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**Research Paper**

# A Study on Organic Farming and Sustainable Development in Agriculture with Special Reference to India

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**Abstract**

Agriculture remains the backbone of India, yet modern farming practices have increasingly strained ecosystems through soil degradation, biodiversity loss, and excessive chemical use. Organic farming offers a sustainable alternative by promoting natural soil fertility, crop diversity, and ecological balance while minimizing environmental harm. This study, based on secondary data from journals, government reports, and online resources, reviews ten key works on organic farming in India. The findings highlight that organic farming contributes to food security, rural development, and alignment with India's sustainability goals, though challenges such as lower yields, higher costs, labor intensity, and certification barriers persist. Government initiatives, including PKVY, NPOP, and MOVCDNER, have strengthened organic value chains and exports, while technological interventions like precision farming, drones, and digital marketplaces show potential to overcome productivity and market access limitations. The study concludes that organic farming represents a viable pathway to sustainable agriculture, provided stronger policy support, awareness programs, and innovative technologies are adopted to ensure economic viability and farmer participation.

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## INTRODUCTION

Agriculture has been central to human civilization, serving as the backbone of India. However, while modern farming methods have boosted productivity, they have also strained our environment, affecting essential natural cycles, causing soil erosion, and impacting carbon storage. Organic farming offers a promising approach to reducing these negative impacts by focusing on sustainable practices. By using organic materials instead of chemical fertilizers, pesticides, and synthetic additives, organic farming preserves natural recovery processes, supports biodiversity, and improves ecosystem health. Combining organic practices with modern technologies can also address some of organic farming's current challenges, such as productivity limitations, and further strengthen sustainable agriculture. Organic farming increases yields in an environmentally friendly manner and enhances farmers' quality of life. It aligns with global sustainability goals, promoting a greener and more resilient future for agriculture. This paper presents based on ten reviews.

## 1. OBJECTIVES OF THE STUDY

1.1. To study the current organic farming practices and techniques adopted by Indian farmers.
1.2. To explore how organic farming contributes to India's sustainable development goals
1.3. To explore innovative technologies that can enhance organic farming practices.
1.4. To identify the main challenges encountered by organic farmers in India and assess how government policies and initiatives support organic agriculture.
1.5. To examine the future potential and growth opportunities for organic farming in India.

### 2. Limitations of the study

The study primarily utilizes secondary data, which may not accurately reflect current organic farming practices or conditions due to time lags in reporting and data collection. Variability in data sources can lead to inconsistencies, as different organizations may use varying definitions and methodologies for measuring organic farming metrics. Secondary data may not capture the latest changes in policies affecting organic farming.

## 3. METHODOLOGY

I have gathered Secondary data from various sources, including periodicals, newspapers, magazines, government publications, research papers, and online resources, to examine topics like organic farming and sustainable development.

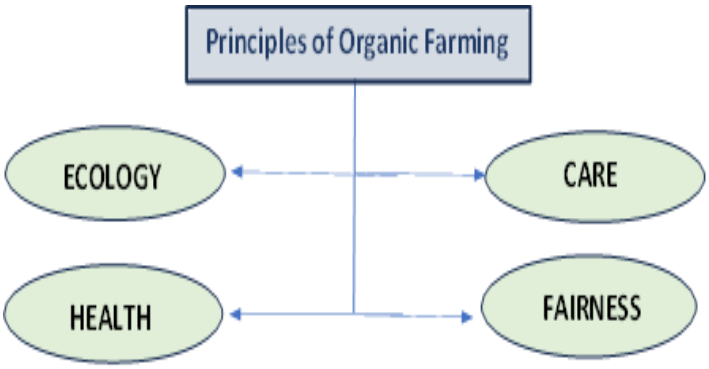
### 4. Organic and Conventional Farming

Organic farming and conventional farming differ in key practices. Organic farming avoids synthetic chemicals, instead using natural approaches like composting, crop-rotation and biological pest control to enhance biodiversity and soil health, supporting long-term sustainability. Conversely, conventional farming relies on synthetic fertilizers, pesticides, and intensive methods like monoculture and heavy irrigation to boost short-term yields, which can harm soil and biodiversity over time. Organic farming emphasizes ecological balance, while conventional farming focuses on efficiency and high productivity.

