

# PRODUCTION, TRADE, AND FUTURE PROSPECTS OF ORGANIC AGRICULTURE IN INDIA

## Abstract

Organic agriculture is an eco-friendly sustainable agricultural production system that enhances multiple ecosystem services. Globally, India is the fourth largest country in terms of area under organic agricultural land. This chapter analyzes the trends in area, production, and trade scenario of organic agriculture in India. Global scenario and intercountry comparison has been attempted to capture the organic agriculture contribution to both global and national food security. Furthermore, regional disparity, key challenges, and future prospects of organic agriculture were also briefed. The chapter concludes with possible strategies to strengthen organic agriculture to address climate change and ensure the food security of the nation.

**Keywords:** organic agriculture, production, trade, trends, India

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## I. INTRODUCTION

The increasing awareness and demand for quality food have transformed agriculture into a more dynamic sector in the recent past. However, agriculture is currently facing two critical challenges of maintaining and enhancing the productivity of agricultural systems while sustaining natural resources (FAO, 2017). Although modern agricultural practices significantly contributed to food security, they have also resulted in higher social and ecological externalities (Hazell and Wood, 2008). The irrational use of chemical inputs has led to the degradation of natural resources, higher emission of greenhouse gases, water scarcity, and deterioration of soil health (Godfray and Garnett 2014; Foley et al. 2011; Kumara et al. 2020; Kumara et al. 2023). These factors together with the impacts of climate change make it further difficult to achieve sustainable food production systems. Therefore, innovative and 'holistic' farming system approaches are crucial to protect the environment while simultaneously increasing productivity.

Organic Farming is widely recognized as a sustainable production system that supports the environment and enhances ecosystem services. These farming systems are formulated to increase food production without disturbing the agroecological balance. Food and Agricultural Organization (FAO) defined Organic agriculture as a 'holistic production management system which promotes and enhances agro-ecosystem health, including biodiversity, biological cycles, and soil biological activity (FAO, 1999). Similarly, the International Federation of Organic Agriculture Movements (IFOAM) defined organic agriculture as a 'production system that sustains the health of soils, ecosystems, and people'. A plethora of empirical evidence highlighted the various economic and environmental advantages of organic agriculture over chemical farming (Kumara et al. 2015).

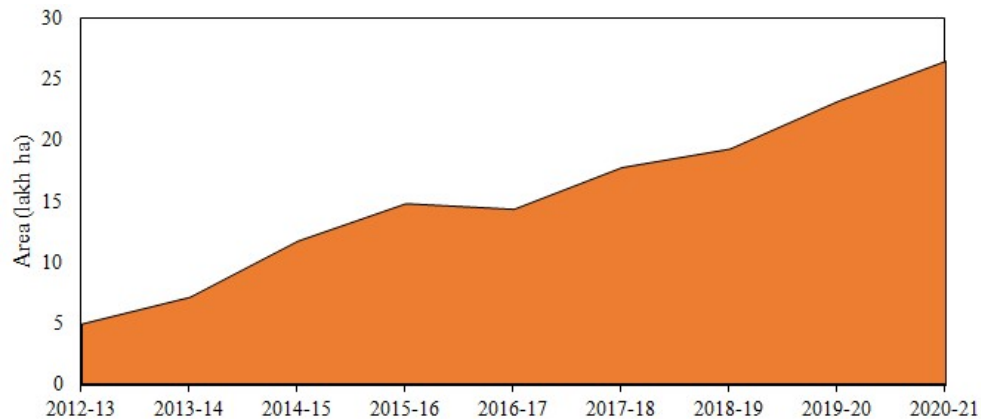
India has achieved remarkable growth in food production through the adoption of green revolution technologies. The food grain production of the country has increased by more than six-fold to 315 million tonnes compared to the pre-green revolution era (PIB, 2022). The increase in agricultural productivity was mainly attributed use of external inputs such as fertilizers, pesticides, irrigation, and farm machinery (Chowdhury et al. 2013). However, the indiscriminate use of chemical inputs over the year resulted in adverse health and environmental related problems. The productivity of major cropping crops such as rice and wheat has declined and or reached the plateau. In addition, the negative impact of climate change further aggravated the situation and create more challenges for the creation of a sustainable agricultural production system.

