

14. Organic Farming in India: Potential Technologies and Way Forward

**Vishnu, Puneet Kumar Chhokar,
Preeti Yadav, Ramzan Mohammed**

Sam Higginbottom University of Agriculture Technology and Sciences
SHUATS, Prayagraj, India

Siddharth

University of Queensland,
St. Lucia, Brisbane, QLD, Australia.

Abstract:

Seizing this opportunity will benefit our farmers, consumers, and the ecosystem as a whole. Safe and healthy food is already in high demand in a world rocked by the COVID pandemic. As people become more conscious of what their friends, family, and relatives consume, the benefits to their health are becoming increasingly significant. Products made from organic farming therefore have a particular level. People used to spend money on heartbeats, premium local vegetables, and organic products. This resulted in a life span and a stable way of living. An overview of the benefits, challenges, and current situation of organic farming in India is provided in this essay.

14.1 Introduction:

Organic farming is not a recent tradition in India; it has been around for thousands of years. It is a farming technique that primarily uses biological elements, such as beneficial bacteria and organic wastes from farms, crops, and animals, along with other biological wastes, to cultivate the land and develop crops in a way that maintains the soil's vitality and health. As a result, nutrients are released into the crops, increasing their capacity to produce in a sustainable manner in a clean, green environment. In the words of Dr. A.P.J. Abdul Kalam "Organic agriculture is an admirable fit for dry lands in many ways and the dry land offer many benefits that would make it relatively easy to implement." The overall goals of organic agriculture are enhancing soil health, utilizing locally produced inputs, and employing a sizable amount of locally produced labor. The Food and Agriculture Organization suggested that "Organic agriculture is a unique production management system that, by utilizing on-farm agronomic, biological, and mechanical methods in exclusion of all synthetic off-farm input, promotes and enhances agro-ecosystem health, including biodiversity, biological cycles, and soil biological activity."

According to Mendon *et al.* (2020), producing organic food is a unique type of farming that creates a favorable perception in the eyes of consumers while striking a balance between environmental sustainability and avoiding detrimental effects on consumer safety.

Varkey (2020) asserts that environmental sustainability in agricultural technologies, methods, and output is becoming more and more significant in both developed and developing countries. Farmers' traditional knowledge of indigenous agricultural practices is increasingly being scrutinized for a variety of reasons.

Magnaye's (2018) study investigates the relationship between small-scale organic farming and entrepreneurship, taking into account both the financial advantages of entrepreneurship and the techniques employed in organic farming to preserve the environment. It also seeks to determine, through qualitative research using case studies, what skills an organic farmer needs to start an organic farm business and how smallholder organic farming might be organized. Conversely, Giovannucci (2007) notes that, on the whole, there is strong evidence to support the idea that small farms may benefit from using organic practices. As most of the cases demonstrated numerous direct benefits as well as related externalities, it is reasonable to draw the conclusion that assisting small and resource-poor farmers to adopt organic farming practices can be rather acceptable.

"Organic agriculture is a holistic production management system which promotes and enhances agro-ecosystem health, including biodiversity, biological cycles, and soil biological activity," is the most widely recognized definition of organic farming (Reddy, 2010). It highlights the employment of management techniques over off-farm inputs, keeping in mind that localized systems are necessary due to regional characteristics. This is achieved by fulfilling any specific function within the system by agronomic, biological, and mechanical techniques whenever possible, rather than with synthetic materials (FAO, 1999; Reddy, 2010).

Organic Farming:

A comprehensive approach to production management, organic agriculture supports and improves the health of the agro-ecosystem, including biological cycles, biodiversity, and soil biological activity. Organic agriculture, according to IFOAM, is a production system that maintains the wellbeing of people, ecosystems, and soils. Instead, then using inputs that have negative impacts, it depends on biological processes, biodiversity, and cycles that are tailored to the local environment. Tradition, creativity, and science are all combined in organic agriculture to improve the common environment, foster just relationships, and improve everyone's quality of life. Four overarching organic farming principles have been developed by the International Federation of Organic Agriculture Movements (IFOAM). These principles serve as the foundation for the growth and development of organic agriculture in a worldwide setting.