Organic farming promotes environmental sustainability by enhancing soil health, conserving water, and boosting biodiversity. Economically, it offers premium market access and reduces input costs, benefiting smallholders. Socially, it supports health by minimizing chemical exposure, fosters rural development, and strengthens local food systems.

### 5. Principles of Organic Farming

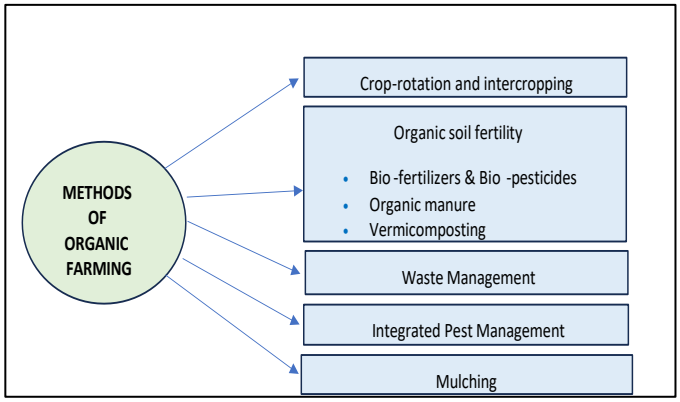
The principles of organic farming are based on creating a balance between agricultural productivity and environmental sustainability.




Organic practices emphasize the health of plants, soil, people and animals, focusing on natural, sustainable methods. By replicating ecosystems, they enhance biodiversity and soil quality while ensuring fairness in food production and protecting resources for the future.

Methods of Organic Farming

### 6. Methods of Organic Farming




**6.1 Crop Rotation & Intercropping**: Rotating crops improves soil health, reduces pests, and increases yield. Intercropping, or growing multiple crops together, enhances biodiversity, making the system more resilient and productive.

**6.2 Soil Fertility**: Bio-fertilizers introduce helpful microorganisms, organic manure provides nutrients, and vermicomposting turns waste into nutrient-rich compost.

**6.3 Waste Management**: Organic waste is composted or repurposed into fertilizers and pesticides, minimizing environmental impact.

**6.4 Integrated Pest Management (IPM)**:
This approach combines cultural and biological practices to control pests while maintaining ecological balance. These methods promote sustainability, improve soil health, and enhance crop resilience.

### 6.5 Mulching

It means covering the soil with natural materials like straw or leaves to keep moisture, block weeds, and improve soil as it breaks down.

## 7. Innovative Technologies for Organic Farming

GPS and remote sensing enable organic farmers to monitor field variability and optimize inputs, while soil health monitoring tools like sensors and apps support nutrient management. Technologies such as vertical farming and hydroponics enhance space and resource efficiency for urban organic production. Drones aid in crop monitoring and pest management, reducing the need for chemicals, and mobile apps, online platforms, and blockchain provide valuable insights on organic practices and market trends. Additionally, advanced composting systems and water management innovations like drip irrigation and rainwater harvesting promote soil health.

## 8. Fences to Organic Success

### 8.1 Lower Yields

Organic farms produce about 20-30% less than conventional ones, especially during the transition, which raises food supply and pricing concerns.

**8.2 Higher Costs**: Organic seeds, fertilizers, and labor-intensive practices drive up production costs, affecting small farmers' profits.

**8.3 Labor Demand**: Organic methods require more manual work, adding stress on farmers and increasing labor costs.

**8.4 Pest and Disease Issues**: Without synthetic pesticides, organic crops are more vulnerable to pests and diseases, risking losses.