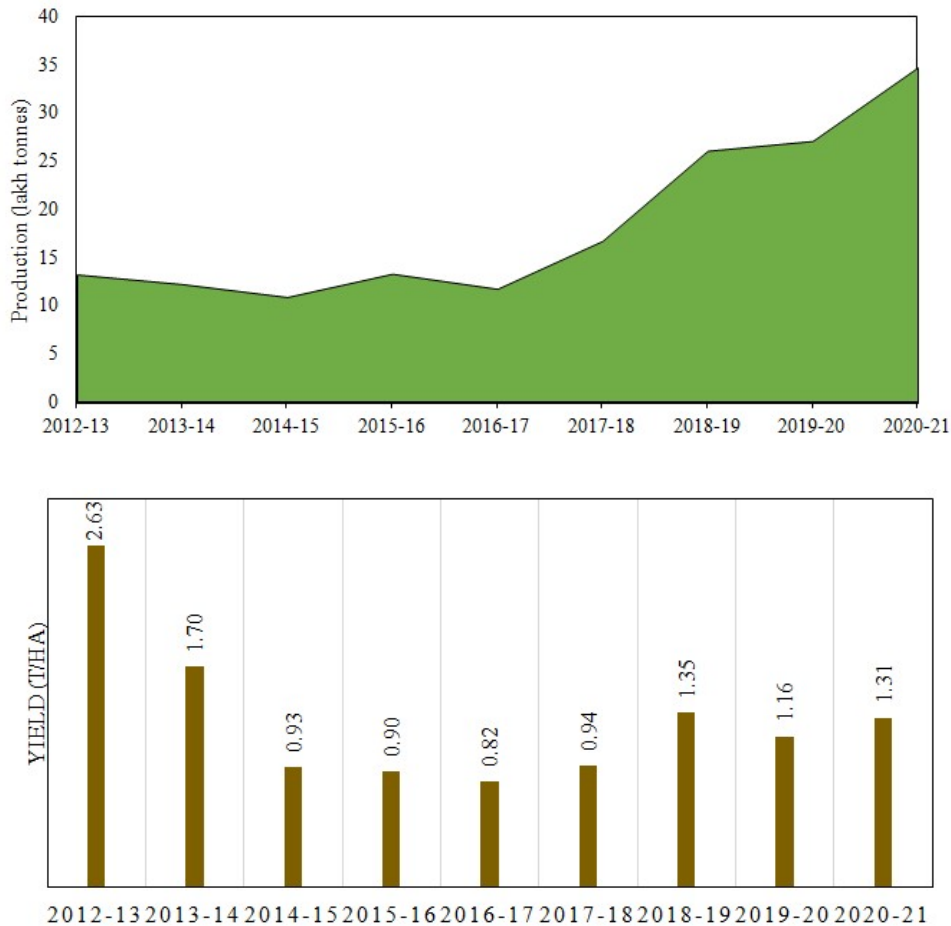
In India, Organic agriculture is not a new concept; it has been adopted by farming communities since ancient times as a part of traditional farming. Realizing the contribution of organic agriculture to ecosystem services and the growing demand for organic products, the Government of India had taken several initiatives to promote and upscaling of organic farming practices. A dedicated National Centre for Organic and Natural Farming was established in the year 2004 to facilitate policy formulation and support various programs related to organic farming systems.

## II. CURRENT STATUS OF ORGANIC AGRICULTURE IN INDIA

Data on the area, production, and productivity of organic farming were collected from the Agricultural and Processed Food Products Export Development Authority (APEDA) for the period 2012 to 2020, with a focus on drawing policy inferences. At the national level, the total acreage of organic production has shown a significant increase, rising from 5.04 lakh ha during TE 2012-13 to 26.58 lakh ha during TE2020-21 (Fig. 1). This increase in acreage under organic farming corresponds to a substantial annual increase of 20.77% annual growth, which is statistically significant. A similar trend is observed in production, which has experienced an annual growth rate of 14.59 %. However, the productivity of organic farming initially showed a declining trend up to the period TE2016-17. Whereas in the later stage, the yield has slightly improved. Overall, the productivity has declined from 2.36 t/ha during TE2012-13 to 1.31 t/ha in TE2020-21 (Fig. 1).

The notable increase in organic area and production is attributed to various initiatives taken by the Government of India, primarily 'Paramparagat Krishi Vikas Yojana' (PKVY) scheme which was implemented in 2015. The objective of the scheme is to provide support and promote organic production, certification, marketing, and post-harvest management, encouraging farmers to adopt organic agriculture practices. The positive impact of the program is evident in the increase in area and production. Notably, the scheme has a remarkable effect on organic production, as indicated by the exponential growth in production (22.89 lakh tonnes) during the period from TE2016-17 to TE2020-21 period (Fig. 1).



