

## **Study on the Future Prospectus of Organic Farming in India**

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### **Abstract:**

*Organic farming is a technique, which involves the cultivation of plants and rearing of animals in natural ways. This process involves the use of biological materials, avoiding synthetic substances to maintain soil fertility and ecological balance thereby minimizing pollution and wastage. In other words, organic farming is a farming method that involves growing and nurturing crops without the use of synthetic based fertilizers and pesticides. Also, no genetically modified organisms are permitted. It relies on ecologically balanced agricultural principles like crop rotation, green manure, organic waste, biological pest control, mineral and rock additives. Organic farming makes use of pesticides and fertilizers if they are considered natural and avoids the use of various petrochemical fertilizers and pesticides. International Federation of Organic Agriculture Movements (IFOAM), an international organization established in 1972.*

**Keywords:** *Organic farming, Green manure, Fertilizers, Pesticides.*

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### **I. Introduction:**

Organic agriculture is a production system that sustains the health of soils, ecosystems and people. It relies on ecological processes, biodiversity and cycles adapted to local conditions, rather than the use of inputs with adverse effects. Organic agriculture combines tradition, innovation and science to benefit the shared environment and promote fair relationships and a good quality of life for all involved. The most important aspect of organic farming is its ecological balance maintaining abilities. Compared to traditional farming techniques (introduced with the green and the golden revolution), Organic farming tends to be cheaper and can be easily grown locally. For example inputs like HYV seeds are costlier as compared to organic substitutes. The organic outputs are healthier and possess more nutritional value as compared to the traditionally grown counterparts. Organic techniques are more labour intensive. Hence it is favourable in countries with the abundance of labour like India. Export of organic outputs fetches high prices because of their health benefits. Effectively, they result in an inflow of profitable foreign currency reserves. Chemical fertilisers and pesticides accumulation degrade the soil fertility and lead to soil erosion. On the contrary, organic techniques refrain from the use of fertilisers hence are eco-friendly ( Sandeep *et al.*, 2012)

### **Key Features of Organic Farming**

1. Protecting soil quality using organic material and encouraging biological activity
2. Indirect provision of crop nutrients using soil microorganisms
3. Nitrogen fixation in soils using legumes
4. Weed and pest control based on methods like crop rotation, biological diversity, natural predators, organic manures and suitable chemical, thermal and biological intervention
5. Rearing of livestock, taking care of housing, nutrition, health, rearing and breeding
6. Care for the larger environment and conservation of natural habitats and wildlife

### **Need of organic farming**

With the increase in population our compulsion would be not only to stabilize agricultural production but to increase it further in sustainable manner. The scientists have realized that the 'Green Revolution' with high input use has reached a plateau and is now sustained with diminishing return of falling dividends. Thus, a natural balance needs to be maintained at all cost for existence of life and property. The obvious choice for that would be more relevant in the present era, when these agrochemicals which are produced from fossil fuel and are not renewable and are diminishing in availability. It may also cost heavily on our foreign exchange in future.



Use of fertilizers of organic origin such as compost manure, green manure, and bone meal and places emphasis on techniques such as crop rotation and companion planting. Biological pest control, mixed cropping and the fostering of insect predators are encouraged. Organic standards are designed to allow the use of naturally occurring substances while prohibiting or strictly limiting synthetic substances.

For instance, naturally occurring pesticides such as pyrethrin and rotenone are permitted, while synthetic fertilizers and pesticides are generally prohibited. Synthetic substances that are allowed include, for example, copper sulfate, elemental sulfur and Ivermectin. Genetically modified organisms, nanomaterials, human sewage sludge, plant growth regulators, hormones, and antibiotic use in livestock husbandry are prohibited. Organic farming advocates claim advantages in sustainability, openness, self-sufficiency, autonomy/independence, health, food security, and food safety.

#### **Effect of cropping system:**

The growing of a mixture of crops (polyculture) reduces disease or pest problems in comparison with monoculture. Polyculture has rarely, if ever, been compared to the more widespread practice of growing different crops in successive years (called crop rotation) with the same overall crop diversity. Cropping systems that include a variety of crops (polyculture and/or rotation) may also replenish nitrogen (if legumes are included) and may also use resources such as sunlight, water, or nutrients more efficiently.

Organic agriculture can be defined as "an integrated farming system that strives for sustainability, the enhancement of soil fertility and biological diversity while, with rare exceptions, prohibiting synthetic pesticides, antibiotics, synthetic fertilizers, genetically modified organisms, and growth hormones". Organic farming system in India is not new and is being followed from ancient time. It is a method of farming system which primarily aimed at cultivating the land and raising crops in such a way, as to keep the soil alive and in good health by use of organic wastes (crop, animal and farm wastes, aquatic wastes) and other biologic. FAO suggested that "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".