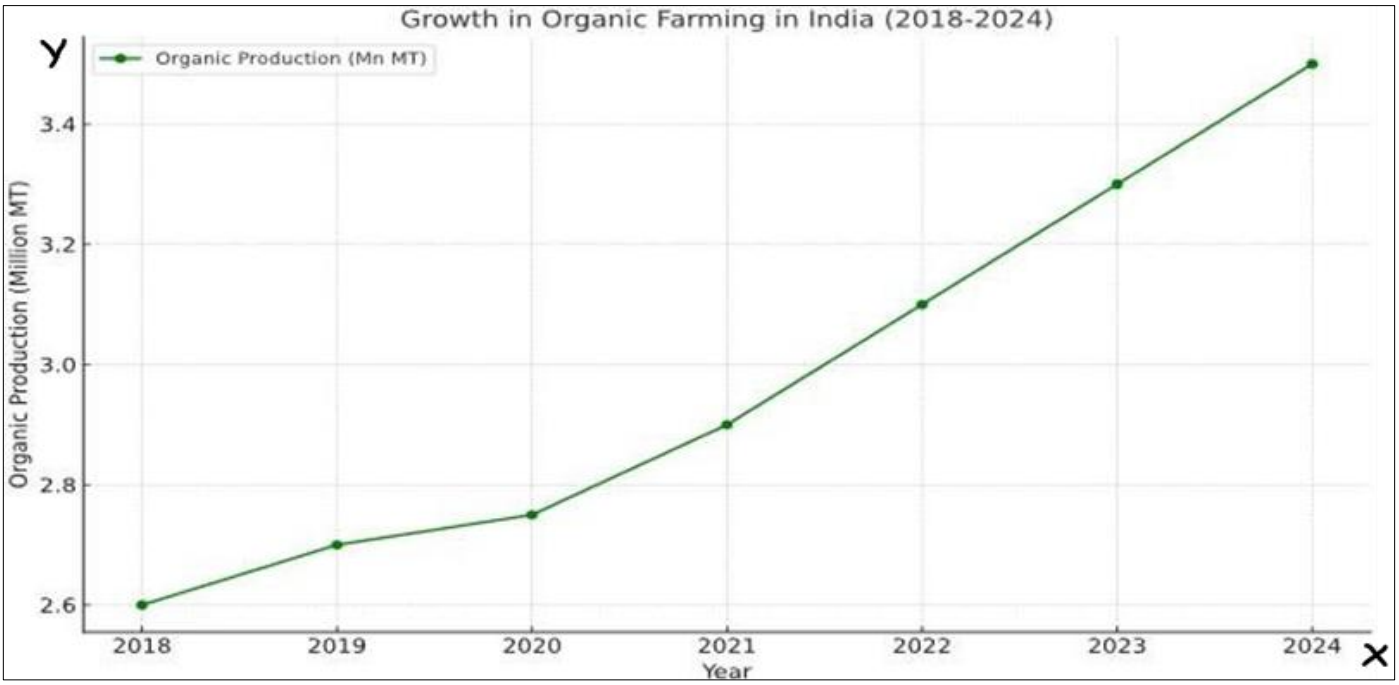
**8.5 Market Access**: Small farmers often struggle to reach organic markets, facing competition and fluctuating prices.

**8.6 Nutrient Management**: Organic fertilizers are less potent, leading to nutrient challenges, especially in poor soils.

**8.7 Research Gap**: Limited research and resources in organic farming make it hard for farmers to access tailored support.

## 9. Current and prospects

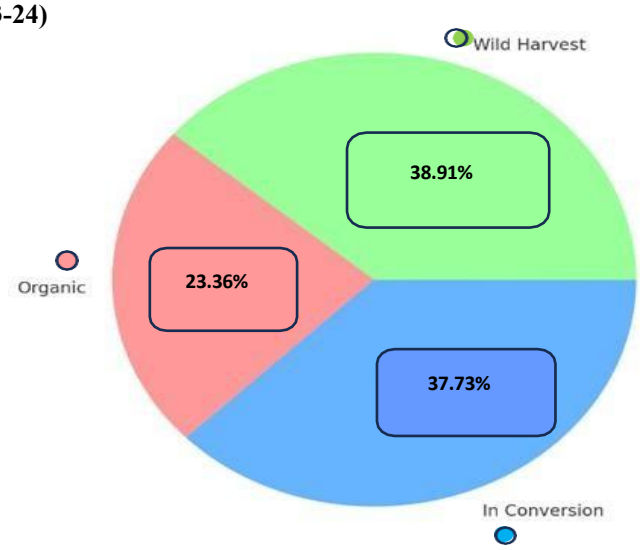
Organic farming in India has experienced significant growth in recent years. Primarily fueled by a rising awareness of environmental sustainability and concerns about consumer health.