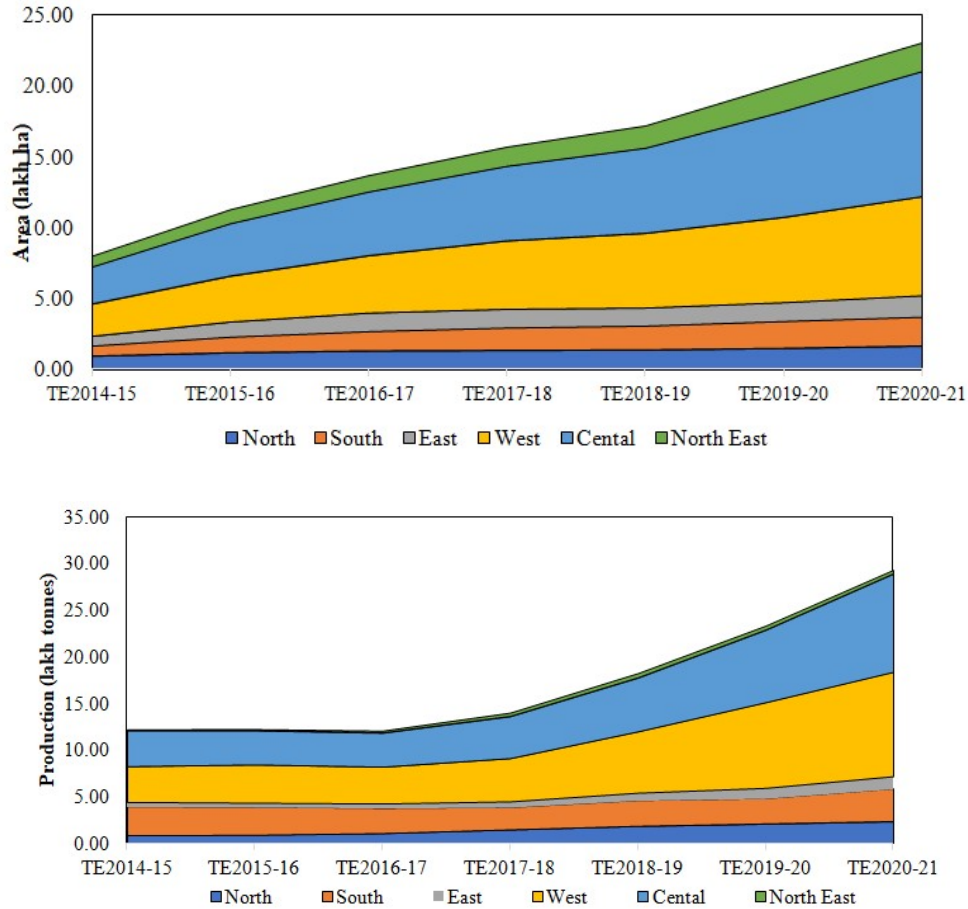


**Figure 1:** Trends in Area, Production, and Yield of Organic Agriculture in India

- 1. Regional Status of Organic Agriculture in India:** The analysis of region-wise area and production of organic agriculture provides a clear understanding of the concentration of organic farming. During TE2020-21, among six regions, central region of India accounts for the maximum acreage (38.33 %) under organic agriculture. It was followed by west region (30.20 %), south region (8.86 %), northeast region (8.75 %), north region (7.30 %), and eastern region of India (Fig 2.). The highest increase in acreage growth under organic agriculture was observed in the central region (24.82%) followed by the west (21.31 %), south (19.62 %), east (18.79 %), northeast (18.61 %) and northern region (10.52 %). A similar trend was observed in region-wise distribution of organic crop production across the various regions of India. The highest growth in organic production was observed in the northeast region of about 28.89 % followed by the northern part (18.14 %), east (17.63 %), west (17.57 %), and central region (17.46 %). Surprisingly, organic production in the southern region is declined by 0.33% over the reporting period.

The promising change in the organic agriculture scenario, especially in North East Region mainly because of the programme Mission Organic Value Chain Development in

North East Region (MOVCD-NER). Under this program, farmers are encouraged with the financial assistance of Rs.32500/ ha/ 3 years to support organic agriculture.



**Figure 2:** Regional Trends in Area and Production of Organic Agriculture

**2. Regional Disparity of Organic Agriculture in India:** The state-wise status of organic agriculture is presented in Table 1. It is clear that Madhya Pradesh holds the maximum area of 8.62 lakh ha (32 % of total area) under organic agriculture during TE 2020-21 followed by Maharashtra (3.01 lakh ha), Rajasthan (2.70 lakh ha), Gujarat (1.12 lakh ha) and Odisha (0.92 lakh ha) are the major top five states having maximum area under organic agriculture. However, the percentage change in area under agriculture from TE2012 to TE2020 was highest in north-eastern states such as Manipur (17,273 %), Meghalaya (3090 %), Tripura (1942 %), Mizoram (1447 %) and Arunachal Pradesh (727 %). Although the area under organic agriculture is low but the rapid increase in acreage from TE2012 to TE2020 was significantly highest in these states. A similar trend was observed in growth in the acreage of organic agriculture, the maximum growth in the area was observed in Manipur (142.20 %), Meghalaya (79.91 %), Arunachal Pradesh (74.45 %), Jharkhand (68.63 %) and Tripura (64.22 %) (Table 1).

