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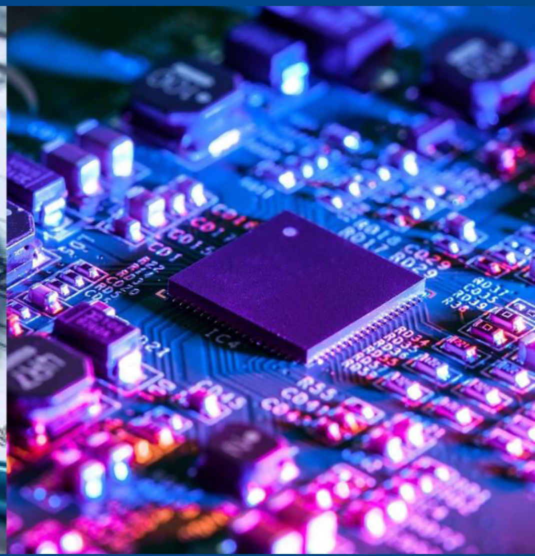

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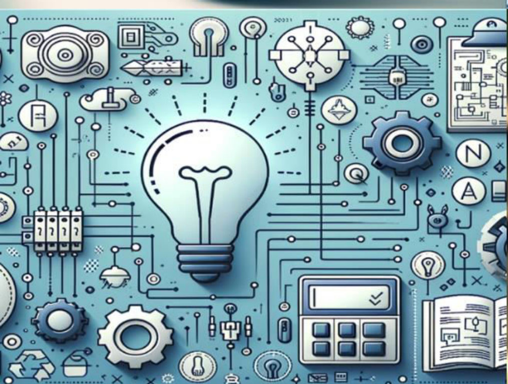

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Sowing Sustainability: The Economic and Ecological Impact of Organic Farming

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EXECUTIVE SUMMARY: Organic farming is an eco-friendly farming practice that does not utilize synthetic chemicals and GMOs, enhancing soil fertility and biodiversity. This study analyzes its economic and environmental effects, profitability, and sustainability. Economically, organic farming is viable though initially there are lower yields (12–18% less), as the cost of production is 14–19% less. The market for organics was worth €135 billion worldwide in 2022, and India's market is increasing at 20% per annum. Indian retail sales have gone up from €38.7 million in 2004 to €374 million in 2023. It also creates jobs, and rural folks benefit from it, especially in low-rainfall regions and hilly regions. Government programs such as PKVY and MOVCDNER promote organic farming, but certification remains a concern, with 28% of farmers knowing the process. Organic farming promotes biodiversity (30% higher), increases soil fertility, and lowers green house gas emissions by 75%. Large-scale uptake will reduce emissions by a huge margin. Challenges are low initial production, expensive certification, and market limitations. Solutions are ease of certification, capital provision, increasing market access, logistics, and consumer campaigns. Organic farming can enhance food security, conserve the environment, and promote rural economies with good policies and incentives, and therefore can be a sustainable and profitable agricultural system for the future.

I. INTRODUCTION

Organic farming is a holistic farming and livestock system that shuns synthetic chemicals, maintains soil fertility, water quality, and biodiversity. It has its roots in traditional farming and gained popularity in the early 1900s as an alternative to chemical farming. In 2022, 188 nations practice organic farming on 96 million hectares with 4.5 million farmers. The world market for organic food totaled €135 billion, showing increasing demand for sustainable food and healthy diets among consumers.Organic farming aims at the control of ecosystems through crop rotation, composting, and biological control of pests to increase soil fertility and sustainability. Organic farming lowers greenhouse gas emissions by 75%, increases biodiversity by 30%, and reduces water pollution. Research shows that changing 10,000 medium-sized farms to organic farming would cancel out emissions equal to taking 1 million cars off the road each year. Indian government schemes such as NMSA and PKVY encourage organic farming, and farmers gain economic advantages as urban markets expand for organic produce. Problem Statement: Organic vs. Traditional Farming Conventional agriculture's dependency on chemical inputs causes soil loss, water pollution, and climate change. Organic agriculture provides a sustainable option but is constrained by lower initial yield, high costs, and price volatility. Farmers complain about pest management, increased labor costs, and price fluctuations despite premium prices for organics. Indian government programs such as PKVY and MOVCDNER promote organic agriculture, but market access and infrastructure must be enhanced. Research Aims This study assesses the economic and environmental sustainability of organic farming, pitting cost structures, yield volatility, and profitability in the long term against conventional farming. It also assesses government policy, market demand, and subsidies, and whether organic farming is profitable and viable for the future.

II. LITERATURE REVIEW

Sapbamrer and Thammachai (2021) reviewed 50 literature reviews of the factors of adoption of organic farming and classified them into farmer characteristics (e.g., education, gender), psychobehavioral factors (e.g., norms, attitudes), knowledge of farming (e.g., size of farm), and support systems (e.g., training, information availability). Female farmers, according to them, are likely to adopt organic farming because of concerns related to health, and education promotes adoption.Smith et al. (2019) performed a worldwide meta-analysis of organic versus conventional agriculture, emphasizing the environmental advantages of organic agriculture (e.g., greater biodiversity, carbon in the soil) but also its volatility of yields. Likewise, Tuomisto et al. (2012) compared European research and concluded that organic agriculture decreases per-hectare nutrient leaching but has greater per-product emissions for certain indicators.

