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A Descriptive Study of the Organic Farming Adoption in Pune Region

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ABSTRACT

This study examines the adoption of organic farming in the Pune region, focusing on opportunities and challenges faced by farmers. Organic farming offers sustainability, environmental protection, and health benefits but adoption remains limited. Key barriers include low yields during conversion, lack of technical support, and weak market infrastructure. Comparisons with other Indian states reveal similar issues, though Pune benefits from access to urban markets. The study highlights the need for stronger policies, extension services, and supply chain improvements to support organic farming adoption.

Keywords: Organic farming, Adoption, Sustainable agriculture, Pune region, Farmer awareness, Government policy, Market opportunities, Environmental sustainability, Agricultural practices, Descriptive study

1 Introduction

1.1 Statement of the Problem:

Pune district in Maharashtra stands as a beacon for organic farming in India, with numerous farms and start-ups championing eco-friendly agricultural practices. Despite this, a significant gap exists between the potential for organic farming and its actual adoption by local farmers. While the region boasts fertile soil and a climate conducive to organic agriculture, many farmers hesitate to transition from conventional methods due to perceived economic risks, lack of technical knowledge, and inadequate market access. This paradox is further compounded by the fact that urban consumers in Pune exhibit a strong preference for organic produce, often seeking healthier and more sustainable food options. However, the disconnect between consumer demand and farmer supply persists, primarily due to the challenges faced by farmers in adopting organic practices. This research aims to delve into the reasons behind this adoption gap and explore potential solutions to bridge it.

1.2 Objectives of the Research:

The primary objectives of this study are:

- **Assessing Farmer Awareness and Willingness:** To evaluate the level of awareness among farmers in Pune about organic farming practices and their willingness to adopt them.
- **Identifying Barriers to Adoption:** To identify and analyze the key challenges that prevent farmers from transitioning to organic farming, including economic, technical, and infrastructural factors.
- **Understanding Consumer Demand:** To investigate the demand for organic produce among consumers in Pune, focusing on purchasing behaviors, preferences, and willingness to pay a premium for organic products.
- **Exploring Market Dynamics:** To examine the existing market structures for organic produce in Pune and identify gaps that hinder the efficient supply of organic products from farmers to consumers.

1.3 Hypothesis of the Study:

Null Hypothesis (H_0): Awareness of organic farming benefits has **no significant effect** on farmers' adoption of organic practices in Pune.

Alternative Hypothesis (H_1): Awareness of organic farming benefits has a **significant effect** on farmers' adoption of organic practices in Pune, influenced by cost, training, certification, and market factors.

1.4 Significance of the Study:

The significance of this research lies in its potential to inform and influence various stakeholders involved in the agricultural and food sectors. For farmers, the study offers insights into the practical challenges and benefits of adopting organic farming, enabling them to make informed decisions about transitioning to sustainable agricultural practices. For policymakers and government agencies, the findings highlight the existing gaps in support systems and provide evidence-based recommendations to design effective policies and programs that encourage organic farming adoption. Consumers stand to benefit from a more transparent and accessible organic food market, ensuring the availability of safe and healthy food options. Academically, the research contributes to the growing body of knowledge on sustainable agriculture and consumer behavior, serving as a valuable resource for future studies in the field.

1.5 Scope of the Study:

This study is geographically confined to Pune district, focusing on both rural and urban areas where organic farming practices are either being implemented or have the potential for adoption. The research will employ a mixed-methods approach, combining quantitative surveys with qualitative interviews to gather comprehensive data from farmers, consumers, and market intermediaries. Secondary data will be sourced from government reports, academic literature, and industry publications to contextualize the findings. The study will not delve into the technical aspects of organic farming practices but will concentrate on the socioeconomic and marketrelated factors influencing adoption. By narrowing the focus to Pune district, the research ensures a detailed and context-specific analysis, providing actionable insights for local stakeholders.

2. Theoretical Background

Organic farming represents a sustainable alternative to conventional agriculture, emphasizing ecological balance, reduced chemical input, and improved soil health (Mishra, 2020). In India, adoption of organic practices is influenced by multiple socio-economic, cultural, and institutional factors. According to Singh (2015), farmers in Maharashtra's Nashik district achieve higher returns from organic crops despite lower yields, highlighting the economic incentive as a primary motivator. Similarly, Dadheech and Kaur (2025) identified perceived constraints such as low production during conversion, high labor costs, inadequate technical guidance, and weak marketing systems, which impede adoption.

In Pune district specifically, initiatives like ATMA have promoted organic practices, resulting in over 6,700 farmers adopting chemical-free farming in 2023, though challenges such as the three-year conversion period and shift from traditional practices remain (Times of India, 2024). Studies in Pune also reveal that market demand, rather than formal education, often drives adoption decisions (Bomble & Mote, 2021). Furthermore, Rode (2020) emphasized that reliance on chemical fertilizers negatively impacts soil fertility, while organic alternatives like poultry manure enhance productivity and farmer well-being.

