

Organic Farming for Sustainable Agriculture: Future Outlook and Options

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Abstract

Organic products are grown under a system of agriculture without using chemical fertilizers and pesticides, with an environmentally and socially responsible approach, and provide healthy food. It is developing rapidly and is practised in more than 120 countries. In 2022-23, the total area under the organic certification process (registered under the National Programme for Organic Production) is 10.17 million ha. This includes 5.39 million ha of cultivable area and another 4.8 million hectares for wild harvest collection. Madhya Pradesh has covered the most significant area under organic certification. In contrast, India produced around 2.9 million MT of certified organic products, which include all varieties of food products, namely Oil Seeds, fibre, Sugar cane, Cereals and millets, Cotton, Pulses, Aromatic and Medicinal Plants, Tea, Coffee, Fruits, Spices, Dry Fruits, Vegetables, Processed foods etc. The production is not limited to the edible sector; it produces organic cotton fiber, functional food products, etc. Among different states, Madhya Pradesh is the largest producer. In terms of exports, the total value was 0.31 million Mt. The organic food export realisation was around Rs. 5525.18 Crore (708.33 million USD). Products are exported to the USA, European Union, Canada, Great Britain, Switzerland, Turkey, Australia, Ecuador, the Korean Republic, Vietnam, Japan, etc. The objectives of organic farming ensure that food production has high nutritional value in adequate quantities and preserves and enhances the long-term fertility of soils.

Keywords: Organic farming, Sustainable Agriculture, Export, Production, India

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INTRODUCTION

Organic farming based on "Nature can provide for everyone's need but not for greed".....Mahatma Gandhi

Organic agriculture has the potential to secure a global food supply, just as conventional agriculture is today, but with reduced environmental impact (FAO, International Conference on Organic Agriculture, 2017). Organic agriculture is not a new concept in India. The Vedas of the later Vedic period were the first to introduce a scientific approach to organic farming. The essence of this approach is to live in harmony with nature rather than exploiting it. Our ancient literature briefly mentions several organic inputs, such as the Rigveda, Ramayana, Mahabharata, and Kautilya Arthasashthra. Organic agriculture has its roots in traditional agricultural practices that have been evolving in villages and farming

communities for centuries (Bhattacharyya & Chakraborty, 2005).

The most popularly accepted definition of organic farming is: 'Organic agriculture is a holistic production management system which promotes and enhances agro-ecosystem health, including biodiversity, biological cycles, and soil biological activity. It emphasises using management practices in preference to using off-farm inputs, considering that regional conditions require locally adapted systems. This is accomplished by using, wherever possible, agronomic, biological and mechanical methods, as opposed to using synthetic materials, to fulfil any specific function within the system (FAO, 1999).

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, which have 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 General Assembly, 2008). The term 'conventional farming' refers to a production system which employs a full range of pre- and post-plant tillage practices (e.g. plough, disc plant, cultivator), synthetic fertilisers and pesticides. It is characterised by a high degree of crop specialisation. In contrast, organic farming is characterised by diverse crops (Reddy, 2010).

Organic Farming Practices in India

Organic farming has been practiced in India for many decades. Indian civilization flourished on organic farming and was one of the most prosperous nations in the world. India had witnessed a tragic Bengal famine in 1942-43 that claimed millions of lives due to starvation. India's annual food grain production in 1950-51 was only about 50 mt. Against this backdrop, the Green Revolution introduced in 1966 was imperative in adopting modern agricultural inputs and alleviating hunger. After the Green Revolution, India's food grain production increased rapidly due to the adoption of modern inputs such as pesticides, fertilizers, and modern farm machinery. Organic products are grown under a system of agriculture without using chemical fertilisers and pesticides, with an environmentally and socially responsible approach. This method of farming works at the grassroots level, preserving the reproductive and regenerative capacity of the soil. Good plant nutrition and sound soil management produce nutritious food rich in vitality and disease resistance. India has the maximum number of organic farmers (1st rank globally) and occupies the 6th position in terms of area under the World's Organic cultivation (APEIDA). In 2016, Sikkim was the first state to be declared entirely organic.

