Chronicle of Bioresource Management 2025, 9(2):075-080

Chronicle of Bioresource Management
An International E-magazine

June, 2025 *Popular Article*

Open Access

Corresponding Author
Sk Asraful Ali
e-mail: asraful.agron@gmail.com

Citation: Kaur et al., 2025. Organic Farming in India: Transforming Agriculture for Tomorrow. Chronicle of Bioresource Management 9(2), 075-080.

Data Availability Statement: Legal restrictions are imposed on the public sharing of raw data. However, authors have full right to transfer or share the data in raw form upon request subject to either meeting the conditions of the original consents and the original research study. Further, access of data needs to meet whether the user complies with the ethical and legal obligations as data controllers to allow for secondary use of the data outside of the original study.

Conflict of interests: The authors have declared that no conflict of interest exists.

Keywords:

Certification, Organic farming, Soil health, Sustainability

Article History

Article ID: CBM6389
Received on 23rd May 2025
Received in revised form on 08th June 2025
Accepted in final form on 25th June 2025

Organic Farming in India: Transforming Agriculture for Tomorrow

Ramanjit Kaur[1], Seema Sepat[2] and Sk Asraful Ali[1*]

Abstract

Organic farming in India has gained momentum as a sustainable alternative to conventional agriculture, driven by concerns over environmental degradation and resource depletion. Despite its potential to enhance soil health and biodiversity, organic farming faces challenges such as limited awareness, labour shortages, certification hurdles, and underdeveloped supply chains. Research indicates an initial decline in yields during the transition period, but comparable or improved productivity is achievable with proper management. Government initiatives like the National Programme for Organic Production (NPOP), Paramparagat Krishi Vikas Yojana (PKVY), and Mission Organic Value Chain Development for North Eastern Region (MOVCDNER) support organic agriculture through certification and market linkages. However, only a small fraction of India's agricultural land is organic, making its overall impact on food security modest. Addressing policy gaps, improving input quality, and strengthening market access are crucial for realizing the full benefits of organic farming in India.

1. Introduction

Green revolution technologies catalysed by high yielding varieties, fuelled by synthetic chemical inputs and supported by increased irrigation has no doubt transformed the Indian agriculture from subsistence farming to surplus generating enterprise. But now it is being realized that the success was mostly on the cost of resources, environment and sustainability. Depleting natural resources, especially the ground water, deteriorating soil health and fertility, increasing dependence on synthetic inputs from non-renewable sources, ever-growing costs of cultivation and diminishing returns have raised many questions on the long-term sustainability of the technology. Scientists and policy makers are now increasingly diverting their attention in search of alternative technologies, which are not only productive and meeting today's requirements but are also resource conserving, environment friendly and ensuring safe and healthy food with long term sustainability promise (Murmu

Author's Address

[1]ICAR-Indian Agricultural Research Institute, Pusa Campus, New Delhi (110 012), India
[2]ICAR-Indian Institute of Maize Research, Ludhiana, Punjab (141 004), India

et al., 2022).

Organic agriculture, a mainstay of farming since centuries is fast emerging as the viable option to fulfil all the sought after requirements, Growing awareness among consumers for safe and healthy food and supporting organic farming technologies for ensuring higher productivity with quality has boosted the confidence of policy planning process for its adoption as a viable system of food production.

Initial hiccups on its suitability and fears of low productivity are being dispelled with the results of long term experimentation and it is being accepted that if appropriate technologies are brought in and adopted, the organic agriculture can yield the same in resource rich areas and can give much higher productivity in less endowed resource poor and rainfed areas.

2. Definition of Organic Farming

"Organic farming is a production systems which avoid or largely exclude the use of synthetically compounded fertilizers, pesticides, growth regulators and rely upon crop rotations, crop residues, animal manures, green manures, off-farm organic wastes, mechanical cultivation, mineral bearing rocks, and aspects of biological pest control to maintain soil productivity and tilth, to supply plant nutrients, and to control insects, weeds, and other pests" (USDA, 1980). "Organic Agriculture is a production system that sustains the health of soils, ecosystems, and people. It relies on ecological processes, biodiversity and cycles adapted to local conditions, rather than the use of inputs with adverse effects. Organic Agriculture combines tradition, innovation, and science to benefit the shared environment and promote fair relationships and good quality of life for all involved" (IFOAM, 2008).

3. Principles of Organic Farming

The Principles of Health, Ecology, Fairness, and Care are the roots from which organic agriculture grows and develops. They express the contribution that organic agriculture can make to the world, and a vision to improve all agriculture in a global context (Figure 1).

➢ Principle of Health: Organic agriculture should sustain and enhance the health of soil, plant, animal, human and planet as one and indivisible.

➢ Principle of Ecology: Organic agriculture should be based on living ecological systems and cycles, work with them, emulate them and help sustain them.