14.1.1 Principles of Organic Farming:

In organic farming, according to IFOAM there are 4 principles:

- A. Principle of Health:** The goals of organic agriculture are to uphold and improve the health of the land, plants, animals, people, and the world as a whole. Integrity and wholeness characterize healthy living systems. It is the preservation of one's physical, mental, social, and ecological well-being rather than just the absence of disease.

- B. Principle of Ecology:** By creating ecosystems, maintaining genetic and agricultural diversity, and designing farming systems, organic agriculture aims to achieve ecological balance. It is the responsibility of those who produce, handle, trade, or use organic products to safeguard and improve the environment as a whole, which includes the air, water, landscapes, climate, habitats, and biodiversity.
- C. Principle of Fairness:** Relationships that guarantee equity with regard to the shared environment and opportunities in life should be the foundation of organic agriculture. Equity, respect, justice, and stewardship of the common environment—among humans as well as in their interactions with other living things—are characteristics of justice and fairness.
- D. Principles of Care:** To safeguard the environment, present and future generations' health, and overall well-being, organic agriculture must be maintained with prudence and responsibility. By embracing acceptable technology and rejecting unreliable ones, like genetic engineering, it should be able to prevent major hazards.

14.2 Types of Organic Farming:

A. Pure Organic Farming:

It entails using biopesticides and organic manures while completely avoiding the use of inorganic chemicals and pesticides (**Kankam, et al ,2020**)

B. Integrated Organic Farming Systems:

Farmers that practice pure organic farming prefer not to employ any technology at all. Integrated organic farming systems, on the other hand, use every piece of technology available to them in order to increase food production and improve their quality of life.

However, they continue to exclude large quantities of chemicals, insecticides, or similar substances. remaining within organic guidelines.

Objectives of Organic Farming:

- Preserve the natural world, reduce pollution, prevent soil erosion and degradation, maximize biological productivity, and encourage good health.
- Preserve soil fertility for an extended period of time by enhancing the soil's biological activity conditions.
- Preserve the biological variety present in the system.
- Attempt to recycle as many materials and resources as you can within the company.
- Give cattle the kind attention they need to maintain their health and satisfy their behavioral demands.
- Prepare organic products with an emphasis on cautious handling and processing techniques to preserve the products' essential elements and organic integrity throughout the whole manufacturing process.
- Utilize renewable resources in agricultural systems that are organized locally.

14.3 Organic Farming in India:

The need to boost agricultural output and stabilize it in a sustainable way has arisen from the world's population growth contrasted with a declining supply of basic resources like food and water. With declining returns, the benefits of the "Green Revolution," attributed to Dr. MS Swaminathan, have now peaked, necessitating the development of alternative methods.

In addition, "pollution" is a problem brought on by the overuse of fertilizers and synthetic growth regulators. A natural balance between property and life is urgently needed for existence. Agriculture and farming have become more important in light of the fact that fossil fuels are almost gone and that non-renewable, organic, and environmentally friendly methods are available. About 3.41 million MT of certified organic products were produced in India between 2021 and 2022.

This amount comprises all different kinds of food products, such as oil seeds, sugar cane, pulses, cotton, cereals & millets, aromatic & medicinal plants, tea, coffee, fruits, spices, dry fruits, vegetables, processed foods, etc. Not only does the production encompass the edible sector, but it also yields functional food products and organic cotton fiber. Among different states Madhya Pradesh is the largest producer followed by Maharashtra, Karnataka, Uttar Pradesh and Rajasthan. In terms of commodities Oil seeds are the single largest category followed by Sugar crops, Cereals and Millets,

Tea & Coffee, Fiber crops, fodder, Pulses, Medicinal/ Herbal and Aromatic plants and Spices & Condiments. The total volume of export during 2019-20 was 6.389 lakh MT. The organic food export realization was around INR 4,686 crore (689 million USD).