#### **Why organic farming necessary**

Sustainable and eco-friendly technology. It improves quality, shelf and nutritive value of the farm produce. It encourages sustainable livelihood of the producers as well as safeguards consumers health. It improves the physical, chemical and biological health of the soil. Promotes healthy use of the natural resources and minimizes all forms of the pollution. It enhances and sustains biological diversity within the system.

**Four Principal**

**1.Principle of health :** Organic Agriculture should sustain and enhance the health of soil, plant, animal, human and planet as one and indivisible. Healthy soils produce healthy crops that foster the health of animals and people. Health is the wholeness and integrity of living systems.

**2. Principle of ecology:** Organic Agriculture should be based on living ecological systems and cycles, work with them, emulate them and help sustain them. This principle roots organic agriculture within living ecological systems.

**3. Principle of fairness:** Organic Agriculture should build on relationships that ensure fairness with regard to the common environment and life opportunities. Fairness is characterized by equity, respect, justice and stewardship of the shared world, both among people and in their relations to other living beings.

**4. Principle of care:** Organic Agriculture should be managed in a precautionary and responsible manner to protect the health and well-being of current and future generations and the environment. This principle states that precaution and responsibility are the key concerns in management, development and technology choices in organic agriculture.

**Types of organic farming**

**Pure organic farming :** It includes use of organic manures and biopesticides with complete avoidance of inorganic chemicals and pesticides.

**Integrated Farming :** It involves Integrated Nutrient Management (INM) and Integrated Pest Management (IPM).

**Integrated Farming Systems :** In this type, local resources are effectively recycled by involving other components such as poultry, fish pond, mushroom, goat rearing etc. apart from crop components. It is a low input organic farming.

**Benefits of organic farming**

1. Increase long-term fertility of the soil.
2. It helps in maintaining environment health by reducing the level of pollution.
3. It reduces human and animal health hazards by reducing the level of residues in the product.
4. It helps in keeping agricultural production at a higher level and makes it sustainable.
5. It reduces the cost of agricultural production and also improves the soil health.
6. It ensures optimum utilization of natural resources for short- term benefit and helps in conserving them for future generation. It not only saves energy for both animal and machine, but also reduces risk of crop failure.

**Major organic crops exported from India:**

1	Spices: Cardamom, black pepper, Ginger, turmeric, nutmeg, chilli, clove and vanilla
2	Plantation Tea, coffee, cocoa
3	Pulses Red gram, black gram
4	Fruits Mango, banana, pine apple, passion fruit, orange, cashew
5	Nut Walnut
6	Vegetables Okra, brinjal, onion, tomato, potato
7	Oil seeds Sesame, castor, sunflower
8	Others Cotton, herbal extracts

Source (APEDA)

Santhoshkumar *et al.*, 2017

**Limitations of organic farming in India:** Small land holding , Poor infrastructure facilities, Lack of technology knowledge, Convert organic farm, neighbouring farmer well co-operate, Organic material such as animal dung and other crop waste used for fuel purpose, Organic material are bulky in nature very difficult store and high price, City garbage contain heavy metal, plastic bags, stones and needles. Bio control agen are available only few selected insect pest. Complicated organic certification process and high fees cost, higher human population of India.

**Biofertilizers:**

**1. Symbiotic Nitrogen-fixation:** Rhizobium Bacteria fixes atmospheric nitrogen in roots of leguminous plants, form tumours like growth known as root nodules. It is widely used biofertilizer which can fix around 100-300 kg N/ha in one crop season.

## Weed management

1. **Preventive methods:** Weed free crop seed, Weed free manure, Clean harvesting and ploughing equipment.

2. **Cultural method:**

### i) Crop rotation

Crop rotation involves alternating different crops in a systematic sequence on the same land. It is an important strategy for developing a sound long term weed control program. Weeds tend to thrive with crops of similar growth requirements as their own and cultural practices designed to contribute to the crop may also benefit the growth and development of weeds. Monoculture, that is growing the same crop in the same field after year, results in a build-up of weed species that are adapted to the growing conditions of the crop. When diverse crops are used in a rotation, weed germination and growth cycles are disrupted by variations in cultural practices associated with each crop (tillage, planting dates, crop competition, etc). Within a rotation, crop choice will determine both the current and the potential future weed problems that a grower will face. Traditionally, potato (*Solanum tuberosum* L.) was included in the rotation to reduce weed problems before a less competitive crop was grown. For an organic grower, crop choice is complicated further by the need to consider soil fertility levels within the cropping sequence and to include fertility building periods in the rotation. Variations in crop and weed responses to soil nutrient levels can also play an important part in weed management. The inclusion of a fallow period in the rotation is known to reduce perennial weeds. It is best to alternate legumes with grasses, spring planted crops with fall planted crops, row crops with close planted crops and heavy feeders with light feeders.

