

ORGANIC FARMING FOR SUSTAINABLE AGRICULTURAL DEVELOPMENT

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Organic farming is one of the several approaches to meet the objectives of sustainable development of agriculture. It avoids the use of synthetic chemicals as well as genetically altered organisms and usually subscribes to the principle of sustainable farming. Organic farming is based on various laws, perspectives and certification programs, which prohibit the use of approximately all synthetic inputs, and health of the soil is recognized as the central framework of the organic farming practices.

The agriculture sector is a primary sector of the overall development of rural areas. It plays a significant role in ensuring food security, raw materials, livelihoods and providing a spur to the growth of the industrial and service sector. Therefore, the agriculture sector is the backbone of Indian economy. A large proportion of labour force still depends on agriculture. Based on Usual Principal Status Approach (UPSA), 46.1 percent of the persons were estimated to be employed under agriculture in India during 2015-16 (Gol, 2016).

The health of the individual is at greater risk than ever before because of the chemicals that we ingest into our bodies through the inorganic food we eat. Organic agriculture has positively impacted on the quality of natural resources and biodiversity. Therefore, organic agriculture provides

high nutrient foods to human beings and animals for their well-being. Raising awareness, increasing market requirement, nurturing the attitude of the producer to become organic, increasing research and government supports have resulted into amazing development in organic agriculture since last two decades in the world and India. The global ranking of India in organic agriculture stood at eighth position with 1.78 million hectares of area under it in 2017. The share of organic agricultural land of India was 2.55 percent in the total world of organic agriculture. India has the highest number of organic producers in the world accounting to 30.58 percent. The area under organic farming in India, was over 17 lakh hectares and its total production was 16,75,560.70 metric tonnes in the year 2017-18. In 2016 Sikkim became the first organic state of India.





The concept of Organic Farming:

The system of organic farming is based on an intimate understanding of nature's laws and rules. In today's terminology, it is a method of a farming system which primarily aims 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 and other biological materials along with beneficial microbes (biofertilizers). They release nutrients for increased sustainable production of crops. "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." (IFOAM-2018).

Principles of Organic Agriculture:

The principles of organic farming were formulated and developed in September 2005 by IFAOM. These four principles are the roots, from which organic agriculture developed.

- **The Principle of Health:** Organic farming should sustain and enhance the health of soil, water, air, environment, animal, human and plant as one and indivisible.
- **The Principle of Ecology:** Organic agriculture should be based on living ecological systems and cycles, work with them, emulate them and help sustain them on nature's laws.
- **The Principle of Fairness:** Organic practices should build on relationships that ensure fairness with regard to the common environment and life opportunities.

- **The Principle of Care:** Organic farming should be managed in a precautionary and responsible manner to protect the health and well-being of current and future generations and the overall environment.

Characteristics of Organic Farming:

- 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.
- Self-sufficiency in Nitrogen 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 by 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, behavioral 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.

Sustainable Agriculture & Organic Farming:

Sustainable agriculture integrates the main goal to sustain biodiversity; enhance the quality of natural resources, economic profitability, and social equity. Organic farming provides several benefits for people and the planet. Many changes observed in the environment are long term, occurring slowly over time. Organic agriculture considers the medium and long term effect of agricultural interventions on the agro-ecosystem.

Improving Soil Fertility: Soil building practices such as crop rotations, cover crops, and organic fertilizers are central to organic practices. These practices replenish soil organic matter, feed soil life, reduce erosion, improve soil structure, and enhance nutrient cycling and water retention. The

length of time that the soil is exposed to erosive forces is decreased, soil biodiversity is increased, and nutrient losses are reduced, helping to maintain and enhance soil productivity.

Improving Water Quality: Organic farming practices, such as the application of compost manures and the use of fodder legumes and green manures within extended grain cropping rotations, can optimize soil nutrient release and plant nutrient uptake, and subsequently improve water quality. Enhanced soil structure, water infiltration, and nutrient retention also reduce the risk of groundwater pollution. In many agriculture areas, pollution of groundwater, synthetic fertilizers and pesticides are major difficulties. In some areas where pollution is a real problem, conversion to organic agriculture is highly encouraged as a restorative measure.

Energy and Climate Change: Through the use of leguminous cover crops, compost, and other organic approved materials for fertility management, organic farms often decrease the greenhouse gas emissions associated with both infield and embedded emission components. By prohibiting the use of synthetic fertilizer and pesticides, organic production avoids the CO₂ emissions associated with the production of these inputs. Additionally, many of the practices associated with certified organic production, such as diverse crop rotations, use of cover crops, and application of compost manures enhance the accumulation of carbon in soil. Organic agriculture reduces non-renewable energy use by decreasing agrochemical needs (these require high quantities of fossil fuel to be produced).

Protection of Biodiversity: Organic systems enhance biodiversity at several levels. A variety of seeds and breeds are chosen for greater resistance to diseases, climate, and pests. Producers employ diverse combinations and rotations of plants and animals to increase yields and income. The maintenance and planting of natural areas within and around organic fields and the absence of chemical inputs create suitable habitats for wildlife and important pollinators and beneficial insects. Organic farmers are both custodians and users of biodiversity at all levels.

Components of Organic Farming for Sustainable Agriculture Development:

1. Crop Rotation:

It is a systematic arrangement for the growing of various crops in a more or less regular sequence on the same land covering a period of two years and more. A mixed cropping, pasture and livestock system is desirable or even essential for the success of sustainable agriculture.

2. Crop Residue:

There is a great potential for utilization of crop residues/straw of some of the major crops. About fifty percent of the crop residues are utilized as animal feed, the rest could be very well utilized for recycling of nutrients.