➢ Principle of Fairness: Organic agriculture should build on relationships that ensure fairness with regard to the common environment and life opportunities.

➢ 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.

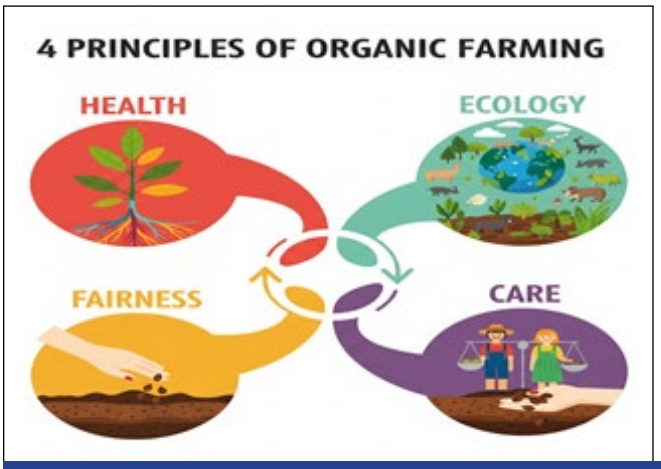

Figure 1: Principles of organic farming

4. Global and National Scenario

As of 2025, organic farming is practiced by 4.3 million producers across 98.9 million hectares (mha) of land in 188 countries worldwide (FiBL Survey, 2025) (Table 1). The regions with the largest organic agricultural land areas were Oceania (53.2 Mha – comprising more than half of the world's organic agricultural land, at 54%) and Europe (19.5 Mha, accounting for 20% of global organic farmland). Latin America followed with 10.3 Mha (10%), succeeded by Asia with 9.1 Mha (9.2%), Africa with 3.4 Mha (3.4%), and Northern America with 3.3 Mha (3.4%).

In India, organic farming has been gradually growing, placing the country as a global leader in organic agriculture. As of 2025, India ranked second worldwide in terms of organic agricultural land and held the top spot for the largest number of organic producers (FiBL Survey, 2025). As on 31st March 2024 total area under organic certification process (registered under NPOP) is 7.3 Mha (2023-24). This includes 44,75,836.91 ha cultivable area and another 28, 50,156.48 ha for wild harvest collection. Among all the states, Madhya Pradesh has covered largest area under organic certification followed by Maharashtra, Rajasthan, Gujarat, Odisha, Sikkim, Uttar Pradesh, Uttarakhand, Kerala, Karnataka and Andhra Pradesh. India produced around 3.6 million tonnes (2023-24)

Table 1: Statistics of organic farming

Parameters	Worldwide	Top countries
Organic agriculture land	98.9 mha	Australia (53.0 mha) India (4.5 mha) Argentina (4.0 mha)
Share of total agricultural land	2.1%	Liechtenstein (44.6%) Austria (27.3%) Uruguay (25.4%)
Producers	4.3 million	India (23,58,267) Uganda (4,04,246) Ethiopia (1,21,552)
Organic market	136.4 billion euros	USA (59.0 billion euros) Germany (16.1 billion euros) China (12.6 billion euros)
Per capita consumption	17 euros	Switzerland (468 euros) Denmark (362 euros) Austria (292 euros)

Source: FiBL Survey, 2025

of certified organic products. Among different states Maharashtra is the largest producer followed by Madhya Pradesh, Rajasthan, Karnataka, and Gujarat. In terms of commodities, Fiber crops are the single largest category followed by oilseeds, sugar crops, cereals and millets, medicinal and aromatic plants, spices and condiments, fresh fruit, vegetable, pulses, tea and coffee. The total volume of export during 2023-24 was 2,61,029 tonnes. The organic food export realization was around ₹ 4007.91 Crore (494.80 million USD). Organic products are exported to USA, European Union, Canada, Great Britain, Sri Lanka, Switzerland, Vietnam, Australia, Thailand, New Zealand, Japan, Korea Republic etc.

5. Government Promoted Organic Farming Schemes

The National Programme for Organic Production (NPOP), launched in 2001, laid the foundation for the systematic development of the organic agriculture sector in the country. To implement the National Project on Organic Farming (NPOF), the National Centre of Organic Farming (NCOF) was established in 2004 along with nine regional centres. In 2011, PGS-INDIA, the Participatory Guarantee System for organic certification, was introduced by the Department of Agriculture and Farmers Welfare, with NCOF serving as its secretariat. The Jaivik Bharat logo, designed to help consumers identify authentic organic food products in India, was launched in December 2017. On March 4, 2022, NCOF was renamed as the National Centre for Organic and Natural Farming (NCONF), now operating with five regional centres. Most recently, in October 2024, the Indian government merged all existing centrally sponsored agriculture schemes into two umbrella programs: Pradhan Mantri-Rashtriya Krishi Vikas Yojana (PM-RKVY) and Krishonnati Yojana (KY). PM-RKVY will promote sustainable agriculture, while KY will address food security and agricultural self-sufficiency.