**Table 1: States-Wise Acreage Scenario of Organic Agriculture**

State	TE2014-15	TE2020-21	% Change	Growth
Madhya Pradesh	2.582	8.623	234	24.6
Maharashtra	0.955	3.017	216	21.91
Rajasthan	0.706	2.701	282	27.12
Sikkim	0.601	0.757	26	4.95
Odisha	0.498	0.922	85	15.5
Gujarat	0.472	1.123	138	14.65
Uttar Pradesh	0.438	0.637	45	6.91
Karnataka	0.368	0.864	135	15.72
Uttarakhand	0.274	0.512	87	12.14
Kerala	0.162	0.418	158	18.33
Andhra Pradesh	0.129	0.355	175	22.22
Goa	0.123	0.128	4	1.53
Jammu & Kashmir	0.121	0.289	139	19.73
Jharkhand	0.086	0.345	302	68.63
Assam	0.071	0.340	377	35.76
West Bengal	0.065	0.063	3	11.81
Himachal Pradesh	0.062	0.123	98	13.96
Tamil Nadu	0.062	0.267	329	32.02
Haryana	0.060	0.057	6	-0.33
Nagaland	0.055	0.124	127	17.88
Chhattisgarh	0.037	0.223	499	36.38
Bihar	0.033	0.187	474	46.29
Punjab	0.019	0.067	243	16.21
Meghalaya	0.014	0.441	3,090	79.91
Arunachal Pradesh	0.013	0.110	727	74.45
Telangana	0.010	0.081	739	7.95
Mizoram	0.006	0.100	1,447	45.7
Tripura	0.002	0.042	1,942	64.22
Manipur	0.001	0.104	17,273	142.2
Total	8.038	23.080	187	20.77

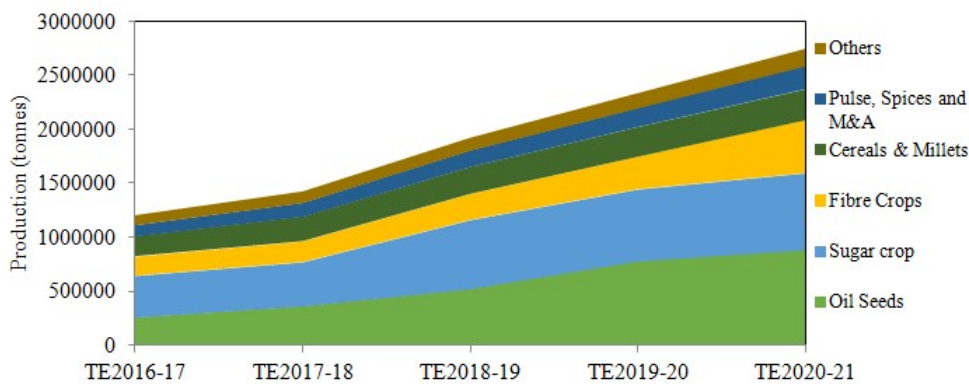
The major producer of organic products in India is presented in Table 2. Madhya Pradesh dominates in terms of both area and production. During TE 2020-21, the state produced 10.4 lakh tons of organic products, which is around 35.42 % of the total national production. Followed by Maharashtra (8.47 lakh tons) and Karnataka (2.82 lakh tons). The top 15 organic producing states account for 99.16 % of organic production in India (Table 2). Overall, India witnessed remarkable growth in organic production, more than doubling from 12.18 lakh tons during TE 2014-15 to 29.29 lakh tons during TE 2020-21 which corresponds to an absolute increase of 17.12 lakh tons (140.44 %). Notably, Himachal Pradesh and Telangana experienced extraordinary growth rates of 4745% and 4133%, respectively, between TE 2014-15 and TE 2020-21. With few exceptions, almost all states exhibited positive growth in organic production. Himachal Pradesh stood out with the highest increase of 93.36%, followed by Chhattisgarh with 51.68% and Telangana with 51.60%. Conversely, Punjab experienced the greatest decline of -11.98% from TE 2014-15 to TE 2020-21 (Table 2).

**Table 2: States-Wise Production Scenario of Organic Agriculture**

State	TE 2014-15	TE 2020-21	% Change	Growth
Madhya Pradesh	3.815	10.372	171.88	17.29
Maharashtra	2.616	8.472	223.91	18.83
Karnataka	2.785	2.817	1.16	-2.94
Rajasthan	0.679	1.867	175.17	17.58
Uttar Pradesh	0.512	1.548	202.51	19.97
Odisha	0.370	1.161	213.66	19.81
Gujarat	0.516	0.848	64.34	9.94
Uttarakhand	0.227	0.374	64.55	9.46
Jammu & Kashmir	0.070	0.343	389.12	33.52
Kerala	0.073	0.277	280.92	24.23
Assam	0.068	0.265	291.81	25.05
Tamil Nadu	0.144	0.192	33.74	5.83
West Bengal	0.108	0.186	72.2	7.91
Chhattisgarh	0.024	0.162	581.58	51.68
Andhra Pradesh	0.080	0.153	92.67	12.62
Meghalaya	0.000	0.081	-	-
Himachal Pradesh	0.001	0.062	4745.37	93.36
Haryana	0.033	0.035	6.33	0.49
Goa	0.034	0.027	-19.77	-3.03
Telangana	0.001	0.023	4133.07	51.6
Punjab	0.012	0.006	-53.7	-11.98
Sikkim	0.001	0.005	910.36	39.52
Tripura	0.002	0.003	128.56	21.57
Arunachal Pradesh	0.000	0.002	719.04	-
Nagaland	0.001	0.001	9.35	-
Manipur	0.011	0.000	-98.06	-
Bihar	0.000	0.000	-	-

Jharkhand	0.000	0.000	-	-
Total	12.180	29.285	140.44	14.59

The major crop groups contributing to the total organic crop production in India are oilseeds, sugar crops, fiber crops, and cereals & millets, collectively accounting for approximately 86.13% (Fig.3). Among these crop groups, 8.83 lakh tons of oilseeds are produced organically followed by sugar crop (7.08 lakh tons), fiber crops (48.69 lakh tons) and cereals and millets (28.74 lakh tons). The highest positive growth in organic crop production of crops was observed in fodder crops from 266 tons during TE2016-17 to 7215 tons during TE2020-21 with a percentage growth of 143.33 followed by tuber crops (82.24 %), oilseeds, and spices & condiments (Fig 3).

