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Impact of Organic Farming on Environmental Sustainability in India

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Abstract

Organic farming is crucial in promoting sustainable development in India by addressing the environmental and health issues caused by conventional agriculture. Excessive use of chemical inputs has led to land degradation, loss of biodiversity, and increased carbon emissions, creating an urgent need for sustainable solutions. These practices improve and conserve resources, increase biodiversity, and contribute to long-term agricultural sustainability. Studies demonstrate that organic farming can meet the increasing demand for healthy food while protecting the environment and empowering farmers. Transitioning to organic farming in India offers farmers various benefits and hurdles. On the one hand, it promotes sustainability and healthier agricultural practices, but on the other, the initial costs of switching from conventional methods can be a major setback for many. Early on, organic farming may lead to lower crop yields, which could affect food security in the short term. Competing with conventional farming also adds pressure, as organic farmers struggle to scale up profitably. To overcome these challenges, raising consumer awareness, offering financial aid, and expanding supportive government policies are essential for wider adoption and success.

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1. INTRODUCTION

Organic agriculture is becoming a crucial aspect of sustainable development in India, addressing both environmental issues and the need for food security. With traditional farming methods facing problems due to chemical inputs, soil degradation, and climate change, organic farming presents a solution to restore ecological balance while improving farmers' livelihoods. Organic agriculture enhances soil health and reduces reliance on harmful chemicals by focusing on natural fertilizers, pest control strategies, and biodiversity. This comprehensive approach aligns with India's sustainable agriculture goals, fostering resilience in rural areas and ensuring the production of safe, nutritious food for the growing population. Organic practices can empower farmers, conserve natural resources, and contribute to a healthier ecosystem, making it an essential strategy for the country's sustainable development. Organic farming is an agricultural method that emphasizes natural processes and sustainability avoiding synthetic chemicals, fertilizers, and genetically modified organisms (GMOs). My paper reveals that to improve soil health, and biodiversity and maintain a balanced ecosystem.

Further, it produces healthier food for consumers and is more respectful of the environment, promoting the humane treatment of animals and the planet's long-term health.

2. Review of Literature

This section includes a review of the literature related to organic agriculture in the context of sustainable development in India. The research provides a good basic understanding of the problem by reviewing several studies and examining relevant studies from journals, articles, and unpublished research. This chapter highlights previous works to identify research gaps and establish a theoretical foundation, enhancing understanding and insights for the study. I have cited 15 reviews of literature that highlight the role of organic farming in promoting sustainable development in India. The study highlights how organic farming practices improve soil health, reduce chemical inputs, and support environmental conservation. These findings align with the goals of sustainable agriculture and demonstrate the potential of organic farming to address ecological challenges while ensuring long-term agricultural productivity in India.

3. Historical Background of Organic Farming

In history, different cultures have practiced the evolution of organic agriculture in India. For example, Ancient civilizations like the Greeks, Romans, and Chinese used natural methods to grow crops such as composting and crop rotation. The mid-19th century saw the rise of synthetic fertilizers and pesticides. However, pioneers such as Sir Albert Howard emphasized the importance of organic farming, experimenting with compost, and other natural methods. The beginning of the 20th century marked the beginning of the modern organic farming movement, initiated by Austrian philosopher Rudolf Steiner's biodynamic agriculture. In the 1930s, JJ Rodale founded the Rodale Institute, which promoted organic farming in the United States. In the 1960s, the movement gained momentum in response to growing concerns about the environmental and health impacts of industrial agriculture. Today, organic farming is a growing movement, with a growing demand for organic products worldwide. Many countries have established certification programs to regulate and promote organic farming practices.

4. Objectives of the Study

4.1 To assess the role of organic farming in advancing sustainable development in India.
4.2 To study the effects of organic farming on soil health and biodiversity.
4.3 To examine the economic benefits and challenges faced by organic farmers in India.
4.4 To identify the environmental organic farming practices.
4.5 To analyze the development of organic farming in India.