5.1. Paramparagat Krishi Vikas Yojana (PKVY, 2015)

The government is promoting organic farming Paramparagat Krishi Vikas Yojana (PKVY), a component of Pradhan Mantri-Rashtriya Krishi Vikas Yojana (PM-RKVY). The PKVY scheme provides end-to-end support to organic farmers, i.e. from production to processing, certification, and marketing in a cluster-based approach. The primary focus of the scheme is to form organic clusters to help them create a supply chain. The scheme promotes Participatory Guarantee System (PGS) For India (PGS- India) form of organic certification that is built on mutual trust, locally relevant and mandates the involvement of producers and consumers in the process of certification. The funding pattern under the scheme is in the ratio of 60:40 by the Central and State Governments, respectively. In the case of North Eastern and Himalayan states, it is 90:10 (Centre: State) and for Union Territories, the assistance is 100% from the Central Government.

5.2. Mission Organic Value Chain Development for North East Region (MOVCDNER, 2016)

The Mission Organic Value Chain Development for North Eastern Region (MOVCDNER), a component under the KY, is a central sector scheme (with 100% GoI share) launched by the Ministry of Agriculture and Farmers Welfare to promote organic farming in the eight states of the North Eastern Region (NER). Since the scheme was in value chain mode, it has been able to create concentrated production clusters of specific commodities with necessary postharvest infrastructure and market linkages. All these clusters were targeted for export focus crops and certified under the National Programme for Organic Production (NPOP), which is a third-party certification process. Three phases of MOVCDNER have been concluded covering 1.79 lakh ha and 379 FPOs. Phase IV of the scheme will cover an additional 50,000

ha and 100 FPOs. The scheme is being modified by adding an additional component namely MOVCDNER-Detailed Project Report (MOVCDNER-DPR), which will provide flexibility to the North Eastern states to address critical challenges.

6. Organic Certification

At present in India two types of certification system exists namely -

➢ Third-party certification system (NPOP certification): India is among the first few developing countries to have developed and launched a credible third-party certification system. The National Programme for Organic Production (NPOP) launched during 2001 was the first such quality assurance initiative by the Government of India, which is governed by APEDA under Ministry of Commerce and Industry. It is mainly focused on export purposes (Figure 2a).

➢ PGS-INDIA certification system: The third-party certification bears high fees and more documentation as a result small and marginal farmers are not able to offer for certification. To make it more easy, affordable and simplest system of certification which can be accessible by more number of small and marginal farmers to adopt certification and further sale in domestic market, Participatory Guarantee System (PGS)-INDIA organic certification system was launched in 2011 by Department of Agriculture and Cooperation & Farmers Welfare, Government of India, which is governed by the Ministry of Agriculture and Farmers Welfare under INM (Integrated Nutrient Management) Division. It is mainly focused on local/ domestic market purposes. In this certification system, only the farmers who have completed the full conversion period without any major or serious non-compliance are declared as "PGS-INDIA Organic". Farmers who have one or more major non-compliance or are under the conversion period are declared as "PGS-INDIA Green" (Figure 2b).

a. NPOP certification logo b. PGS-INDIA certification logo

Figure 2: Organic certification logo

7. Impact of Organic Farming in India

The economic outcomes and productivity of organic farming in India are shaped by a complex interplay of factors beyond just the production system itself. Key determinants include the scientific management of nutrients and pests, the adoption of diverse agronomic practices, the length of the conversion period from conventional to organic, market access for organic produce, and the process of certification. These variables make it difficult to generalize the economic impacts of organic farming across the country. Furthermore, with organic agriculture accounting for only about two percent of India's total agricultural land, it is challenging to quantify its contribution to national food security.

A substantial body of research - more than 30 peer-reviewed articles have examined the effects of organic farming on crop yields and productivity across various crops. Syntheses of these studies indicate that yields typically decline during the initial two to three years after converting from chemical-intensive to organic systems. This is primarily due to the time required for organic inputs to restore soil health and biological activity. However, once this transition phase is complete, organic systems often achieve yields comparable to those of conventional agriculture. Practices such as integrating livestock, ensuring an adequate supply of biomass, effective composting, and incorporating cover crops and legumes into crop rotations have all been shown to enhance yields under organic management. Long-term research by the Indian Council of Agricultural Research (ICAR), conducted since 2004 across 12 states and a range of crops, has demonstrated that organic farming can increase yields by 5 to 20 percent for crops like ladies' fingers, turmeric, cotton, black pepper, onion, chili, ginger, green gram, sunflower, maize, soybean, and cowpea. Conversely, yield reductions of 5 to 20 percent were observed in crops such as potato, cabbage, French beans, lentils, radish, mustard, cauliflower, baby corn, rice, chickpea, and groundnut (Khurana and Kumar, 2020).