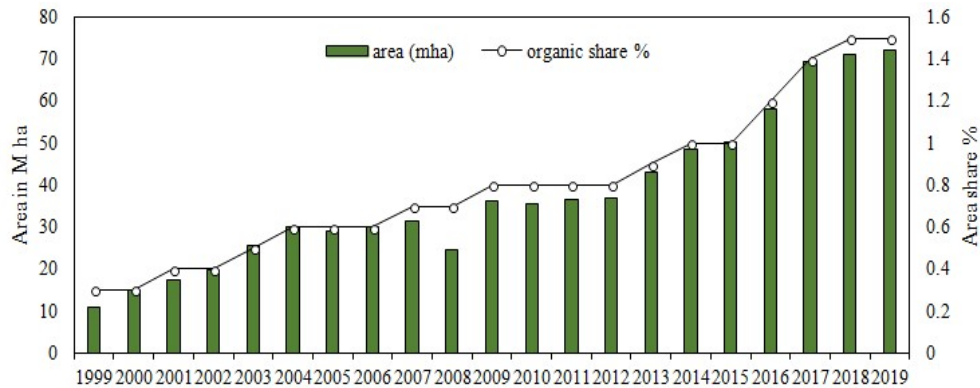


**Figure 3:** Crop Group-Wise Organic Production Scenario in India

**3. Global Scenario of Organic Agriculture:** Sustainable agriculture is pivotal to attaining Sustainable Development Goals (SDGs), as recognized by the Food and Agriculture Organization (Ilk & Liza, 2017). Organic farming is one of many approaches to promote sustainability, which involves the reduced use of chemical fertilizers and pesticides. To navigate towards this the countries are making their own efforts to transform to organic cultivation from conventional farming practices. Over the years, there has been significant progress in the global organic farming sector. Figure 4 illustrates the current scenario of organic agriculture worldwide.

In 2019, the global organic farming area (including conversion) is reached 72.3 Mha, a considerable increase from the 11 Mha recorded in 1999. The percentage of organic area in relation to the total cultivable land in the world currently stands at 1.5%, up from 0.3% in 1999. It is evident from Fig. 4 that there was tremendous growth in the area after 2015 with an addition of 22.3 Mha within a span of four years. This growth is mainly due to several initiatives taken by governments to reduce the chemical inputs use and promoting sustainable farming practices.





**Figure 4:** Global Organic Agriculture Cultivated Area and Share. (Source: IFOAM, 2021)

Major countries contributing to organic cultivation are given in Table 3. The highest area under organic cultivation is in Australia with 35.69 Mha, accounting for approximately 50% of the total area under organic in the world. The organic area in this country has increased significantly by 130 % from TE2014 to TE2020. Argentina holds the second major country with 3.92 mha in TE 2020, contributing 5.4% to the world's total organic area, followed by China (2.6 mha) and Uruguay (2.34 mha). However, there was not much change in the area under cultivation in USA, Argentina, and China over the past six years. The highest change in organic area was observed in India with a 146 % increase from 0.93 Mha in TE2014 to 3.21 Mha in TE2020.

The highest change in area under organic is in India with a 146 % increase from 0.93 Mha in TE 2014 to 3.21 mha in TE 2020. This increase in area under organic was due to several policy measures undertaken by the Government of India after 2015. Major scheme to promote organic cultivation introduced was Paramparagat Krishi Vikas Yojana (PKVY) which mainstreamed the process of awareness and initial support for organic farming. These top 10 countries contribute around 65-70 % of the world's organic cultivation. This surge can be attributed to several policy measures implemented by the Government of India that effectively raised awareness and provided initial support for organic farming. These top 10 countries collectively contribute to approximately 65-70% of the world's organic cultivation area.