Organic products are exported to USA, European Union, Canada, Switzerland, Australia, Japan, Israel, UAE, New Zealand, Vietnam etc. In terms of export value realization Processed foods including soya meal (45.87%) lead among the products followed by Oilseeds (13.25%), Plantation crop products such as Tea and Coffee (9.61%), Cereals and millets (8.19%), Spices and condiments (5.20%), Dry fruits (4.98%), Sugar (3.91), Medicinal plants (3.84%) and others.

Table 14.1: Organic Agriculture Statistics in India (2021-22)

Area	Cultivated Area (Organic + In conversion)	4726714.74 Ha.
	Wild Harvest Collection Area	4393151.17 Ha.
	Total Area (Cultivated + Wild Harvest)	9119865.91Ha.
Production	Farm Production	3410195.02 MT
	Wild Harvest Production	20540.63 MT
	Total Production	3430735.65 MT

Source-<https://www.apeda.gov.in/apedawebsite/organic/data.htm>

A. Need of Organic Farming:

- Excessive use of chemical fertilizers reduces the fertility of soil.
- Excessive use of chemicals has led to soil, water, and air pollution.
- To conserve ecosystem.
- To promote sustainable development.
- Inexpensive farming.
- Increased demand of organic products due to safety of food.

B. Benefits:

- Environment-friendly.
- Promotes sustainable development.
- Healthy and tasty food.
- Inexpensive process.
- It uses organic inputs.
- Generates income.
- Generates income through exports.
- Source of employment.
- Organic farming is more labor intensive. Hence, it generates more employment.

C. Disadvantages and Limitations of organic farming:

- Incompetent: The major issue of organic farming is the lack of inadequate infrastructure and marketing of the product.
- Less production: The products obtained through organic farming are less in the initial years as compared to that in chemical products. So, farmers find it difficult to accommodate large-scale production.
- Shorter shelf life: Organic products have more flaws and a shorter shelf life than that of chemical products.
- Limited production: Off-season crops are limited and have fewer options in organic farming.
- Higher price.
- The lack of awareness.
- Organic products generally demand a higher price due to a higher demand.
- Shorter shelf life.
- Organic products have a shorter shelf life due to the absence of artificial preservatives.

D. Organic Farming in India:

- India is the country with the most organic producers and the tenth largest area dedicated to organic farming.
- Uttarakhand, Tripura, and Sikkim were the first states in the world to achieve complete organic status, and other states have set comparable goals.
- Compared to the rest of the country, Northeast India has historically consumed significantly less chemicals and has been an organic region.

- In a similar way, the island and tribal territories are being supported to carry on with their natural history.
- India's top exports of organic goods include rice, lentils, tea, sesame, soybeans, flax seeds, and medicinal plants.

14.4 Government Initiatives to Support Organic Farming:

14.4.1 Mission Organic Value Chain Development for Northeast Region (MOVCD):

The Ministry of Agriculture and Farmers Welfare launched the Central Sector Scheme Mission Organic Value Chain Development for North East Region (MOVCD-NER), a sub-mission under the National Mission for Sustainable Agriculture (NMSA), for implementation in the states of Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim, and Tripura during the 12th plan period. In order to connect growers with consumers and support the development of the entire value chain, from inputs, seeds, and certification to the construction of facilities for collection, aggregation, processing, marketing, and brand building initiatives, the scheme aims to develop certified organic production in a value chain mode.

14.4.2 Paramparagat Krishi Vikas Yojana (PKVY):

PKVY was established in 2015 with the goal of supporting and promoting chemical-free farming. By doing so, it hopes to restore soil health through organic farming. The program encourages the use of the Participatory Guarantee System (PGS)

For India (PGS-India)² form of organic certification, which is based on mutual trust, relevant to the local community, and requires producer and consumer participation in the certification process.

Key Thrust areas of PKVY in promoting organic farming include the following:

- To encourage integrated farming systems that are based on natural resources and climate resilience, which guarantee the preservation and enhancement of soil fertility, the conservation of natural resources, the recycling of nutrients on the farm, and the reduction of farmers' reliance on outside inputs.
- Sustainable integrated organic farming systems can lower agricultural costs for farmers and increase their net income per unit of land. Chemical-free, nutrient-dense food can be produced in a sustainable manner for human consumption. The environment can be protected from harmful inorganic chemicals by implementing eco-friendly, low-cost traditional techniques and farmer-friendly technologies.
- To create direct market links between farmers and local and national markets; to empower farmers through the formation of their own institutions, such as clusters and groups capable of managing production, processing value addition, and certification management; and to turn farmers into entrepreneurs.
- Utilize the services of experts from the public agricultural research system in India.