### ii) Cover crops

Rapid development and dense ground covering by the crop will suppress weeds. The inclusion of cover crops such as rye, red, clover, buckwheat and oilseed radish or over wintering crops like winter wheat or forages in the cropping system can suppress weed growth. Highly competitive crops may be grown as short duration 'smother' crops within the rotation. Additionally, cover crop residues on the soil surface will suppress weeds by shading and cooling the soil. When choosing a cover crop, consideration should always be given to how the cover crop will affect the succeeding crop. In addition, decomposing cover crop residues may release allelochemicals that inhibit the germination and development of weed seeds.

### iii) Intercropping

Intercropping involves growing a smother crop between rows of the main crop. Intercrops are able to suppress weeds. However, the use of intercropping as a strategy for seed control should be approached carefully. The intercropping can greatly reduce the yields of the main crop if competition for water or nutrients occurs.

### iv) Field Scouting

It involves the systematic collection of weed and crop data from the field (weed distribution, growth stage, population, crop stage etc). The information is used, in the short term, to make immediate weed management decisions to reduce or avoid economic crop loss. In the long term, field scouting is important in evaluating the success or failure of weed management programs and for making sound decisions in the future.

### v) Mulching

Mulching or covering the soil surface can prevent weed seed germination by blocking light transmission preventing seed germination. Allelopathic chemicals in the mulch also can physically suppress seedling emergence. There are many forms of mulches available. Listed are three common ones.

**vi) 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 microflora essential for plant growth (Nagavallema *et al.*, 2004).

**3) Mechanical practices:** Mechanical removal of weeds is both time consuming and labor-intensive but is the most effective method for managing weeds. The choice of implementation, timing, and frequency will depend on the structure and form of the crop and the type and number of weeds. Cultivation involves killing emerging weeds or burying freshly shed weed seeds below the depth from which they germinate. It is important to remember that any ecological approach to weed management begins and ends in the soil seed bank. The soil seedbank is the reserve of weed seeds present in the soil. Observing the composition of the seedbank can help a farmer make practical weed management decisions. Burial to 1 cm depth and cutting at the soil surface are the most effective ways to control weed seedlings mechanically. Tillage, Stale seed bed, Hand weeding, Hoeing, Moving, Mulching, Burning.



**4. Soil solarization:** Soil solarization is conducted for a minimum of four to six weeks during the warmer time of year, when there is high solar irradiation and minimal cloud and precipitation, thus its effect is climate dependent. It has been attempted in the spring and fall, but may not be as reliable then because temperatures are cooler. In addition, depending on soil texture, solarization heat penetrates to different soil depths.

**5. Allelopathy:** The allelochemicals such as flavonoids, terpenoids, and strigolactones can be used as herbicides, fungicides, and growth regulators (marigold :congress grass).

**Organic farming techniques can be incorporated because of the following benefits:**

Protecting the long term fertility of soils by maintaining organic matter levels, encouraging soil biological activity, and careful mechanical intervention. Providing crop nutrients indirectly using relatively insoluble nutrient sources which are made available to the plant by the action of soil micro-organisms. Nitrogen self-sufficiency through the use of legumes and biological nitrogen fixation, as well as effective recycling of organic materials including crop residues and livestock manures. Weed, disease and pest control relying primarily on crop rotations, natural predators, diversity, organic manuring, resistant varieties and limited (preferably minimal) thermal, biological and chemical intervention. The extensive management of livestock, paying full regard to their evolutionary adaptations, behavioural needs and animal welfare issues with respect to nutrition, housing, health, breeding and rearing. Careful attention to the impact of the farming system on the wider environment and the conservation of wildlife and natural habitats.

## II. Conclusion:

Organic farming appears to be a sustainable, economic and eco-friendly, since there is no risk of residual toxicity. It improves soil fertility and yielded quality production. An addition of compost prepared from farm wastes i.e. FYM, Neem-cake, biogas slurry, vermi-compost etc. helps maintain organic matter in soil. As per the United States Department of Agriculture (USDA) study team on organic farming "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. Organic farming can provide quality food without adversely affecting the soil's health and the environment (Yadav *et al.*, 2013).

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