5. Importance of the Study

5.1 It provides sustainable development to reduce environmental impacts caused by conventional agriculture.
5.2 It supports public health by meeting the demand for food free of synthetic chemicals.
5.3 Organic methods empower farmers economically and encourage resilience in rural communities.
5.4 This approach aligns with India's goals for ecological balance and sustainable agriculture.
5.5 By enhancing soil quality through natural practices, organic farming supports long-term productivity.
5.6 It helps lower carbon emissions and improve ecosystems' ability to adapt to climate change.

6. Methodology

I have collected secondary sources of data. It consists of periodicals, newspapers, magazines, government reports, research articles, and the internet, to study topics such as organic farming and sustainable development.

7. Limitations of the Study:

7.1 This study relies entirely on secondary data from existing reports, journals, and government publications.
7.2 Organic farming practices vary significantly across different regions of India, which may affect the generalizability of findings
7.3 The study addresses environmental benefits but does not provide an in-depth quantitative analysis of long-term impacts like soil regeneration or biodiversity enhancement, which take decades to fully materialize.

8. Necessities of Organic Farming

Organic farming is essential because it focuses on sustainable and environmentally friendly practices. It enhances the quality, shelf life, and nutritional value of agricultural products while supporting the long-term welfare of farmers and safeguarding consumer health. This approach also contributes to the soil's physical, chemical, and biological well-being, promotes the responsible use of natural resources, and minimizes pollution. Additionally, organic farming fosters biodiversity within agricultural systems, creating a balanced and resilient ecosystem. Further, Organic farming is grounded in ecological orientation, focusing on the natural cycles of nutrients within the farm, predominantly utilizing materials produced on-site. In contrast, conventional farming is primarily economically driven. It supplements nutrients with chemical fertilizers and employs herbicides for weed control and pesticides for pest management. these two farming methods highlight the varying impacts on the environment and sustainability.

9. Roles and Principles of Organic Farming in Sustainable Development

Organic farming plays a pivotal role in several key areas. Reduces carbon emissions, pesticide residues, water pollution, health risks, and the use of non-renewable energy by avoiding synthetic inputs and adopting natural practices. At the same time, it increases soil health and biodiversity through methods like crop rotation and the use of diverse species. Additionally, organic farming generates economic opportunities and employment in rural areas by promoting sustainable practices. Lastly, it helps ecosystems adjust to climate change, ensuring

resilience and adaptability in the face of environmental challenges.

The principles of organic agriculture encompass four key aspects. The principles of health emphasize the importance of maintaining and improving the health of the soil, plants, animals, people, and the planet as an indivisible entity. The principle of ecology favors agricultural practices anchored in living ecological systems and cycles, thus promoting harmony with nature. The principle of equality emphasizes the need to foster relationships that ensure equality in the common environment and access to life opportunities. Lastly, the precautionary principle advocates for a careful and responsible agricultural approach to safeguard the health of present and future generations and protect the environment.

10. Major Organic Crops Growing in India

India is known for its diverse agricultural practices and many crops are grown organically throughout the country. Some of the main organically grown crops include traditional millets like finger millet and pearl millet are becoming increasingly popular (Millets); organic rice and wheat are especially prominent in states like Punjab and Haryana (Cereals); commonly cultivated varieties include chickpeas, lentils, and pigeon peas (Pulses); fruits such as mangoes, bananas, apples, and citrus varieties are frequently cultivated using organic farming practices (Fruits); a diverse selection of vegetables, such as tomatoes, eggplants, and various leafy greens (Vegetables); turmeric, ginger, and black pepper play a vital role in organic farming due to their natural pest-repellent properties and potential to enhance soil health (Spices); sunflower, groundnut, and mustard are grown organically across diverse regions (Oilseeds). The organic farming movement in India is supported by both government initiatives and non-governmental organizations, promoting sustainable agriculture practices.

11. Methods of Organic Farming

***Source*:** www.magritech.com

Fig 1: Methods of Organic Farming

11.1 Soil Management: Organic farming enhances soil quality by using bacteria from animal waste to boost soil nutrients and fertility.

11.2 Weed Management: Focuses on reducing weed growth through methods like mulching (covering soil with plastic or plant residue) and mowing (cutting the top growth of weeds).