**Source:** https://shorturl.at/n5nt8

The above graph shows the progression of organic farming in India from 2018 to 2024. Organic production has steadily increased, rising from approximately 2.6 million metric tons (Mn MT) in 2018 to an estimated 3.5 million metric tons by 2024. This growth reflects high requirement for organic goods and increased adoption of sustainable farming practices.

**1. Organic Farming Area in India (2023-24)**




| Cultivated area | Hectare | In Degree | In Percentage |
|---|---|---|---|
| Organic | 17,11,107.27 | 84.00° | 23.36% |
| In conversion | 27,64,729.64 | 135.80° | 37.73% |
| Wild Harvest | 28,50,156.48 | 140.20° | 38.91% |

**Source:** NPOP (2024)

In 2023-24, India's organic farming landscape includes 1,711,107.27 hectares of certified organic farming, 2,764,729.64 hectares transitioning to organic certification, and 2,850,156.48 hectares for wild harvest collection of organic-certified plants. This reflects a growing commitment to sustainable agricultural practices.

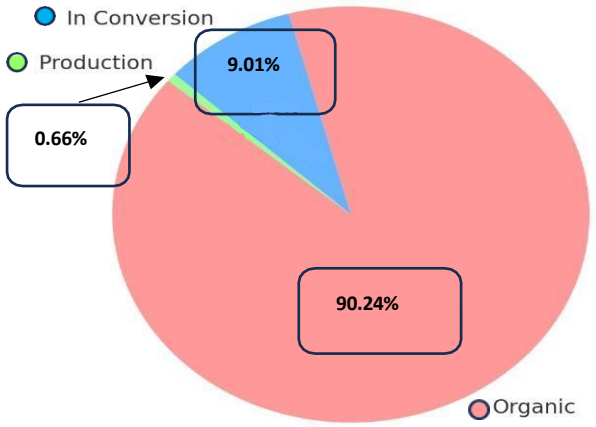
| Farm Production | Metric Ton | In Degree | In Percentage |
|---|---|---|---|
| Organic | 32,28,233.03 | 324.44 | 90.24% |
| In Conversion | 3,22,248.24 | 32.48 | 9.01% |
| Wild Harvest Production | 23,740.60 | 2.38 | 0.66% |

**Source:** NPOP

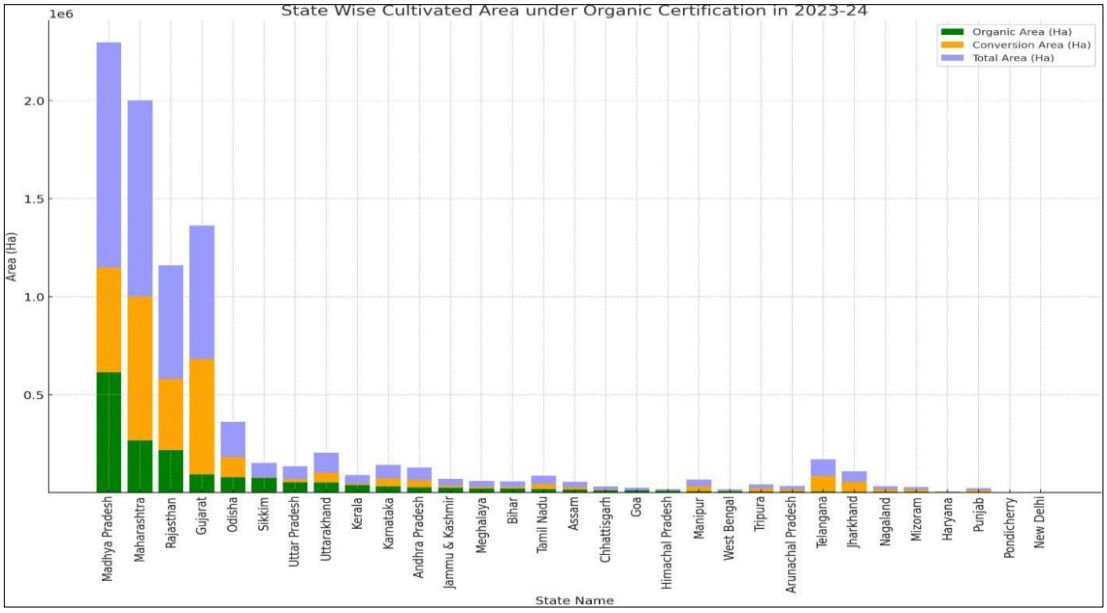
***TEQ** – Total Export Quantity, ****TEV**- Total Export Value

India's organic product exports have been growing steadily, with a value of over USD 1.04 billion in 2023. The key export markets include the US, the European Union, Canada, and Australia.