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Rees et al. (2024) examined 120 articles, with the conclusion that the effectiveness of policy for organic farming depends on farming productivity and market maturity. Rosario et al. (2022) found psychological and social determinants of adoption of sustainable farming. Serebrennikov et al. (2020) found that economic and environmental attitudes, and availability of information, play a significant role in adoption decisions. Baranski et al. (2017) compared the health advantages of organic food and found lower pesticide exposure and allergy risk, although evidence is not conclusive. Reganold and Wachter (2016) found organic farming is less productive but more profitable, sustainable, and yields healthier crops. Knapp and van der Heijden (2018) found lower yield stability in organic farming, although green manure and fertilization can help to overcome this problem. Geisseler and Scow (2014) demonstrated that organic farming encourages soil microbial activity to increase. Bengtsson et al. (2005) indicated that it increases species richness by 30%, thus promoting biodiversity. Zhou et al. (2015) supported that organic farming reduces energy needs while at the same time enhancing land use. Mondelaers et al. (2009) confirmed that organic farming increases soil organic matter and reduces nutrient loss, thus emphasizing its ecological benefits.

III. RESEARCH METHODOLOGY

This research critically analyzes research methodologies on organic farming in India focusing on research design, data sources, analytical framework, and limitations. The research is purely based on secondary data from government reports, academic research, and institutional publications, ensuring credibility and reliability. The study is descriptive in scope and employs statistical reports, literature, and qualitative data to measure the economic, environmental, and social implications of organic farming. Quantitative data from the Council on Energy, Environment, and Water (CEEW) and Indian Council of Agricultural Research (ICAR) supply evidence of yield, soil, and profit trends. Qualitative data from case studies and policy reports by NABARD and APEDA indicate socio-economic and policy implications. Data Collection Technique The evidence is taken from government and institutional reports (e.g., ICAR, NABARD, APEDA), research reports, and NGO reports (e.g., Centre for Sustainable Agriculture, Kheti Virasat Mission). PKVY and MOVCDNER are some government schemes in favour of organic agriculture. International research from institutions like Rodale Institute and FAO offers comparative points of view.

Methodology for Data Analysis Using descriptive synthesis, the research synthesizes comparative study data, reports, and journals. It assesses the policy usefulness and sustainability of organic farming and provides evidence-based information to farmers, policymakers, and researchers without using specific analytical models.

Data Analysis and Interpretation

The Economic Impacts of Organic Agriculture in India

National studies on the economic implications of organic farming indicate reduced production costs (14–19% less than the conventional system) but yield losses of 12–18%. Despite this, profitability increases in certain crops such as paddy (5.6%) and soybean (3.2%), whereas wheat indicates a minor increase (0.2%). Organic farming continues to be a marginal percentage (0.4%) of cultivated land in India, but demand in the market increases at a rate of 20% each year, promoted by 13.9 million certified organic producers. Organic farming's labor-based nature has also contributed to rural employment, at the advantage of smallholder producers. The study covers states across six agro-climatic zones: **Central** (Madhya Pradesh, Chhattisgarh), **Eastern** (Bihar, Orissa), **Northern** (Rajasthan, Haryana), **Southern** (Karnataka, Kerala), **Western** (Gujarat, Maharashtra), and **Northeastern** (Sikkim, Mizoram). With a multistage random sampling scheme, the study interviewed 2,880 organic and conventional farmers, 2,880 consumers, and conducted 12 focus group discussions (FGDs). Data were gathered in 2014 (pre-PKVY) and 2017 (post-PKVY) through structured questionnaires. Analytical techniques employed were t-tests (quantitative), Pearson's chi-squared tests (qualitative), and Difference-in-Difference (DiD) (impact assessment).

A cost-benefit analysis (Cost A2 + family labor) considered both monetary costs (labor, machinery, inputs) and family labor, with income from the market prices of primary products and by-products. The findings highlighted the efficiency of non-governmental organization-initiated Regional Councils (NGO-RCs) in promoting organic farming through community participation. Less-developed areas were more adaptable to organic farming as a result of lower chemical application and dependence on rainfed agriculture, while more developed areas enjoyed better infrastructure, including facilities for organic input production. Low knowledge of certification, limited availability of manure rich in phosphorus, and lack of infrastructure are the key issues. Addressing these with more funding, training, and construction infrastructure can help improve the sustainability and profitability of organic farming in India.

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Years	Organic are (farmland) [ha]	Organic area share of total farmland [%]	Organic producers	Organic retail sales [Million €]
2000	2775	1426	0	
2001	41000	5661	0.02	
2002	37050	5147	0.02	
2003	73500	5147	0.04	
2004	114037	5147	0.06	
2005	185937	48846	0.1	38.7
2006	432259	141904	0.24	
2007	1030311	195761	0.57	
2008	1018469.6	340000	0.57	7.84
2009	1180000	677257	0.66	13.23
2010	780000	400551	0.43	20.3
2011	1084266.01	547591	0.6	31.49
2012	500000	600000	0.28	50.89
2013	510000	650000	0.28	69.5
2014	720000	650000	0.4	101.32
2015	1180000	585200	0.66	144.2
2016	1490000	835000	0.83	171.65
2017	1780000	1093288	0.99	185.89
2018	1938220.79	1149371	1.08	
2019	2299222.37	1366226	1.28	185.89
2020	2657889.33	1599010	1.48	185.89
2021	2657889.33	1599010	1.49	185.89
2022	4726714.74	2480859	2.65	185.89
2023	4475836.91	2358267	2.51	374.01

Table 01 : Represents India's overall organic farmland, organic area share of total farmland, organic producers, organic retail sales.