11.3 Crop Diversity: Shifts from monoculture to polyculture, cultivating various crops to meet demand and support soil microorganisms.

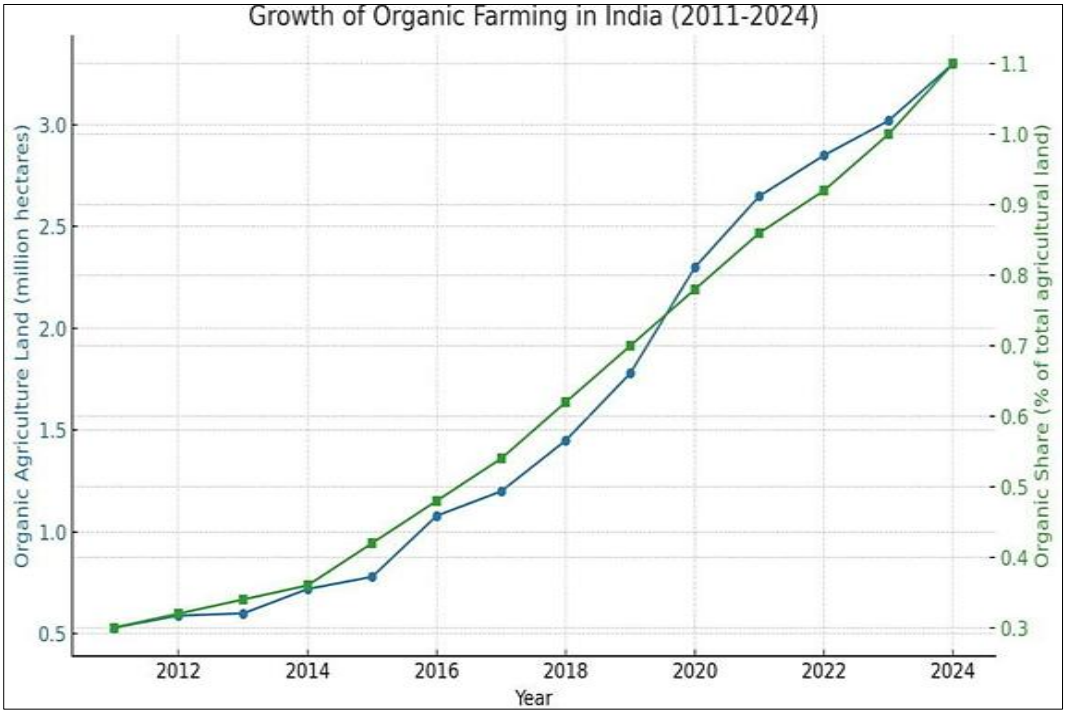
11.4 Controlling Organisms: Manages harmful organisms with natural or low-chemical herbicides and pesticides to protect crops.

11.5 Livestock Management: Emphasizes feeding animals organic food, allowing outdoor access, using natural breeds, and recycling manure to improve soil.

11.6 Biological Management: Uses beneficial insects, companion planting, crop rotation, and composting to control pests and promote soil health.

Table 1: Growth of Organic Farming in India

S. No.	Year	OS (%)	OAL (MHa)
1	2011	0.3	0.53
2	2012	0.32	0.59
3	2013	0.34	0.60
4	2014	0.36	0.72
5	2015	0.42	0.78
6	2016	0.48	1.08
7	2017	0.54	1.20
8	2018	0.62	1.45
9	2019	0.70	1.78
10	2020	0.78	2.30
11	2021	0.86	2.65
12	2022	0.92	2.85
13	2023	1.00	3.02
14	2024	1.10	3.30



***OS -** Organic Share (% of total agricultural land)
****OAL -** Organic Agricultural Land (in million hectares)
***Source*:** Information provided by APEDA under NPOP

Fig 1: Growth of Organic Farming in India

Here is the graph showing the growth of organic farming in India from 2011 to 2024. It illustrates both the increase in OAL (MHa) and the OS (%) over these years. The blue line represents the growth of OAL, while the green line shows the increase in the OS as a percentage of total agricultural land. The data reflects a steady upward trend for both factors. It has steadily increased the OS of 0.3% and OAL by 0.53 (MHa) in 2011 to an estimated OS of 1.10% and OAL by 3.30 (MHa) by 2024.