The Government of India has implemented major schemes for boosting organic farming in India since after independence (1) The Paramparagat Krishi Vikas Yojana (PKVY), (2) Mission Organic Value Chain Development for North Eastern Region (MOVCNDR), (3) Capital Investment Subsidy Scheme (CISS) under the Soil Health Management Scheme, (4) National Mission on Oilseeds and Oil Palm (NMOOP), 50 % subsidy (Rs.300/ha) for the supply of bio-fertilisers, rhizobium culture, PSB, Azatobacter, Mycorrhiza and vermicompost, (5) National Food Security Mission (NFSM), (6) Bharatiya Prakritik Krishi Padhati (BPKP), (7) National Horticulture Mission, (8) National Mission for Sustainable Agriculture, (9) Rashtriya Krishi Vikas Yojana, (10) The mission for Integrated Development of Horticulture (a. National Horticulture Mission, b. Horticulture Mission for North Easter and Himalayan states, c. National Bamboo Mission, d. National Horticulture Board, e. Coconut Development Board, Central Institute for Horticulture, Nagaland), (11) National Project on Management of Soil Health and

Fertility, (12) National Project on Organic Farming (NPOF) Scheme-NCOF, (13) National Programme for Organic Production (NPOP), (14) Macro Management of Agriculture.

Principles of organic farming

The four main principles of organic farming production suggested by IFOAM in 2005 (IFOAM was founded in 1972) are:

- The Principle of Health – Organic agriculture should sustain and enhance the health of soil, plants, animals, humans, and planets and be indivisible.
- The Principle of Ecology – Organic agriculture should be based on living ecological systems and cycles, working with them, emulating them, and helping sustain them.
- The Principle of Fairness – Organic agriculture should build on relationships that ensure fairness concerning the familiar environment and life opportunities.
- The 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 (I.F.O.A.M., 2005b).

Objectives of organic farming

The objectives of organic agriculture have been expressed in the standard document of the IFOAM as follows:

1. Ensure food production has high nutritional value in adequate quantities.
2. Embrace natural systems rather than seeking domination over them
3. Foster and enhance biological cycles within farming systems involving microorganisms, soil flora and fauna, plants, and animals.
4. Preserve and enhance the long-term fertility of soils.
5. Utilize renewable resources in locally organised agricultural systems as much as possible.
6. Operate within a closed system, maximising the use of organic matter and nutrient elements.
7. Provide livestock conditions conducive to expressing all aspects of their innate behaviour.
8. Prevent all forms of pollution resulting from agricultural practices.
9. Preserve the genetic diversity of the agricultural system and its surroundings, including protecting plant and wildlife habitats.

Benefits of Organic Farming The benefits provided by organic farming are:

1. Organic farming contributes to environmental health by reducing pollution levels.
2. It facilitates sustainable agricultural production, ensuring long-term viability.
3. Organic practices enhance soil health, promoting fertility and productivity.

4. Products from organic farming typically exhibit superior quality, characterised by larger size, enhanced flavour, and aromatic attributes.
5. Organic techniques improve soil water holding capacity, aiding in conservation.
6. Organic farming enhances nutrient availability, which is crucial for plant growth and development.
7. Organic farm products are renowned for their superior quality attributes, including size, flavour, and aroma.

Organic farming is a holistic food production mechanism emphasising the sustainable use of locally available resources. To sustain growth and ensure quality, it is imperative to adopt a comprehensive approach, gain support from all stakeholders with environment-friendly technologies, conduct market assessments, and provide adequate financial support.

Modern technology and a sustainable environment cannot coexist. Organic farming is an alternative to conventional agriculture because it sustains production without seriously harming the environment and ecology (Veeresh, 1999). Organic farming is the most widely recognised alternative farming practice to conventional farming. Alternatives include biological, natural, and permaculture farming (Sharma & Arun, 2001). After three years of switching to natural cultivation, the soil was still recovering from the aftereffects of chemical farming (Save, 1992). There is an urgent need for corrective actions because almost all the benefits of high-yielding varieties accrue mainly in the short term, and in the long term, they cause adverse effects. Organic farming is based on the absolute exclusion of chemicals and fertilizers, not only for the present but also for the future (Ayala, 2001).

Organic farming is a farming system that primarily aims to cultivate the land and raise crops in a way that keeps the soil alive and in good health. It uses organic wastes (crop, animal and farm wastes, aquatic wastes) and other biological materials, along with beneficial microbes (fertilizers), to release nutrients to crops for increased sustainable production in an eco-friendly, pollution-free environment (Singh *et al.*, 2019). Farmers often incur expenditures such as farm machinery, bunding, and purchasing bio inputs to augment soil fertility and yield. In addition, various barriers like transaction costs (lack of access to relevant knowledge on cultivation practices, market), mandatory documentation required for inspection and certification, lack of demand in the domestic market, constraints to enter the international market, and institutional factors restrict the spread of organic farming (Das, 2004). Agriculture is the most critical sector of the economy. In India, with the increase in various health diseases during the past few decades, organic products have been the most helpful in reducing some diseases through organic commodities, thereby creating a lag in the availability

and requirement of organic products. Thus, the present study considers organic farming a major demand nowadays, including in India. However, the average yields of organic produce need to be increased significantly; against this background, the study seeks to examine the organic area, production, and productivity along with an analysis of Indian state-produced organic commodities.