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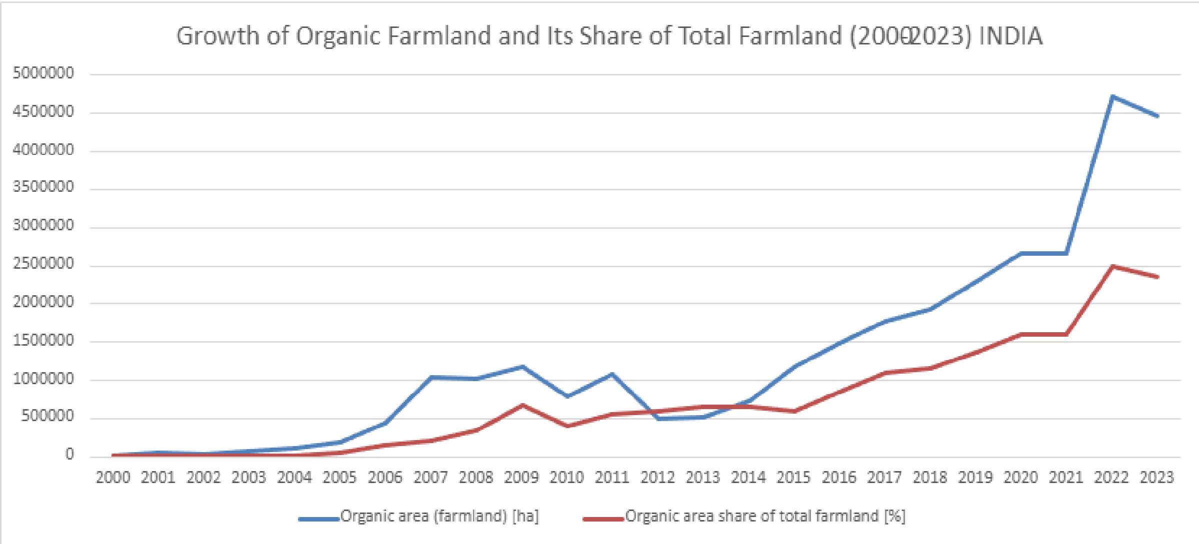
The table shows a significant rise in organic farming between 2000 and 2023. Land under organic farming increased from 2,775 ha in 2000 to 4,475,836.91 ha in 2023, or 2.51% of agricultural land. Organic farmers also rose to over 2.35 million in 2023, which represents broader adoption. Organic sales rose significantly as well, to 374.01 million euros in 2023, from 38.7 million euros in 2004. This data from FiBL shows fast development in organic farming because of increased consumer demand, government support, and a shift towards sustainable agricultural practices.

Figure 05: Growth of Organic Farmland and Its Share of Total Farmland (2000-2023) INDIA Source: Adapted from Organic World, 2025 FiBL survey based on national data sources, data from certifiers

The graph indicates a remarkable rise in organic agricultural land in India during the period 2000-2023. Following a steady growth till 2005, there was a sudden spurt after 2015, prominently observed in 2021, when organic farm land area nearly doubled to 4.5 million hectares by 2023. The proportion of organic farm land to the total agricultural land also rose, which is indicative of heightened adoption of organic farming because of government incentives, consumer pressure, and environmental degradation.



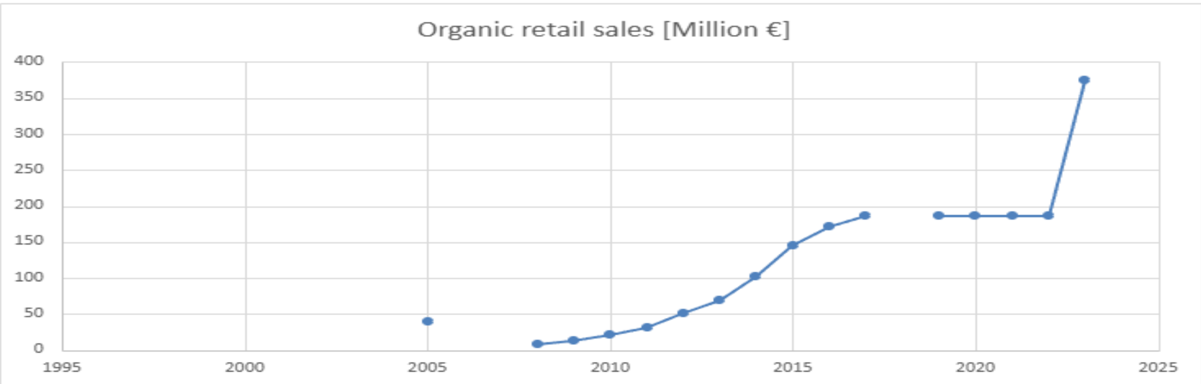


Figure 06: Organic retail sales [Million €]

Source: Adapted from Organic World, 2025 FiBL survey based on national data sources, data from certifiers

The line graph shows organic retail sales, in millions of euros (€), from 2000 to 2023, with a rising trend in demand for organic products. Between 2005 and 2010, the sales rose gradually, then there was a steep rise after 2010, especially

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between 2012 and 2016, due to increased consumer awareness, better distribution channels, and government encouragement. Sales remained steady between 2017 and 2021, perhaps due to market saturation, but rose tremendously in 2023, indicating renewed consumer demand and potential policy changes. The trend indicates more growth in the organic retail market.

