need to also be considered.

### Principles of organic agriculture

1. **Principle of health:** - Organic agriculture should sustain and enhance the health of soil, plant, animal, human and planet as one and indivisible.
2. **The principle of ecology:** - This principle roots organic agriculture within living ecological systems. It states that production is to be based on ecological processes and recycling. Nourishment and well-being are achieved through the ecology of the specific production environment. For example, in the case of crops this is the living soil; for animals it is the farm ecosystem; for fish and marine organisms, the aquatic environment.
3. **Principle of fairness:** - Organic agriculture should build on relationships that ensure fairness with regard to the common environment and life opportunities.
4. **Principle of care:-** Organic Agriculture is a living and dynamic system that responds to internal and external demands and conditions. This principle states that precaution and responsibility are the key concerns in management, development and technology choices in organic agriculture.

### Components of organic farming

Important components of organic farming are biological nitrogen fixation, crop rotation, residues of crops, bio pesticides, biogas slurry etc (Plate 1). Vermicomposting has emerged as a major component in organic farming which is very effective in enhancing soil fertility and growth of crops in a sustainable way. The various components of organic farming are:-

- **Crop rotation:** For practicing sustainable agriculture there should be rotation of crops on the same land over a period of two years or more for maintaining soil fertility and control of insects, weed and diseases. For example use of legumes in rotation improves soil fertility.
- **Crop Residue:** India has great potential of using residues of crops and straw of cereals and pulses in recycling of nutrients during organic farming. Crop residues when

inoculated with fungal species improve physico-chemical properties of soil and crop yields.

- **Organic manure:** The organic manure is obtained from biological sources (plant, animal and human residues). Organic manure helps in increasing crop growth directly by improving the uptake of humic substances and indirectly promoting soil productivity by increasing availability of major and minor plant nutrients through soil microorganisms.
- **Waste:**
  - Industrial waste: Industrial by products such as spent wash & coir waste can be used as manure.
  - Municipal and Sewage waste: It is an important component of organic waste.
- **Biofertilizers:** Biofertilizers are microorganisms that have the capability of increasing the fertility of soil for example by fixing atmospheric nitrogen and through mycorrhizal fungi and phosphate solubilizes; these are ecofriendly and sustainable way of achieving soil fertility. Bio fertilizers have biological nitrogen fixing organism which help them in establishment and growth of crop plants and trees, enhance biomass production and grain yields.
- **Bio-pesticide:** Bio-pesticides are of plant origin and include plant products like alkaloids, phenolics, terpenoids and some secondary chemicals. They are biologically active against insects, fungi, nematodes affecting their behaviour and physiology. Commonly known insecticides are Pyrethrum, Nicotine, Neem, Margosa, Rotenone etc.
- **Vermicompost:** Vermicompost is organic manure or compost produced by the use of earthworms that generally live in soil, eat organic matter and excrete it in digested form. These are rich in macro and micronutrients, vitamins, growth hormones and immobilized micro-flora essential for plant growth.



**Plate 1. Components of organic farming**

### Effect of inorganic fertilizers and other agro-chemicals on soil and plants

- Modern agriculture involving use of agrochemicals like fertilizers causes:
- Depletion in soil fertility and pollution problems in ground as well as surface water bodies.
- A portion of the nutrients added through fertilizers does not become available to plants and remain in soil which may result in Eutrophication in water bodies like lakes or increase in nitrate concentration in ground water more than the permissible limit of 10 ppm causing Blue baby Syndrome.
- Increases the soil acidity with nitrification.
- Denitrification results in formation of methane, ammonia, elemental nitrogen and nitrous oxide.
- Depletion of micronutrients like sulphur & zinc.
- Increased risk of humus depletion and decline in crop production through large doses of N-fertilizers.
- Trace toxic metal contaminants can cause problem when they reach human body through food chain.

**Benefits of organic farming:** The benefits provided by organic farming are:-

- It maintains health of environment by reducing pollution.
- It helps in increasing agricultural production in a sustainable way.
- It helps in improving the soil health.
- Agriculture products obtained from organic farming are better in quality (Bigger in size, flavor, size & aroma).
- Water holding capacity of the soil is increased through organic farming.
- It improves the availability of nutrients required and essential for plants (Macro nutrients & Micro- nutrients).
- Organic farm products are usually of better size, flavor, aroma (Quality).
- Underground water of the area under organic farming is free of toxic chemicals.
- Vermicomposting brings down waste bulk density.
- Vermicomposting has hormone like substance auxins which increases plant growth.
- Maintains Carbon: Nitrogen ratio in the soil and increases the fertility and productivity of the soil.

#### **Major problems in marketing Indian organic products**

- Price expectations are too high in relation to quality.
- Low consistency of quality.
- Slow shipment, restrictions for importing Indian organic products.
- Time consuming and complicated paper work while dealing with export authorities
- The poor customer service from the Indian traders after sales is the major problem in export marketing.
- Lack of proper marketing network a marketing implementation.
- Less effort to develop domestic markets.

#### **Scope and modes to promote organic farming**

- Increase in biological activity makes lower depth nutrients availability possible.
- Increases water holding capacity of the soil.
- Improves texture & structure of soil.