MATERIALS AND METHODS

The present study is based on secondary data sources available in the public domain that have been made both in India and abroad and collected from published sources such as the International Federation of Organic Farming Movements (IFOAM), FiBL Statistics, National Centre of Organic Farming (NCOF), APEDA (Agricultural Processed Food Products and Export Development Authority), Journals, periodicals, and newspapers reports are liberally used for the preparation of the paper.

The present study analyses the organic farming area, production, commodities produced, and export of organic products, and it presents the results in tabular form and using graphical techniques.

RESULTS AND DISCUSSION

Area, production under organic farming NPOP Scheme: India scenario

The Government of India also launched the Nation Programme for Organic Production (NPOP) in 2001. The European Commission and Switzerland have recognised the NPOP standards for production and accreditation systems as equivalent to their country's standards. Similarly, the United States Department of Agriculture (USDA) has recognised NPOP conformity assessment accreditation procedures as comparable to those in the US. With these recognitions, the Indian organic products duly certified by the accredited certification bodies of India are accepted by the importing countries.

Currently, India ranks 1st in terms of the total number of producers under organic crops and 5th in terms of the World's Organic Agricultural land cultivation (FiBL & IFOAM Year Book, 2020). According to the Agricultural and Processed Food Products Export Development Authority (APEDA), the cultivated land under certification is around 1.71 million ha (2023-24), which includes 2.76 million ha under cultivated area (in conversion), and the rest is under forest area (wild harvest collection). India produced 3.57 million Mt of certified organic products under organic cultivated area (Table 1), including all varieties of food products. In 2023-24, the total area under the organic certification process (registered under the Nation Programme for Organic Production) is 1.71 million ha. This includes 2.85 million ha of cultivated area (in wild harvest collection) and another 2.77 million ha (in conversion).

India is home to about half of the world's organic producers, mainly because of the small size of each producer (Bhattacharyya *et al.*, 2005; Bhutani *et al.*, 2018; Bhardwaj *et al.*, 2019).

In 2023-24, India produced around 3.23 million MT of certified organic products, which includes all varieties of food products, namely sugarcane, pulses, Millets and Cereals, Cotton, Aromatic and Medicinal Plants, Coffee, Tea, Spices, Fruits, Dry Fruits, Fibre, Oilseeds.

From 2022-23 to 2023-24, exports declined from 0.31 million MT to 0.26 million MT. Also, exports declined by around 1517 crores from Rs.5525.18 and 4007.91 Crores, exported in 2022-23 and 2023-24, respectively. The export of organic food (708.33, 494.80 Million USD) in 2022-23 and 2023-24, respectively. Organic products are mainly exported to the USA, European Union (EU), Canada, Great Britain, Vietnam, Sri Lanka, Thailand, Switzerland, Cameroon, Isreal etc. Mukherji *et al.*, 2018 observed that entrepreneurs and several start-ups positively responded to government initiatives formed in the organic segment.

Table 1: Area, Production and Export of Organic Farming in India (2022-23 and 2023-24)

Particulars	2022-23	2023-24
Cultivated Area (Organic)	1.76 million Ha	1.71 million Ha
Cultivated Area (In conversion)	3.63 million Ha	2.77 million Ha
Wild Harvest Collection Area	4.8 million Ha	2.85 million Ha
Total Area	10.17 million Ha	7.33 million Ha
PRODUCTION		
Farm Production (Organic)	2.67 million MT	3.23 million MT
Farm Production (In conversion)	0.29 million MT	0.32 million MT
Wild Harvest Production	0.02 million MT	0.02 million MT
Total Production	2.97 million MT	3.57 million MT
ORGANIC EXPORT		
Total Export Quantity	0.31 million MT	0.26 million MT
Total Export value (INR)	Rs. 5525.18 Crore	Rs. 4007.91 Crore
Total Export Value (US\$)	708.33 Million USD	494.80 Million USD

Source: National Programme of Organic Production (NPOP), APEDA, 2024.