**Table 3:** Area Under Organic Cultivation of Major Countries (Mha)

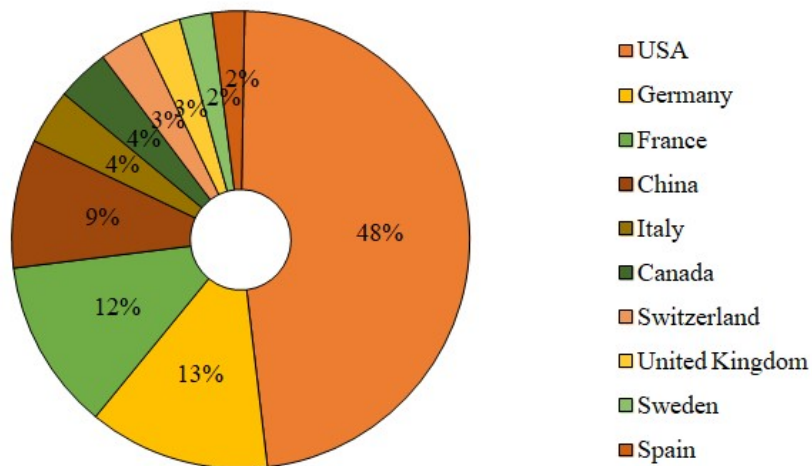
Country	TE2014	TE2017	TE2020	% Share in total	% change (TE 2014-TE2020)
Australia	15.47	28.50	35.69	49.74	130.75
Argentina	3.30	3.16	3.92	5.46	18.69
China	1.97	2.30	2.60	3.62	32.20
Uruguay	1.03	1.62	2.34	3.27	126.77
India	0.93	1.48	2.30	3.21	146.43
France	1.07	1.55	2.28	3.17	113.44
Spain	1.63	2.02	2.35	3.27	43.67
USA	2.20	2.03	2.23	3.10	1.21

Italy	1.30	1.73	2.01	2.80	54.62
Germany	1.03	1.24	1.51	2.10	46.13
Global	42.87	59.30	71.75	-	67.38

**Note:** TE: Triennium average; Source: Compiled from various issues of The World of Organic Agriculture

### III. TREND IN THE EXPORT OF ORGANIC PRODUCTS FROM INDIA

For any commodities to trade across the nations, it should have a potential market for those products. Fig 5. the largest retail markets in the world for organic foods. The retail market in the USA accounts for 48% of total organic foods in the world with a market size of ₹3.5 lakh crore, followed by Germany (13%), France (12 %) and China (9%). These four countries collectively contribute to around 80% of world’s organic retail market. This indicates the scope of export of organic foods to the USA and European markets from India.



**Figure 5:** Major countries with largest share of retail market for organic foods (Source: IFOAM/FiBL, 2021).

In 2020, the export of organic products reached at 638 thousand MT (Table 4.). Recent trends indicate that USA, European Union (EU), and Canada are the larger importer of Indian organic products (Singh et al., 2019). The USA a is emerged as a leading importer of organic products from India, followed by the EU and Canada (Table 4). Correspondingly, the value of exports to these nations aligns with the volume. Other major destinations are Australia, Vietnam, and Israel. The export to Vietnam has significantly increased from 0.024 in 2016 to 3.27 thousand MT in 2020, this huge change is mainly from the export of processed foods and tea/coffee products. In terms of export value, the USA alone contributes ₹24024.8 million in export to India followed by the EU (₹17067 million), and Canada (₹3170 million). Overall, India exported a total of 638.99 thousand MT of organic products in 2020-21 with a value of ₹46859.1 million across different nations.

**Table 4:** Top Countries of Export of Organic Products and its Value from India

Country	Export Quantity (in 000' MT)			Export Value (₹ million)		
	2016-17	2020-21	% Change	2016-17	2020-21	% Change
U.S.A.	116.60	376.07	222.54	9749.00	24024.80	146.43
European Union	124.40	175.67	41.22	11431.50	17067.00	49.30
Canada	42.74	64.23	50.27	1931.00	3170.05	64.17
Switzerland	9.43	5.19	-44.93	564.60	654.70	15.96
Australia	1.73	2.36	36.09	424.20	475.43	12.08
Israel	0.62	2.53	308.27	28.70	173.01	502.84
U.A.E	0.94	0.74	-21.98	16.10	143.23	789.65
Vietnam	0.02	3.27	13357.80	1.11	113.15	10093.90
NewZealand	1.78	1.76	-1.41	78.50	122.45	55.99
Japan	0.29	1.37	378.90	200.30	183.40	-8.44
Total	309.77	639.00	106.28	24779.60	46859.10	89.10

**Source:** various issues of APEDA, Government of India

The commodity-wise analysis revealed that oil seeds and processed foods are major products contributing to 65 % of total organic exports from India (Table 5). In the year 2020-21, organic processed foods accounted for the highest export volume (405 thousand MT), followed by oilseeds (100 thousand MT), and cereals and millets (Reddy, 2017). India, known as the world's largest producer of millet, primarily exports it to USA and Europe. Among organic products, sugar, and tea-coffee are the largest commodities to be exported, with volumes of 41.94 and 10.8 thousand MT respectively. India ranks 2<sup>nd</sup> in sugar and tea production, after meeting domestic requirements it is exported to other nations. Additionally, other products like organic honey, tubers, essential oils, and flowers are exported in small quantities. Processed foods have shown a significant increase in export between 2017 to 2020 with a growth of 23 times, whereas, the export of organic oil seeds and pulses has decreased. In 2020, a total of 888.18 thousand MT of organic food was exported, which is almost double the volume of export recorded in 2017.