STATE WISE PRODUCTION OF ORGANIC FERTILIZERS IN INDIA (2020-21)

Sl. No.	State	City Compost (A)	Organic manure (B)	Vermi0compost (C)	PROM (D)	Bioenriched Organic Manure (E)	Rural Compost (F)	Farm Yard Manure (G)	Total Manure MT {A+B+C+ D+E +F+G)	Deoiled Cake MT
1	Andhra Pradesh	0	8.02	336.00	0	88.5	0	0	432.52	4108.00
2	Arunachal Pradesh	0	0	0	0	0	0	0	0	0
3	Assam	2350	49100	107731.22	1702	803.6	1312	11945	174943.82	121
4	Bihar	0	29215.1	75556.95	0	0	0	0	104772.05	0
5	Chhattisgarh	3998	829643	76150.46	0	0	515333	1002801	2427925.5	0
6	Delhi	21677	269	1098	0	0	0	0	23044.00	0
7	Goa	0	00	460	0	0	0	0	460.00	0
8	Gujarat	44236.56	87295.6	2128	27446.18	3500	4290	125450	294346.338	7130
9	Haryana	0	223.15	0	4576.410	0	0	0	4799.54	0
10	Himachal Pradesh	0	0	22.00	0	0	0	0	22.00	0
11	Jammu & Kashmir	0	0	0	0	0	0	0	00.00	0
12	Jharkhand	6196	5	360	40	4	0	0	6605	0
13	Karnataka	68824	183769	31355	14704	15092	1011125	37542874	38867743	2031
14	Kerala	9885.88	26038.75	752.5368	144	6489.032	312.6	356.89	43979.68	2330.25
15	Madhya Pradesh	5436.7	28377	25520.9	11140.9	0	0	0	70475.4	0
16	Maharashtra	42231.00	34909.00	13312.00	40993.00	0	0	0	131445.00	7678.3
17	Manipur	0	100	0	0	50	0	0	150	0
18	Meghalaya	0	0	0	0	0	0	0	0	0
19	Mizoram	0	0	6	0	0	0	0	6	0
20	Nagaland	0	15015	1060.5	0	0	12726	52520	81321.5	0
21	Odisha	13153.5	12,102	17064.5	680	785	0	5565	49,350	0
22	Punjab	36005.22	1458.66	545	6116.98	37.22	0	0	44163.08	236.47
23	Rajasthan	17870	2960	12425	11442	70	0	0	44767.00	0
24	Sikkim	0	0	0	0	0	0	0	0	0
25	Tamil Nadu	57456.8	55461.55	4451.042	588.9816	157.7	324149	0	442265	20138
26	Telengana	24706.00	1197.1	29.121	927.3	230.0	0	0	27134.00	0
27	Tripura	0	0	522.015	383.05	85.151	0	0	990.216	0
28	Uttar Pradesh	0	7703	131	7614.75	17789.49	0	0	33238.24	0
29	Uttarakhand	2100	396.64	0	3462.63	0	0	0	5959.27	2700
30	West Bengal	50750	261	2343.09	810.7	7983.84	0	114.69	59294.32	0
31	Chandigarh	0	0	0	0	0	0	0	0	0
32	Puducherry	0	0	0	0	0	600	600	1200	70
	Total	406876.66	1,365,507.57	373360.3348	132772.8816	53077.033	1869847.6	38742226.58	42,940,832.474	46543.02
Source : Data received from states.										

Table 02: State wise production of organic fertilizers in India (2020-21)

Source: Data sourced from, National Centre For Organic and Natural Farming.

The given table represents state-wise production of organic fertilizer in India during 2020-21, containing different types such as city compost, organic manure, vermicompost, PROM, bio-enriched organic manure, rural compost, and farmyard manure (FYM). Overall production was 42,940,832.47 MT, and the highest amount was contributed by farmyard manure (38,742,226.58 MT). The highest production was from Karnataka with 3,887,874.3 MT, followed by Maharashtra (1,314,145 MT) and Punjab (441,438 MT), which had the highest contribution of phosphate-rich organic manure. States such as Arunachal Pradesh, Meghalaya, and Manipur contributed zero/negligible production. Statistics reflect regional imbalance in the production of organic fertilizer and increased contribution of organic farming in India.

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STATEWISE PRODUCTION OF BIOFERTILISERS IN INDIA (2020-21)			
Sl.No.	State	Carrier based (MT)	Liquid based (KL)
1	And &Nic island	0	0
2	Andhra Pradesh	123.19	98.49
3	Daman & Diu	0.00	0.00
4	Karnataka	1446.50	870.53
5	Kerala	164.98	2612.00
6	Lakshdweep	0.00	0.00
7	Puducherry	97.17	2.16
8	Tamilnadu	88652.43	434.313
9	Telangana	448.72	150.14
9	Chattisgarh	558.88	268.68
10	Gujrat	19483.31	8055.72
11	Goa	30.00	0.00
12	Madhya Pradesh	21834.30	15811.10
13	Maharashtra	5328.18	2140.95
14	Rajasthan	10612.00	0.00
15	D & N Haveli	0.00	0.00
16	Delhi	0	0
17	Chandigarh	0.00	0.00
18	Haryana	3105.42	113.17
19	Himachal Pradesh	0.22	0.22
20	Jammu & Kashmir	0.00	0.00
21	Punjab	16042.27	361.37
22	Uttar Pradesh	0.00	5725.64
23	Uttarakhand	3708.83	1150.81
24	Bihar	74.59	2.11
25	Jharkhand	0.00	0.00
26	Odisha	19406.64	859.60
27	West Bengal	448.59	33.54
28	Arunachal Pradesh	0.00	0.00
29	Assam	438.54	3447.35
30	Manipur	20.00	24.01
31	Meghalaya	0.00	0.00
32	Mizoram	1.40	0.00
33	Nagaland	19.14	0.00
34	Sikkim	0.00	69.02
35	Tripura	283.99	9.02
	Grand Total	192329.2896	42239.9351

Table 03: STATE WISE PRODUCTION OF BIO-FERTILISERS IN INDIA (2020-21)
Source: Source: Data sourced from, National Centre For Organic and Natural Farming.