Area under organic certification NPOP Scheme: Among State Scenario

Organic farming is a holistic food production mechanism emphasising the sustainable use of locally available resources. To sustain growth and ensure quality, it is imperative to adopt a comprehensive approach by getting support from all stakeholders with environment-friendly technologies, providing market assessment, and providing adequate financial support. In 2023-24, Madhya Pradesh covered the largest area under organic certification, followed by Maharashtra, Gujarat,

Rajasthan, Odisha, Karnataka, Uttarakhand, Sikkim, Chhattisgarh, Uttar Pradesh, and Jharkhand Table 2. The top three states account for more than half of the area under organic cultivation. In 2023-24, about 80 per cent of the total area is cultivated under organic. In terms of export value realisation, Processed foods, including soya meal (61%), lead among the products, followed by Oilseeds (12.85%), Cereals and millets (12.71%), Sugar (4.77%), Plantation crop products such as Tea and coffee (2.16 %), Spices and condiments (1.72%), Pulses (1.1%0 %), and others (APEDA, 2023).

Table 2: State-wise Area under Organic Certification NPOP 2023-24

State Name	Organic Area (In Ha)	Conversion Area (In Ha)	Total Area (In Ha)
Madhya Pradesh	612816	535420	1148236
Maharashtra	267229	733851	1001080
Rajasthan	215299	364793	580092
Gujarat	92334	588486	680820
Odisha	77696	103326	181022
Sikkim	75473	257	75730
Uttar Pradesh	52889	13503	66391
Uttarakhand	51628	50192	101820
Kerala	36209	8055	44264
Karnataka	30612	40474	71086
Andhra Pradesh	25877	37802	63679
Jammu & Kashmir	24963	9784	34747
Meghalaya	20112	9592	29703
Bihar	19087	9975	29062

State Name	Organic Area (In Ha)	Conversion Area (In Ha)	Total Area (In Ha)
Tamil Nadu	18099	24659	42758
Assam	15434	11646	27079
Chhattisgarh	11289	3855	15144
Goa	11180	1107	12287
Himachal Pradesh	8182	1153	9334
Manipur	7172	25413	32585
West Bengal	7012	1106	8118
Tripura	5884	14597	20481
Arunachal Pradesh	5841	10696	16538
Telangana	5400	79465	84865
Jharkhand	3524	50884	54408
Nagaland	3340	12881	16222
Mizoram	3230	11008	14238
Haryana	2260	665	2925
Punjab	1009	10080	11089
Pondicherry	21	0.34	22
New Delhi	5	4	10
Total	1711107	2764730	4475837

Source: National Programme of Organic Production (NPOP), APEDA

Organic Area under Wild collection

Among all the states of India, Chhattisgarh (33.57%) has covered the largest area under the wild collection, followed by Madhya Pradesh (31.83%) and Rajasthan (13.98), and the lowest was Uttarakhand, followed by Andhra Pradesh and Jharkhand during 2023-24. It may be seen from Table 3. State-wise organic farm production during 2023-24. Madhya Pradesh (35.81%) is

the largest producer, followed by Maharashtra (15.62%), Rajasthan (12.58%) and Gujrat (5.40%) in terms of commodities, Oilseeds, Sugarcane, Cereals, Millits, herbal/Medicinal and Aromatic plants, condiments and Spices, Fresh Fruit Vegetables, Tea and Coffee and Pulses. This shows a wide coverage area under organic farming in the Indian states.

Table 3: State-wise organic Area under Wild collection for the year 2023-24

State Name	Organic Area (In Ha)
Chhattisgarh	956894
Madhya Pradesh	907234
Rajasthan	398590
Himachal Pradesh	202216
Maharashtra	170107
Uttar Pradesh	72612
Punjab	63880
Kerala	20116
West Bengal	15000
Jammu & Kashmir	13599
Tamil Nadu	9876
Goa	9674
Ladakh	5000
Assam	2500
Karnataka	1667
Odisha	935
Jharkhand	196
Andhra Pradesh	38
Uttarakhand	24
Total	2850157

Source: National Programme of Organic Production (NPOP), APEDA

Area under Paramparagat Krishi Vikas Yojana (PKVY) scheme (2015-16 to 2021-22)

The agriculture sector is in distress with minimising profitability due to the increasing cost of

inputs and stagnant output process. The broader adoption of organic farming can effectively tackle these two problems of Indian agriculture (Seufert *et al.*, 2012). The Indian government is solving this problem by

encouraging organic farming through the centrally sponsored scheme of Paramparagath Krishi Vikas Yojana (PKKVY). Since 2015-16, an area of 11.85 lakh hectares has been brought under organic farming through the Paramparagat Krishi Vikas Yojana (PKVY) scheme, and the government also intends to another 6 lakh hectares area to organic farming through the PKVY scheme from 2022-23 to 2025-26 (PIB, 2023). The area

under organic farming was added through the Paramparagat Krishi Vikas Yojana. Madhya Pradesh added that the highest are under organic (175560) during 2021-22. Under PKVY, farmers of various country states are provided financial assistance of Rs 50000/ha for three years. Rs 31000 per hectare for three years is provided directly to farmers.