**11. Organic Production in India (2023 - 2024)**




**Main Export Products:** Organic tea, spices, rice, pulses, and cotton. Export Volume: 460,000 metric tons. State-wise Cultivated Area under Organic Certification during 2023-24.




**Source**: NPOP

In the above graph, the x-axis denotes the name of the state, and the y-axis refers to the Cultivated Area in Hectare. It shows that Madhya Pradesh ranks first in organic certified cultivation area, with a total of 1,148,236.07 hectares. In contrast, New Delhi holds the last position with a minimal total of 9.60 hectares, and Tamil Nadu ranks modestly with 42,758.27 hectares.

**13. Government Initiatives and Support**

To promote organic farming the Indian government launched various initiatives, including Parampara at Krishi Vikas Yojana (PKVY) (2015), which funds ₹50,000 per hectare for cluster-based organic farming, aiding over 2 million farmers by 2024. The Mission Organic Value Chain Development for the North East Region (MOVCDNER) (2015) focuses on strengthening the organic value chain in Northeast India, certifying 250,000 hectares and increasing farmer incomes. The National Program for Organic Production (NPOP) (2001) facilitates organic certification aligned with global standards, driving exports to USD 1.04 billion by 2024. The National Project on Organic Farming (NPOF) (2004) supports bio-fertilizer production and organic resources, while the Participatory Guarantee System (PGS) (2011) offers a self-certification model for over 1 million small farmers, reducing certification costs. The Capital Investment Subsidy Scheme (CISS) (2004) provides up to 25% subsidy for infrastructure development in organic production, and the Bhartiya Prakritik Krishi Paddhati (BPKP) (2020) promotes zero-budget natural farming for sustainability. Lastly, the Jaivik Kheti Portal (2018) serves as an online marketplace connecting farmers with buyers, enhancing prices by eliminating intermediaries and supporting organic certification.

**14. Future Prospects of Organic Farming**

**14.1. Rising Demand and government support:** Growing health awareness is driving demand for organic produce, especially among urban consumers willing to pay premium prices.

**14.2. Technological Advancements:** R&D investments in organic techniques and digital tools are improving yields, profitability, and marketing.

**14.3. Export Potential and Environmental Benefits:** India's agricultural diversity enables strong potential for organic exports and global market access. Organic farming promotes soil health, biodiversity, and water conservation, supporting climate resilience.

**14.4. Collaborative Models:** Cooperatives and public-private partnerships improve resource access and knowledge sharing for small farmers.

**14.5 Education, Awareness, and Challenges:** Training programs and consumer awareness initiatives boost organic practices and market demand. Certification costs and market barriers remain; streamlining certification and infrastructure is essential for sector growth.

## CONCLUSION

Organic farming in India represents a promising path toward sustainable agricultural development, aligning with both environmental goals and long-term food security. By minimizing synthetic inputs, organic farming conserves soil health, fosters biodiversity, and reduces pollution, contributing significantly to ecological resilience. The growing demand for organic products, coupled with India's diverse agricultural landscape, positions the country as a leading contributor to sustainable agricultural practices globally. However, organic farming faces barriers, such as high conversion costs, lower initial yields, and limited market access, which hinder its broader adoption among smallholder farmers.

## 16. SUGGESTION

To harness the full potential of organic farming for sustainable development, India should focus on increasing awareness, enhancing policy support, and improving access to resources for farmers. Government initiatives like targeted financial incentives, simplified certification processes, and investments in infrastructure can ease the transition to organic farming. Additionally, incorporating advanced technologies, such as precision agriculture and soil health monitoring tools, will enable farmers to maximize productivity sustainably. Building stronger organic supply chains and consumer awareness campaigns will also support the sector's growth, helping India achieve its sustainability goals while supporting rural livelihoods.

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