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The table illustrates state-wise biofertilizer production in India in 2020-21. Tamil Nadu has the highest carrier-based production (88,652.43 MT), followed by Madhya Pradesh and Gujarat. Madhya Pradesh and Gujarat have the highest liquid biofertilizer production. The overall production is 192,239.29 MT in carrier-based and 42,239.95 KL in liquid-based biofertilizers. Some states such as Andaman & Nicobar, Delhi, and Arunachal Pradesh produced nothing, indicating regional differences in production.

S. NO.	State Name	PGS under PKVY	NPOP
1	Andhra Pradesh	3,60,805	63,678.69
2	Bihar	31,561	29,062.13
3	Chhattisgarh	1,01,279	15,144.13
4	Goa	15334	12,287.40
5	Gujarat	10000	6,80,819.99
6	Haryana	-	2,925.33
7	Himachal Pradesh	18748	9,334.28
8	Jharkhand	25300	54,408.20
9	Kerala	94480	44,263.91
10	Karnataka	20900	71,085.99
11	Madhya Pradesh	74960	11,48,236.07
12	Maharashtra	66756	10,01,080.32
13	Odisha	45800	1,81,022.28
14	Punjab	6981	11,089.41
15	Tamil Nadu	32940	42,758.27
16	Telangana	8100	84,865.16
17	Rajasthan	148500	5,80,092.22
18	Uttar Pradesh	171185	66,391.34
19	Uttarakhand	140740	1,01,820.39
20	West Bengal	21400	8,117.80
21	Assam	4400	27,079.40
22	Arunachal Pradesh	380	16,537.53
23	Meghalaya	900	29,703.30
24	Manipur	600	32,584.50
25	Mizoram	780	14,238.30
26	Nagaland	480	16,221.56
27	Sikkim	63000	75,729.78
28	Tripura	1000	20,481.36
29	Jammu & Kashmir	5160	34,746.75
30	Pondicherry	-	21.51
31	Delhi	-	9.6
32	Ladakh	10480	-
33	Daman & Diew	642	-
34	Dadar & Nagar	500	-
Total		**44,75,836.90**	**1498583**
Grand Total (NPOP + PGS)		**5974419.9**	

Table 04: State wise details of total cumulative area covered under organic farming NPOP (including MOVCDNER) + PGS under PKVY till 2023-2024

Source: Adopted from press release of Ministry of Agriculture & Farmer Welfare

Organic farming in India operates under two certification systems: the Participatory Guarantee System (PGS) for the national market and National Programme for Organic Production (NPOP) for exports. India has 5,974,419.9 hectares of certified organic areas, of which 4,475,836.90 hectares are certified by PGS and 1,498,583 hectares by NPOP. Gujarat leads in NPOP-certified area (680,819.99 ha), followed by the largest PGS-certified area of Madhya Pradesh (74,960 ha). Rajasthan, Uttar Pradesh, Nagaland, Sikkim, and Arunachal Pradesh also contribute significantly, driven by state policy support for organic farming.

In order to increase organic farming, the Indian government has initiated various programs. Paramparagat Krishi Vikas Yojana (PKVY) promotes organic farming adoption through PGS certification, ensuring access to sustainable agriculture for marginal and small farmers. Likewise, the Mission Organic Value Chain Development for the Northeastern Region (MOVCDNER) seeks to enhance organic farming in Northeast India through value chain development and market linkages. Moreover, NPOP facilitates export market certification of organic products, allowing Indian farmers to compete in organic markets globally..

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Details of funds Allocated, released & utilized under the MOVCDNER scheme during the last 3 years and current year 2021-22 to 2024-25 as on 09.12.2024 (Rs in lakh)

Sl. No.	Name of the State	Year 2021-22			Year 2022-23			Year 2023-24			Year 2024-25		
		Allocation	Released	Expenditure (*)	Allocation	Released	Expenditure(*)	Allocation	Released	Expenditure (*)	Allocation	Released	Expenditure(#)
1	Assam	2,587.98	0.00	0.00	2,681.80	2,059.15	2,059.15	3,717.98	3,684.91	2,426.26	4,062.50	2,030.99	286.00
2	Manipur	6,238.76	4,911.50	4,911.50	2,915.37	2,915.36	2,915.36	2,805.38	2,805.38	2,056.87	3,941.35	0.00	---
3	Meghalaya	836.65	92.88	92.88	2,011.88	621.57	621.57	2,465.40	2,465.40	1,742.79	4,096.00	590.00	0.00
4	Nagaland	2,781.18	2,114.20	2,114.20	1,961.01	1,390.60	1,390.60	2,346.10	2,346.10	1,173.05	4,250.00	1,062.00	824.00
5	Mizoram	1,858.80	1,291.74	1,291.74	1,604.25	1,140.90	1,140.90	2,336.16	2,336.16	1,523.30	4,187.00	573.00	0.00
6	Arunachal Pradesh	2,938.02	2,776.10	2,776.10	1,860.77	1,642.17	1,642.17	2,574.75	2,574.75	1,428.22	6,250.00	988.00	988.00
7	Sikkim	2,406.84	795.69	795.69	4,005.10	1,538.83	1,538.83	3,260.69	3,260.69	3,260.69	1,949.58	487.00	360.07
8	Tripura	3,042.70	1,178.27	1,178.27	2,759.82	3,000.26	3,000.26	3,370.04	3,370.04	2,126.96	3,625.00	906.00	0.00
	Total	**22,690.93**	**13,160.39**	**13,160.39**	**19,800.00**	**14,308.84**	**14,308.84**	**22,876.50**	**22,843.43**	**15,738.14**	**32,361.43**	**6,636.99**	**2,458.07**