3. Manure:

The organic manure is derived from biological sources like the plant, animal and human residues. Organic manure acts in many ways in augmenting crop growth, crop protection, and soil productivity. The direct effect of organic manure relates to the uptake of humic substances or its decomposition products affecting favorably the growth and yield of plants.

A) Bulky Organic Manure: Farm Yard Manure (FYM), Compost Manure, Green Manure

B) Concentrated Organic Manure: Concentrated

Figure 1.1: Components of Organic Farming



Source: http://www.agritech.tnau.ac.in/org_farm/orgfarm_introduction.html

organic manures are made from raw materials of animal or plant origin. These manures commonly used are oilcakes, blood meal, fishmeal, meat meal, and horn and hoof meal.

4. Waste:

- **Industrial Waste:** Among the industrial by-products, spent wash from distillery, molasses and press mud from industry have good manure value. This industrial waste manure can be used after proper decomposition.
- **Municipal and Sewage Waste:** Sewage sludge, particularly from industrialized cities, is contaminated with heavy metals and these pose hazards to plants, animals and human beings.

5. Biofertilizers:

Biofertilizer is microorganism's culture capable of fixing atmospheric nitrogen when suitable crops are inoculated with them. The main inputs are microorganisms, which are capable of mobilizing nutritive elements from non-usable form to usable form through a biological process.

6. Bio-Pesticide:

Bio-pesticides are natural plant products that belong to the 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.

However, their biological activity against insects, nematodes, fungi, and other organisms is well documented.

7. Vermicompost:

Vermiculture has a component in biological farming, which is found to be effective in enhancing soil fertility and producing large numbers of agricultural crops. It is organic manure produced by the activity of earthworms that generally live in soil, eat biomass and excrete it in digested form. The average nutrient content of vermicompost is much higher than that of FYM.

Key Indicators of Organic Farming: World & India

According to the FiBL-IFOAM annual report 2019, 69.8 million hectares of organic agricultural land, including in-conversion areas were managed organically in 2017 worldwide. The compound growth rate of the world's organic agriculture area was 6.78 percent and that of India 9.69 percent during 2005-17. The table-1 reveals the comparative analysis of key issues of organic farming among the world and India during 2017-18. Organic agriculture practices have been carried out exponentially in the world during the last decade and now applied in 181 countries worldwide. The total area under organic agriculture was 69.8 million hectares and 1.78 million hectares in the world and India respectively. Australia is leading an expansion of organic farming area accounting 35.65 million hectares (51.07

Table 1: Key Indicators of Organic Farming: World & India (2017-18)

Sr. No	Indicator	World		India	
		Total	Top	Total	Top
(1)	(2)	(3)	(4)	(5)	(6)
1	Organic Activities	181 Countries	Liechtenstein	33 States	Sikkim
2	Organic Agricultural Land (Million Hectare)	69.8	Australia 35.6	1.78	Madhya Pradesh 0.4
3	Wild Collection Areas (Million Hectares)	42.4	Finland 11.6	4.22	Madhya Pradesh 0.54
4	Organic share to total Agricultural Land (in Percent)	1.4	Liechtenstein (37.9)	1.0	Sikkim 100.0
5	Producers (in Millions)	2.9	India 0.83	0.83	Madhya Pradesh 0.31
6	Organic Retail Sales (Million Euros)	92074	USA 40011	186	-
7	Per-capita Consumption (Euros)	12.2	Switzerland 288	0.2	-

Source: FiBL-IFOAM Annual Report 2019, <http://apeda.gov.in/apedawebsite/organic/data.htm>

percent) in the world. India stands at 8th rank in the world which has 1.78 million hectares and contributed 2.55 percent organic area to the world's total organic agriculture land. The share of the world's organic land to total agricultural land was 1.4 percent in 2017. The countries with the highest organic share are Liechtenstein with 37.9 percent of its agricultural and under organic practices. India has 1.0 percent (1.78 million hectares) organic share to total agriculture land. Sikkim is India's first Organic state to convert the entire state into organic practices.

There were 2.9 million organic producers actively engaged in worldwide during 2017. India has the largest number of organic producers with 0.83 million (30.62 percent). Worldwide, organic retail sales have grown in large number (92074 million Euros), but in India, organic market (186 million Euros) has not developed extensively. India's per capita consumption of organic food was 0.2 Euros as against the world's per capita consumption (12.2 Euros). In India, among all the states Madhya Pradesh has effectively implemented organic practices and schemes. Therefore, Madhya Pradesh has the highest organic area and production within the country since the last decade.

Conclusion:

The organic agriculture positively affects and sustains the quality of natural resources (soil, water, and air) and biodiversity. The application of organic farming yields better economic and environmental benefits to farmers for raising their standard of life. It is inevitable to frame and implement various policies, programmes, and strategies to promote organic agriculture in order to realize its full potential. Public awareness has transformed the initial supply driven organic movements to demand driven. The premium prices and government support for organic farming has led to the implementation of organic practices. The farmers have converted their chemical farming method to organic farming method for economic, health and environment reasons. The organic farming practices are sustainable in nature and have enhanced environmental quality and ecosystem. Organic farming is based on the principle of maximum production with high quality, without affecting the soil fertility and the environment. India has the potential to become a major organic agricultural country given the international demand for our farm products, different agro-climatic regions for the cultivation of a number of crops,

the size of the domestic market and above all the long tradition of environment-friendly farming and living. Developed and developing countries have rapidly adopted organic farming practices. At the global level, every country has taken initial steps to support organic farming through implementing various programmes and policies for spreading organic practices among farmers. A strong national organic policy is the need of the hour to address the important current issues and obstacles and for promoting organic farming culture in the country. Considering the current organic status of India, it has a wide scope for increasing organic practices for the achievement of sustainable development of agriculture.

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