**Table 5:** Category Wise Export Quantity of Goods from India (000' MT)

Category	2017-18	2018-19	2019-20	2020-21	% Change (2017-2020)	% Share (2020)
Oil seeds	343.94	444.53	176.11	100.82	-70.7	33.69
Cereals & Millets	52.96	67.85	61.18	48.68	-8.1	8.30
Processed foods	1.74	2.43	299.41	405.38	23157.8	33.03
Sugar crops	15.95	41.13	41.12	41.94	162.9	5.80
Spices and Condiments	5.66	6.78	6.76	8.05	42.4	1.01
Pulses	5.62	5.16	5.18	4.83	-14.0	0.71

Dry fruits	4.27	3.80	3.80	3.71	-13.0	0.53
Medicinal (Herbal/Aromatic)	1.92	2.76	2.90	2.81	46.1	0.40
Plantation (also Coffee and Tea)	8.41	8.97	8.73	10.80	28.3	1.33
Others	3.61	8.25	6.10	5.43	50.2	0.92
Total	458.34	614.09	639.00	888.18	94	-

**Source:** various issues of APEDA, Government of India

In terms of value, the trade of organic commodities is primarily contributed by processed foods followed by oil seeds and cereals, and millets (Table 6). India exported processed foods of ₹21493.2 million in 2020-21 representing a significant 35-fold increase compared to the 2017-18 period. However, high-value commodities like dry fruits have experienced a decline in export by 23% in the same period. Among the organic goods, the largest increase in exports of organic goods was observed in Medicinal (72 %) and plantation (44 %) crops, subsequent to processed foods. Processed foods account for 31.5 % of the total organic export value from India, followed by oil seeds (21.2 %) and plantation crops (including tea and coffee). The export value of goods doubled from ₹34534.8 million in 2017-18 to ₹70785 million in the period 2020-21.

**Table 6:** Category-Wise Export Value of Organic Products from India (₹million)

Category	2017-18	2018-19	2019-20	2020-21	Change % 2017-20	Share % (2020)
Oil seeds	16456.38	20479.17	9129.34	6209.36	-62.3	21.17
Cereals & Millets	3608.85	4318.50	3883.34	3838.21	6.4	7.12
Processed foods	585.15	8347.80	23497.96	21493.23	3573.1	31.53
Sugar crops	744.43	2027.80	2023.47	1834.45	146.4	3.48
Spices & Condiments	2680.20	2935.60	2925.40	2436.90	-9.1	4.91
Pulses	644.15	588.10	591.98	598.98	-7.0	1.05
Dry fruits	3068.64	3748.10	2748.12	2337.21	-23.8	5.22
Medicinal (Herbal/Aromatic)	1046.23	137.70	1462.40	1799.98	72.0	2.01
Plantation (also Coffee and Tea)	3123.64	4085.65	3980.89	4501.33	44.1	7.43
Others	482.51	764.00	243.37	619.07	28.3	0.96
Total	34534.80	51509.90	46859.08	70784.95	105	-

**Source:** Various issues of DGCIS, Government of India

The state-wise trade of organic commodities is presented in Table 7. Madhya Pradesh (MP) is the single largest state contributing to the export of organic goods to different

countries with a share of 55 % of the total quantity and 34 % of the total value. Maharashtra, Gujarat, and Madhya Pradesh hold a share of 10 % each in terms of value. Kerala is exporting 1.1 % of goods with a value of 5.5 % as these are majorly spices which are high-value commodities. Madhya Pradesh predominantly exports soybean and cereals, which are major commodities from the state. About twenty-three states were involved in the export of organic goods of quantity 713.75 thousand MT with a value of ₹56384.6 million in TE2020. The top 10 states in the list contribute about 85 % of the total value of organic products exported from India.

**Table 7: State Wise Major Exporting of Organic Products**

States	Export quantity (000'MT)		Export value (₹million)	
	TE2020	% Share	TE2020	% Share
Madhya Pradesh	392.99	55.1	19364.37	34.3
Maharashtra	87.46	12.3	5992.16	10.6
Gujarat	62.85	8.8	5859.07	10.4
Kerala	7.62	1.1	3091.18	5.5
Haryana	33.29	4.7	2842.91	5.0
Karnataka	16.31	2.3	2800.64	5.0
Telangana	5.65	0.8	4028.31	7.1
Uttar Pradesh	7.34	1.0	1500.88	2.7
West Bengal	4.31	0.6	2676.39	4.7
New Delhi	31.57	4.4	2372.08	4.2
Daman & Diu	34.73	4.9	1781.34	3.2
Rajasthan	20.83	2.9	1545.03	2.7
Tamil Nadu	3.78	0.5	943.60	1.7
Andhra Pradesh	2.63	0.4	898.85	1.6
Goa	0.37	0.1	258.03	0.5
Uttarakhand	0.23	0.0	71.74	0.1
Jammu & Kashmir	1.20	0.2	213.80	0.4
Chhattisgarh	0.04	0.0	40.41	0.1
Punjab	0.28	0.0	28.02	0.0
Himachal Pradesh	0.01	0.0	11.75	0.0
Assam	0.26	0.0	60.29	0.1
Meghalaya	0.00	0.0	1.90	0.0
Jharkhand	0.00	0.0	1.79	0.0
Total	713.76	100.0	56384.66	100.0