Table 4: State-wise, area added to organic farming through PKVY (2015-16 to 2021-22)

State	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22
Andaman & Nicobar	1360	1360	1360	1360	1360	1360	1360
Andhra Pradesh	8660	8660	26000	106000	106000	206000	206000
Arunachal Pradesh	380	380	380	380	380	380	380
Assam	4400	4400	4400	4400	4400	4400	4400
Bihar	6540	6540	10600	10600	10600	24600	24600
Chhattisgarh	3760	3760	4000	24000	24000	109000	109000
Goa	80	80	80	10080	10080	10080	10080
Gujarat	2000	2000	2000	2000	2000	2000	2000
Haryana	400	400	400	400	400	400	400
Himachal Pradesh	2200	2200	4200	4200	5700	17700	17700
Jammu & Kashmir	560	560	560	560	560	560	560
Jharkhand	2000	2000	5540	5540	5540	8940	23940
Karnataka	10900	10900	10900	10900	20900	20900	20900
Kerala	2380	2380	12380	12380	12380	96380	96380
Lakshadweep	0	0	0	2700	2700	2700	2700
Madhya Pradesh	17600	17600	27600	76560	76560	175560	175560
Maharashtra	18640	18640	25160	25160	25160	25160	32160
Manipur	600	600	600	600	600	600	600
Meghalaya	900	900	900	900	900	900	900
Mizoram	680	680	680	680	680	680	680
Nagaland	480	480	480	480	480	480	480
Delhi	0	0	10000	10000	10000	10000	10000
Odisha	6400	6400	6400	20800	20800	44800	44800
Pondicherry	0	0	160	160	160	160	160
Punjab	1000	1000	5000	5000	5000	5000	7000
Rajasthan	15100	15100	23000	123000	123000	123000	123000
Sikkim	3000	3000	3000	3000	3000	3000	3000
Tamil Nadu	2240	2240	2240	6240	6240	8240	8240
Telangana	6000	6000	13800	13800	13800	13800	13800
Tripura	1000	1000	1000	1000	1000	1000	1000
Uttar Pradesh	11500	11500	18800	32800	42800	78580	78580
Uttarakhand	11000	11000	12540	90540	90540	140540	140540
West Bengal	2400	2400	2400	2400	2400	2400	2400
Daman & Diu	0	0	1100	1100	1100	1100	1100
Dadar Nagar	0	0	10000	10000	10000	10000	10000
Chandigarh	0	0	0	1300	1300	1300	1300
Ladakh	0	0	0	0	0	0	10000
Total	144160	144160	247660	621020	642520	1151700	1185700

Source: Minister of Agriculture and Farmers Welfare, PIB, Posted On: 14 MAR 2023 by PIB Delhi.

CONCLUSION

Organic farming is a holistic food production mechanism emphasizing the sustainable use of locally available resources. To sustain growth and ensure quality, it is imperative to adopt a comprehensive approach by getting support from all stakeholders with environment-friendly technologies, providing market

assessment, and providing adequate financial support. Among all the states of India, Chhattisgarh (33.57%) has covered the largest area under the wild collection, followed by Madhya Pradesh (31.83%) and Rajasthan (13.98), and the lowest was Uttarakhand, followed by Andhra Pradesh and Jharkhand during 2023-24. In 2023-24, India produced around 3.23 million MT of certified

organic products, which includes all varieties of food products, namely sugarcane, pulses, Millets and Cereals, Cotton, Aromatic and Medicinal Plants, Coffee, Tea, Spices, Fruits, Dry Fruits, Fibre, Oilseeds. From 2022-23 to 2023-24, exports declined from 0.31 million MT to 0.26 million MT. Also, exports declined by around 1517 crores from Rs.5525.18 and 4007.91 Crores, exported in 2022-23 and 2023-24, respectively. The export of organic food (708.33, 494.80 Million USD) in 2022-23 and 2023-24, respectively. In terms of export value realisation, Processed foods, including soya meal (61%), lead among the products, followed by Oilseeds (12.85%), Cereals and millets (12.71%), Sugar (4.77%), Plantation crop products such as Tea and coffee (2.16 %), Spices and condiments (1.72%), Pulses (1.1%), and others. Organic products are mainly exported to the USA, European Union (EU), Canada, Great Britain, Vietnam, Sri Lanka, Thailand, Switzerland, Cameroon, Israel, etc. Modern methods and approaches create new options for sustainable agriculture, enhance the productivity of organic farming, and improve the livelihood of many farmers in an environmentally friendly way. In other words, organic agriculture mirrors sustainable agriculture.

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