12. Current Status in India: Area Under Organic Farming for the Year 2023-24

In the 2023-24 agricultural year, India has made significant strides in organic farming, with around 3.1 million hectares now under organic cultivation. This progress reflects a strong commitment from both the government and farmers to sustainable practices, particularly in states like Sikkim, Uttarakhand, and Himachal Pradesh, which are enhancing soil health and biodiversity. The growth is fueled by increasing consumer demand for organic products, supported by government initiatives such as subsidies and training for farmers. Overall, these trends indicate a promising future for organic agriculture in India, balancing productivity with environmental sustainability.

13. Organic Farming Policies and Schemes

The organic farming policies and schemes implemented by the government of India have various segments: Paramparagat

Krishi Vikas Yojana (PKVY) - Launched in 2015, this program supports organic agriculture by establishing organic villages and prioritizing health management. PKVY encourages reducing chemical fertilizers, particularly in rainfed and hilly areas, and provides subsidies for organic farmers. Rashtriya Krishi Vikas Yojana (RKVY) - This initiative supports organic farming through state-funded agricultural strategies and district-level plans to increase organic yields. It highlights the nutritional benefits of organic products and aims to improve the health of underserved communities. Mission Organic Value Chain Development for North East Region (MOVCDNER) - The Ministry has implemented this policy to promote organic farming in Assam, Tripura, Meghalaya, Nagaland, Arunachal Pradesh, Manipur, and Sikkim. The mission focuses on developing a market value chain, enhancing market linkages, and conserving organic resources. National Mission on Oilseeds and Oil Palm (NMOOP) - This policy promotes the production of edible oils and the expansion of palm oil plantations as part of its organic farming objectives. Capital Investment Subsidy Scheme (CISS) under the Soil Health Management Scheme - Aiming to boost agricultural productivity and soil health, this program supports organic practices that ensure environmental safety and reduce synthetic chemical use. National Horticulture Mission (NHM) - This program emphasizes farmer training, providing land allocations for organic farming to encourage economic growth within the organic agriculture sector. One District-One Product (ODOP) - The ODOP policy promotes organic agriculture by focusing on specific indigenous products in each district, especially in Uttar Pradesh, to enhance local economies and organic product sales. Zero Budget Natural Farming (ZBNF) - Inspired by traditional Indian farming, this approach avoids synthetic fertilizers, providing a low-cost method supporting organic agriculture's economy. Agri-Export Policy - Launched in 2018, this policy aims to increase the export potential of organic products through targeted economic planning in the agricultural sector. National Project on Organic Farming (NPOF) - This initiative promotes organic production using biopesticides and biofertilizers, reducing reliance on chemical inputs. It also supports certification processes and is recognized by both Switzerland and the European Union for its adherence to organic standards. Here are some programs aimed at promoting the advancement of organic farming in agriculture.

14. Conclusion

In India organic farming is essential for sustainable development, offering a means to address the environmental and health impacts caused by conventional agricultural practices. By using natural fertilizers and promoting biodiversity, organic farming enhances soil health, reduces chemical reliance, and decreases carbon emissions. This method not only aligns with India's sustainability goals but also empowers farmers and meets the increasing demand for safe and nutritious food. Although initial costs and lower yields present challenges, organic farming's long-term benefits to environmental conservation and agricultural resilience are significant. Therefore, with increased support and awareness, organic farming could greatly advance India's agricultural sustainability and contribute to a healthier ecosystem.

15. Suggestions

To strengthen the adoption of organic farming, it is essential to address both its positive and negative impacts. Positively, organic farming promotes environmental health, reduces pollution, and provides nutritious food while supporting farmer welfare and biodiversity. However, challenges like high initial costs, lower crop yields, and limited access to resources can discourage farmers. Financial support, training, and consumer awareness are critical for overcoming these barriers. Expanding government policies and subsidies can facilitate a smoother transition for farmers and boost profitability, enabling organic farming to flourish as a sustainable practice across India.

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