**Source:** Various issues of APEDA, Government of India

#### IV. KEY CHALLENGES IN ORGANIC FARMING

Organic farming faces numerous challenges that hinder its widespread. Some of these challenges are outlined below:

- 1. Yield and Labor Costs:** One of the primary reasons for the limited adoption of organic farming is the perception of lower yield under organic cultivation during the conversion period. Additionally, labour costs are also higher in organic cultivation, especially for intercultural operations which can be effectively managed by using chemical herbicides in conventional farming.
- 2. Marketing and Perishability:** The marketing of organic farming produce is a major problem for organic growers. While organic products require fewer chemical inputs, they are more susceptible to perishability. Consequently, a major challenge here is to develop faster supply chains for organic produce to ensure timely consumption and prevent spoilage.
- 3.** High input cost, unavailability of certified organic seed, complex certification procedure, lack of organic input responsive variety, and supply side issues like inadequate infrastructure are some other challenges faced by the farmers.
- 4.** Further, extensive use of pesticides and chemicals in conventional farming has created the potential for a resurgence of pests, diseases, and growth of weeds when going for organic cultivation. This is the major challenge in transitioning from conventional farming to organic farming (Reddy, 2010). Managing these challenges during the conversion period is a significant hurdle that farmers must overcome when transitioning from conventional to organic farming.
- 5. High Input Costs and Certification Procedures:** Organic farming entails higher input costs due to the use of organic fertilizers, pest control methods, and other organic inputs. Additionally, the availability of certified organic seeds can be limited, making it challenging for farmers to obtain suitable seeds for their organic crops. Moreover, the certification procedure for organic farming can be complex and time-consuming, posing an additional challenge for farmers.

Overall, organic farming faces multiple challenges that impact its adoption and success. Addressing these challenges requires efforts to improve yields, develop efficient supply chains, reduce input costs, streamline certification procedures, promote organic input-responsive varieties, enhance infrastructure and support systems, and provide assistance during the transition from conventional to organic farming. By addressing these challenges, organic farming can flourish and contribute to sustainable agriculture practices. (Reddy, 2010)

#### V. FUTURE PROSPECTS OF ORGANIC FARMING

Organic cultivation is an age-old nature-based food production system of in India, which has been adopted by rural farming communities. The vast experience of Indian farmers in maintaining soil fertility, pest management, extensive drylands, and suitable climatic

conditions is pivotal in strengthening organic production in India. The country has made commendable progress in organic agriculture. Currently, India has become the largest organic producer in the world. About 2.78 Mha of agricultural land in India is under organic cultivation. Over the years, the demand for organic food has witnessed a substantial increase as people are being more conscious about food safety and quality issues. Besides, organic cultivation has a positive impact on soil health and contributes to the overall sustainability of the ecosystem.

In India, there are over 600,000 organic growers, and rank 8<sup>th</sup> globally in terms of area dedicated to organic farming (FIBL & IFOAM Year Book, 2020). Technological innovations in organic cultivation have seen remarkable growth, facilitating higher production and sustainable practices. Integrating mycorrhiza fungi and Nano bio-stimulants has proven to be an effective approach in achieving improved yields while adhering to organic standards. The growth of organic farming in India is further fuelled by several incentives and support mechanisms. Insurance support for farmers safeguards against crop failures and financial losses, instilling confidence in transitioning to organic practices. Improved access to new knowledge and skills through training programs equips farmers with the necessary tools to successfully embrace organic farming. Favourable policies supporting organic production, coupled with the high disposable income of consumers and the rising global demand for organic products, create a conducive environment for the expansion of organic farming in India.

In conclusion, the future prospects of organic farming in India appear promising. The country's rich agricultural heritage, increasing consumer demand, positive environmental impact, and ongoing technological advancements position organic farming for continued growth. By embracing sustainable practices and leveraging available incentives, Indian farmers can contribute to a healthier and more environmentally conscious food system.

## VI. CONCLUSION

India is having immense potential in organic agriculture as demand for organic products is rising in both domestic and international markets. This potential is particularly evident in hilly and rainfed regions, making it crucial to focus on strategies to strengthen organic agriculture in the country. To strengthen this sector in India, the following strategies warrant particular emphasis:

The following strategies need to be given emphasis:

- Development of region-specific organic farming models tailored to different agro-climatic conditions.
- Providing quality inputs and developing suitable residue management technologies.
- Introduction of incentives such as payment for ecosystem services to incentivize organic farming practices.
- Accreditation of different certified agencies to ensure credibility and reliability.
- Improving market access for organic growers.
- Promotion of Innovative institutions, including direct marketing platforms and e-NAM, etc.

- Improving production, trade, and price linkages to foster a robust organic agriculture ecosystem.
- Promotion of Crop Insurance
- Promotion of farmer-producer organizations, cooperatives, and self-help groups to empower and support organic farmers.

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