(*) As per Utilization Certificate communicated by State.
#As informed by the State/UTs

Table 05: Details of funds Allocated, released & utilized under the MOVCDNER scheme during the last 3 years and current year 2021-22 to 2024-25 as on 09.12.2024 (Rs in lakh)
Source: Data sourced from Ministry of Agriculture & Farmer Welfare, Department of Agriculture & Farmer Welfare.

The Paramparagat Krishi Vikas Yojana (PKVY) has seen fluctuating allocations for organic farming, with ₹18,576.81 lakh in 2021-22, peaking at ₹45,028.35 lakh in 2022-23, and ₹32,702.68 lakh allocated for 2024-25 (as of Dec 9, 2024). Fund releases were low in 2021-22 due to COVID-19 but improved significantly in later years. Uttar Pradesh received the highest allocations, followed by Madhya Pradesh, Maharashtra, and Rajasthan. While Bihar, Chhattisgarh, and Odisha effectively utilized funds, Gujarat and Goa received less. The government's financial support highlights the need for better implementation and awareness to maximize organic farming benefits.

3.2 Ecological Impact Analysis

The environmental impact of organic agriculture in India highlights significant sustainability benefits. According to the CEEW report (2023), organic farming is driven by concerns over soil fertility, food toxicity, and rising input costs. Government initiatives like PKVY and MOVCD-NER promote organic farming through financial support, certification, and value chain development. By March 2020, 2.78 million hectares were under certified organic farming, with Rajasthan, Madhya Pradesh, and Himachal Pradesh leading in wild harvest areas. Sikkim became fully organic in 2016. India also leads in organic cotton production, reflecting a broader shift toward sustainable agricultural practices and economic benefits for farmers.

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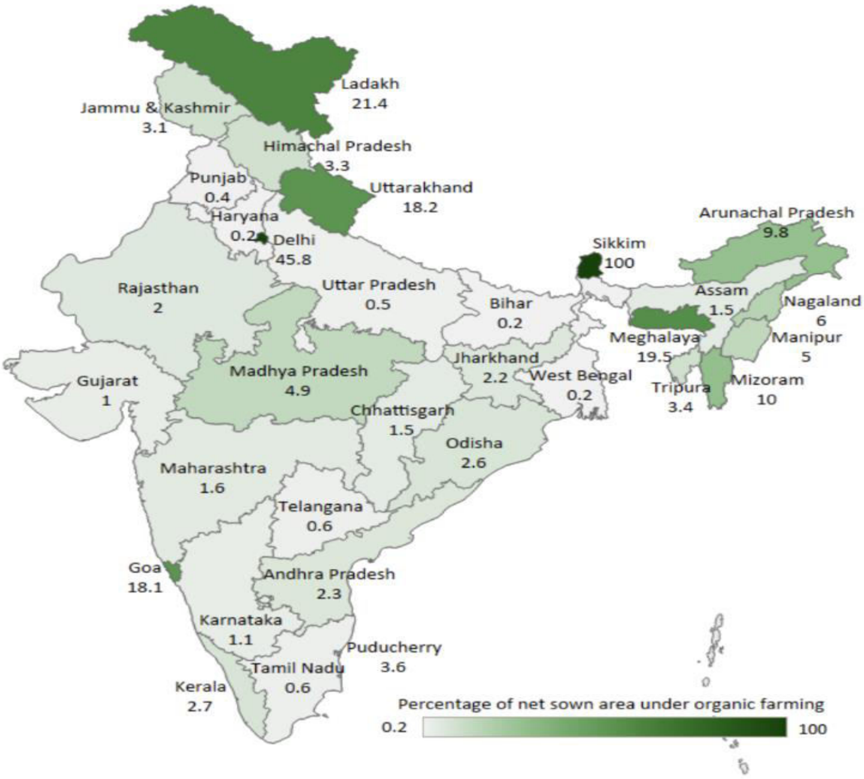

Figure 07: State-wise organic coverage (proportion to the net sown area of the state)
Source: Sourced from Council of Energy, Environment & Water.

The map indicates India's regional gradient in organic farming adoption. Sikkim is the first 100% fully organic state. Northeastern states Mizoram (10%), Meghalaya (19.5%), and Arunachal Pradesh (9.8%) have high adoption. Ladakh (21.4%) and Uttarakhand (18.2%) are notable in the north, while Delhi's 45.8% likely results from scarce agricultural land and city initiatives. Central/west India sees Madhya Pradesh (4.9%) being a trendsetter, followed by Goa (18.1%) emphasizing sustainability. Southern states lag behind, except for Kerala (2.7%), in line with its eco-policies. Eastern India lags behind, with West Bengal and Bihar at 0.2%, but Assam (1.5%) and Tripura (3.4%) are better off. Growth is central in the Northeast, Uttarakhand, Ladakh, and Goa, under policy and market forces, while southern, eastern, and central regions fall behind. The report indicates a national bifurcation, with organic growth being determined by government support and regional farm culture.