14.4.3 National Program for Organic Production (NPOP):

The Indian government's National Programme for Organic Production (NPOP) is a complete accrediting ecosystem that offers an institutional framework for the implementation of national organic production standards. Given the explosive rise in demand for organic goods in the upcoming years, the NPOP is anticipated to be extremely important. The National (India Organic) Logo and the rules governing its usage are provided by the National Programme for Organic Production (henceforth referred to as "NPOP"), along with standards for organic production, systems, criteria, and procedures for accrediting Certification Bodies. The guidelines and practices have been developed in accordance with other international regulations that govern the import and export of goods that are organic. Additionally, this document suggests establishing an institutional framework for the application of national standards for Organic Production.

14.4.4 The Organic Farming Action Programme 2017-2020:

The Organic Farming Action Programme aims to advance and greatly expand organic farming through the implementation of essential initiatives.

- Since a disproportionately large number of organic farms operate in Unique areas, they also receive 25% of the compensatory payment for places that are less favored.
- The "Biobonus," or higher subsidy and better evaluation during the selection process, for organic production in conjunction with aids awarded for investments, processing and marketing, sales, education, and information. Successful organic farming is predicated on a holistic mindset and an as comprehensive and diverse a farming cycle as feasible. The land and water resources are utilized sustainably and conserved for the benefit of future generations.

14.5 Conclusion:

The phenomena known as "organic agriculture" is the sole way to restore the soil and nourish the land while adhering to our traditional farming practices, which exclude the use of fertilizers, pesticides, and chemicals. By deciding not to utilize chemicals, synthetic materials, pesticides, or growth hormones to produce high-quality, healthy food in sufficient quantities, this is a potential step toward sustainable development (Onkar and Suryawanshi, 2019). One agricultural system alternative that rapidly alters farming practices is organic farming. More so than just choosing not to use pesticides or fertilizers, it depends on composts made from natural beginning materials, such as green waste, fertilizer waste, bone meal, and so forth.

14.6 Reference:

1. FAO (1999). Organic Agriculture, Food and Agriculture Organization of the United Nations, Rome.
2. Giovannucci, D. (2007, June 24). Evaluation of Organic Agriculture and Poverty Reduction in Asia. Retrieved from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=996119

3. Kankam, T., Okese, K. A., & Boamah, J. (2020, June 08). Organic Farming: Types, Principles, Methods and Importance. Retrieved from <https://blog.agrihomegh.com/organic-farming-typesprinciples/>
4. Magnaye, D. (2018, November 13). Smallholder Organic Farming: An Entrepreneurial Strategy in Harmony with Nature. Retrieved from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3283615
5. Mendon, S., Salins, M., & Aithal, P. S. (2020, January 13). Emerging Trends in Sustainability of Organic Farming and its Impact on Purchase Intention - a Review & Research Agenda. Retrieved from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3512860
6. Reddy Suresh, B. (2010a). Soil fertility management in semiarid regions: The sociocultural, economic and livelihood dimensions of farmers' practices — A case of Andhra Pradesh, unpublished PhD Thesis, Centre for Economic and Social Studies, Dr. B.R. Amedkar University, Hyderabad
7. Reddy Suresh, B. (2010b). Assessment of Economic and Ecological Returns from Millet- based Bio-diverse Organic Farms vis-à-vis Conventional Farms, CESS Monograph Series No.8, Centre for Economic and Social Studies, Hyderabad
8. The Indian Organic Market: A New Paradigm in Agriculture, ASSOCHAM, India, 2018.
9. Varkey, J. (2020, March 08). Financial Inclusion and Organic Farming Practices of Kuruchya Tribe in Wayanad: An Empirical Study. Retrieved from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3536824