Profitability and net income from organic farming are similarly influenced by multiple factors, including farm size, access to premium markets, labor costs, market connectivity, farmers' expertise, and certification status. While premium prices can boost profits for organic farmers, limited market access often prevents them from realizing these benefits, forcing them to sell at conventional market rates. A significant bottleneck for organic producers is the lack of assured market support, compounded by the complex and costly certification process, particularly for smallholders. Even in Sikkim,

which was declared a fully organic state in 2016, challenges persist due to inadequate capacity-building and insufficient market support systems. Effective support for farmers, especially during the initial three to five years of transition, is crucial for successful adoption of organic practices.

Research on the impact of organic agriculture on soil health is robust and conclusive. Organic farming emphasizes the management of soil organic carbon and nitrogen, which enhances soil health. Practices such as the application of organic manures, use of legumes, crop rotation, recycling of crop residues, biofertilizer application, and composting have been shown to improve the physical, chemical, and biological properties of soil, as well as the availability of essential nutrients. This is particularly important in India's semi-arid and arid regions, where soils often have poor water retention and low organic matter. Organic farming helps improve soil structure and nutrient supply, leveraging locally available resources like minerals, biopesticides, and animal waste (Dubey and Date, 2014).

Organic farming also contributes to soil and water conservation by reducing runoff and erosion through the use of crop rotations, cover crops, intercropping, and composting. These practices enhance soil cover, promote water infiltration, and minimize nutrient losses. However, there is a notable lack of comprehensive studies on the impact of organic farming on water use efficiency in India, indicating a need for further research. Additionally, organic farming reduces greenhouse gas emissions by eliminating synthetic fertilizers and promotes carbon sequestration in soils, though more longitudinal studies are required to fully understand these benefits in the Indian context.

8. Constraints of Organic Farming in India

Organic farming has many benefits over conventional farming but still there are a number of problems encountered in adoption of organic farming. A major issue is the lack of awareness and understanding among policymakers, farmers, and consumers about the principles and benefits of organic agriculture, resulting in vague perceptions and insufficient support at all administrative levels. Organic farming is inherently labour-intensive, requiring more hands-on management of soil fertility and pest control, yet the sector struggles with a persistent shortage of farm labour. Farmers converting from conventional to organic practices risk yield losses during the transition due to the withdrawal of chemical inputs, and the high costs of laboratory testing and certification further discourage adoption. The absence of a robust domestic organic policy, particularly regarding labelling and standards, has led to fraudulent practices and prevents genuine producers from accessing premium markets. Additionally, there is a critical shortage of quality organic inputs and seeds, compounded by a lack of effective marketing and distribution networks, as retailers are often disinterested due to low demand and higher profit margins from chemical inputs. Industrial-scale organic farming is also challenging, as organic methods tend to be more effective on smaller plots, and large-scale operations may require frequent use of approved pesticides to manage pest pressure. The high cost and complexity of certification, especially for smallholders, and the three-year conversion period further deter farmers. The underdeveloped supply chain, particularly in remote and hilly regions, limits market access, storage, and transportation options, leading to product spoilage and cross-contamination risks. Finally, mainstream consumers often judge produce by appearance rather than nutritional value, resulting in lower sales for organic farmers whose products may not meet aesthetic expectations, despite their superior quality.

9. Conclusion

While the green revolution transformed Indian agriculture, its sustainability has come into question due to environmental and resource concerns. Organic farming has emerged as a promising alternative, balancing productivity with ecological health, and gaining momentum through supportive policies and consumer demand. Although initial challenges remain, especially in market access and certification, long-term studies show that organic agriculture can sustain yields, improve soil health, and contribute to a more resilient and sustainable food system for India's future.

10. References

Dubey, Y.P., Datt, N., 2014. Influence of organic, inorganic and integrated use of nutrients on productivity and quality of pea (*Pisum sativum*) vis-à-vis soil properties. Indian Journal of Agricultural Sciences 84(10), 1195–1200.

FiBL Survey, 2025. https://www.fibl.org/fileadmin/

documents/shop/1797-organic-world-2025.pdf. Accessed in May 2025.

IFOAM, 2008. https://www.ifoam.bio/why-organic/organic-landmarks/definition-organic. Accessed in June 2025.

Khurana, A., Kumar, V., 2020. State of organic and natural farming: challenges and possibilities. Centre for Science and Environment (New Delhi), 72.

Murmu, K., Das, P., Sarkar, A., Bandopadhyay, P., 2022. Organic agriculture: as a climate change adaptation and mitigation strategy. Zeichen Journal 8(3), 171–187.

USDA, 1980. https://www.fao.org/4/ac116e/ac116e02.htm. Accessed in May 2025.