3.3 Overall Impact on Sustainability

Indian organic farming presents a mixed path to sustainability, trading off ecological advantages against economic costs. It minimizes dependence on synthetic inputs, reduces production costs (14–19%), and improves soil health, biodiversity, and carbon sequestration at the expense of yield gaps (12–18% less than conventional farming). India has the highest number of certified organic farmers (13.9 million), although organic farming covers just 0.4% of cultivated land. Strategic uptake, promoted by policy, market, and regionally defined appropriateness, can position organic practice in conjunction with India's sustainability objectives.

Organic farming highlights economic opportunity in the form of lower input costs and higher prices of organic produce. Paddy (5.6% increase in profitability) and soybean (3.2%) are marginally ahead, while wheat lags behind (0.2%). Strategic adoption in rainfed, hilly, and tribal areas can yield enormous returns—up to ₹6.8 billion for paddy and ₹6.3 billion for wheat at a 10% conversion rate—demonstrating the need for localized approaches. Indiscriminate scaling, however, has economic risks. The industry's 20% growth every year, driven by health-conscious consumers, points to its potential. Labor-intensive organic farming also increases rural jobs, benefiting smallholders (52% of organic

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farmers) and India's agrarian workforce (42% of the workforce). Scaling, however, demands strong market infrastructure, policy reforms, and yield-improving innovations to meet food security demands.

Ecological Value and Research Needs Ecologically, organic farming promotes soil health through crop rotation, organic manure, and recycling of residues, which is crucial in drought-prone regions. Organic farming decreases chemical runoff, protecting water systems and biodiversity. Global research supports its role in benefiting pollinators and soil microbes, consistent with conservation goals. Carbon sequestration also contributes to climate resilience, but India-specific long-term carbon and biodiversity storage data are scarce. It is important to fill these knowledge gaps to verify organic farming's environmental impact and inform policy.

Organic and Conventional Farming: A Comparative Study Traditional farming holds out the prospect of increased yields, essential for Indian food security, but at the cost of the environment: soil erosion, water contamination, and loss of biodiversity through chemical overuse. Organic farming, while sensitive to the environment, is hampered by yield constraints. A middle path is offered: encourage organic farming in ecologically sensitive, rainfed, and tribal regions (where cost efficiency and soil advantages overcome yield gaps) and keep traditional agriculture in high-yielding regions. This balance harnesses organic farming's environmental advantages—soil fertility, jobs, and climate resilience—without sacrificing national food production.

Aspect	**Organic Farming**	**Conventional** Farming
Yield	12–18% lower (e.g., wheat -12.8%, paddy -18.2%)	Higher yields (baseline)
Cost of Cultivation	14–19% lower (e.g., wheat -13.7%, paddy -17.3%)	Higher due to synthetic inputs
Profitability	Mixed, higher for paddy (5.6%), soybean (3.2%)	Generally higher, but varies by crop
Soil Health	Improved via organic manures, rotation	Can degrade due to chemical use
Biodiversity	Likely supports, data scarce in India	May harm non-target species
Carbon Sequestration	Contributes, needs more research	Lower due to synthetic fertilizers
Employment Generation	More labor-intensive, supports rural jobs	Less labor-intensive, fewer rural jobs

Table 06: comparison, highlighting the trade-offs between the two systems

Source: Sourced from Council of Energy, Environment & Water.

IV. FINDINGS AND RECOMMENDATIONS

Organic agriculture under India's PKVY program demonstrates long-term sustainability despite initial setbacks. Although productivity is slightly lower than conventional agriculture with the lack of synthetic inputs, organic farming increases soil health over the long term, closing productivity gaps. From an economic perspective, increased labor and certification expenditures are compensated with premium premiums (20–30% above conventional) and decreased input dependence, enhancing long-term profitability. Environmentally, organic practices increase soil health (through compost/manure), decrease water pollution, and reduce GHG emissions, consistent with climate objectives. Health gains include chemical-free, nutrient-dense produce, driving increasing consumer demand. Scaling up adoption requires successful marketing, certification, and policy support (government-NGO collaboration). Yield decline during transition phases and market limitations are challenges, which require financial assistance, ease of certification, and better market linkages, especially for small farmers. Institutional capacity in states guarantees success, highlighting the need for policy support in weaker states. Despite initial setbacks, PKVY-integrated organic farming raises farmer incomes, ecosystem resilience, and long-term agricultural sustainability, ensuring economic viability as well as environmental protection.

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Simplify certification processes and subsidize costs to boost smallholder access. Provide transition grants, low-interest loans, and training to offset short-term yield drops and labor expenses. Invest in R&D for organic inputs (natural pesticides, high-yield seeds) and climate-resilient practices (agroforestry, water conservation). Promote digital tools for market access, price tracking, and farm management. Strengthen soil health initiatives and agroecological training to enhance productivity. Foster public-private partnerships for scalable solutions. Prioritize region-specific policies, focusing on ecologically vulnerable and low-resource areas. These steps, balancing economic viability with ecological sustainability, can drive long-term adoption of organic farming while ensuring resilience against climate shocks

V. CONCLUSION

Organic farming offers sustainable food production, balancing initial challenges (lower yields, labor costs) with long-term gains: healthier soils, reduced chemical use, and premium markets. Economically, profitability grows as demand rises and input costs fall. Environmentally, it prevents pollution, enhances biodiversity, and boosts climate resilience through practices like composting and crop rotation. Systemic change—simplifying certification, providing subsidies, and ensuring market access—is crucial for scaling adoption. By prioritizing ecological health and farmer livelihoods, organic farming charts a path toward a sustainable food system. With policy support and public awareness, it can become a global cornerstone, ensuring nutritious food, ecosystem preservation, and agricultural resilience.

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REFERENCES

1. Baranski, M., et al. (2017). Human health implications of organic food and organic agriculture: A comprehensive review. Environmental Health, 16(1), 111. https://ehjournal.biomedcentral.com/articles/10.1186/s12940-017-0315-
2. Bengtsson, J., Ahnström, J., & Weibull, A. C. (2005). The effects of organic agriculture on biodiversity and abundance: A meta-analysis. Journal of Applied Ecology, 42(2), 261–269. https://besjournals.onlinelibrary.wiley.com/doi/10.1111/j.1365-2664.2005.01005.x
3. Geisseler, D., & Scow, K. M. (2014). Organic farming enhances soil microbial abundance and activity—A meta-analysis and meta-regression. Soil Biology and Biochemistry, 78, 13–21. https://pmc.ncbi.nlm.nih.gov/articles/PMC5507504/
4. Knapp, S., & van der Heijden, M. G. A. (2018). A global meta-analysis of yield stability in organic and conservation agriculture. Nature Communications, 9(1), 3632. https://www.nature.com/articles/s41467-018-05956-
5. Mondelaers, K., Aertsens, J., & Van Huylenbroeck, G. (2009). A meta-analysis of the differences in environmental impacts between organic and conventional farming. British Food Journal, 111(10), 1088–1105. https://www.emerald.com/insight/content/doi/10.1108/00070700910992925/full/html
6. Reganold, J. P., & Wachter, J. M. (2016). Organic agriculture in the twenty-first century. Nature Plants, 2(2), 15221. https://www.nature.com/articles/nplants2015221
7. Rees, F., Grovermann, C., & Finger, R. (2024). Farmers' adoption of organic agriculture—a systematic global literature review. European Review of Agricultural Economics, 51(1), 45–67. https://academic.oup.com/erae/article/51/4/1012/7824160
8. Rosário, J., Madureira, L., Marques, C., & Silva, R. (2022). Understanding farmers' adoption of sustainable agriculture innovations: A systematic literature review. Agronomy, 12(4), 589. https://www.mdpi.com/2073-4395/12/11/2879
9. Santhoshkumar, B., et al. (2018). A review on organic farming—Sustainable agriculture development. International Journal of Pure & Applied Bioscience, 6(2), 1138–1150. https://pmc.ncbi.nlm.nih.gov/articles/PMC5507504/
10. Serebrennikov, D., Thorne, F., Kallas, Z., & McCarthy, S. N. (2020). Factors influencing adoption of sustainable farming practices in Europe: A systemic review of empirical literature. Sustainability, 12(2), 555. https://www.mdpi.com/2071-1050/12/22/9719

ISSN: 2582-7219 | www.ijmrset.com | Impact Factor: 8.206| ESTD Year: 2018|

International Journal of Multidisciplinary Research in Science, Engineering and Technology (IJMRSET)

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)

11. Smith, O. M., et al. (2019). Organic farming provides reliable environmental benefits but increases variability in crop yields: A global meta-analysis. Frontiers in Sustainable Food Systems, 3, 65. https://www.frontiersin.org/journals/sustainable-food-systems/articles/10.3389/fsufs.2019.00082/full
12. Thompson, B., Leduc, G., Manevska-Tasevska, G., Toma, L., & Hansson, H. (2024). Farmers' adoption of ecological practices: A systematic literature map. Journal of Agricultural Economics, 75(1), 78–98. https://ideas.repec.org/a/bla/jageco/v75y2024i1p84-107.html
13. Tuomisto, H. L., Hodge, I. D., Riordan, P., & Macdonald, D. W. (2012). Does organic farming reduce environmental impacts? A meta-analysis of European research. Journal of Environmental Management, 112, 309–320. https://www.sciencedirect.com/science/article/abs/pii/S0301479712004264
14. Zhou, X., Liang, C., Jia, Z., Lu, W., & Zhang, T. (2015). Measuring the environmental effects of organic farming: A meta-analysis of structural variables in empirical research. Journal of Environmental Management, 162, 315–326. https://www.sciencedirect.com/science/article/pii/S0301479715301663
15. Centre for Science and Environment. (2024). Sustainable agriculture in India: Organic farming. Council on Energy, Environment, and Water. https://www.ceew.in/publications/sustainable-agriculture-india/organic-farming
16. Department of Agriculture and Farmers Welfare, Government of India. (2024). Status of organic farming in India. National Conference on Organic Farming. https://nconf.dac.gov.in/StatusOrganicFarming
17. FIBL & IFOAM. (2025). The world of organic agriculture: Statistics and emerging trends—Yearbook 2025. Research Institute of Organic Agriculture. https://www.organic-world.net/yearbook/yearbook-2025/online-database.html
18. Ministry of Agriculture and Farmers Welfare, Government of India. (2024). Press release on organic farming in India. Press Information Bureau. https://pib.gov.in/PressReleaseIframePage.aspx?PRID=2100761&utm_source
19. Parliament of India. (2024). Organic farming in India—Parliamentary report. Rajya Sabha Secretariat. https://sansad.in/getFile/annex/266/AU2099_x9xpwO.pdf?source=pqars

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