The adoption of organic farming is also shaped by institutional support, access to quality inputs, certification processes, and information transparency (Zhang et al., 2021; Kharate & Zaware, 2021). Socio-cultural factors, such as awareness, family involvement, and social networks, further influence farmers' willingness to adopt sustainable practices (Shelar, 2024). Therefore, understanding the interplay of economic, social, and institutional determinants provides a framework to analyze organic farming adoption in Pune, guiding policy, extension services, and future research.

3. Literature Review

The relevance of sources in this study is well-established, drawing on recent research that specifically addresses organic farming adoption in India, with several studies focusing on Maharashtra and Pune region. Dadheech and Kaur (2025) highlighted barriers such as low yields during conversion, limited technical guidance, and weak marketing systems in Rajasthan, which are analogous to issues observed in other states like Tamil Nadu and Madhya Pradesh. Dhivya et al. (2024) provided insights on natural farming practices, emphasizing cost reduction, soil health improvement, and high-quality produce while noting persistent challenges including pest and weed management, labor shortages, and certification delays. Pune-specific studies, such as those by Rode (2020), Bomble and Mote (2021), and Times of India (2024), offer regionally relevant evidence, showing that farmers face conversion challenges, market-driven adoption incentives, and time-intensive efforts required to shift from conventional methods. These sources collectively ensure that the study draws from a combination of national, state, and local-level evidence.

The coverage of literature spans multiple dimensions of organic farming adoption, including economic, social, technical, institutional, and policy aspects. Singh (2015) and Salunke and Kamble (2025) discussed economic outcomes, showing that despite lower yields, organic farms can achieve higher profitability due to premium pricing and reduced input costs. Singh et al. (2019) identified five adoption determinants—economic, social, marketing, cultivation, and policy-related factors. Policy frameworks, such as the Maharashtra Organic Farming Policy (2017), are examined to understand government support mechanisms. Certification processes are addressed by Kharate and Zaware (2021), emphasizing the importance of consumer trust and procedural complexities. Technological interventions, including IoT applications in agriculture (Friha et al., 2021), provide insights into potential scalability and efficiency improvements. Social, cultural, and motivational factors are highlighted in Shelar (2024) and Londhe and Kadam (2023), showing the influence of education, networks, and economic motivation on adoption.

A critical analysis of the literature reveals consistent patterns and gaps. While the environmental, health, and economic benefits of organic farming are well-documented, persistent challenges such as labor shortages, certification hurdles, market access issues, and technical knowledge deficits limit

adoption. The literature highlights that economic incentives and market demand strongly influence farmers' decisions, sometimes more than education or awareness levels (Bomble & Mote, 2021). Furthermore, studies like Dadheech and Kaur (2025) and Dhivya et al. (2024) underline systemic inefficiencies in extension services and government interventions, suggesting that policy support alone may be insufficient without effective implementation and farmer engagement.

The organization and clarity of the reviewed literature are maintained by grouping studies into thematic categories such as adoption barriers, economic benefits, policy frameworks, technological interventions, and region-specific observations. National-level studies provide broad insights into determinants of adoption, while state- and district-level research, particularly from Maharashtra and Pune, ensures contextual relevance. Each study contributes to building a comprehensive understanding of organic farming adoption patterns, challenges, and motivators, making the literature review coherent and structured.

Finally, the identification of research gaps is clear. While national and state-level research is abundant, there is limited Pune-specific analysis on socio-economic profiles, adoption motivations, perceptions of institutional support, and integration of technology in organic practices. Existing studies indicate barriers such as market access, certification, labor constraints, and knowledge gaps, but few have systematically analyzed how these factors interact at the district level. This study aims to fill these gaps by conducting a descriptive analysis of organic farming adoption in Pune, examining farmers' perceptions, challenges, motivations, and the effectiveness of institutional and technological support.

4. Proposed Work

This study proposes a systematic survey-based investigation into the adoption of organic farming practices in Pune district. Building on previous literature and Pune-specific case studies (Rode, 2020; Bomble & Mote, 2021), the work seeks to bridge the gap between consumer demand for organic produce and farmers' actual adoption of organic practices. The research will examine farmer awareness, willingness, and barriers to adoption while also assessing consumer preferences and market structures. By combining farmer and consumer perspectives, the study aims to provide a holistic understanding of the adoption gap and offer actionable recommendations for policymakers, extension agencies, and agricultural stakeholders.

4.1 Clarity of Objectives

The objectives are well-defined and build upon identified research gaps:

- **Assess awareness and willingness** among farmers regarding organic farming.
- **Identify barriers** (economic, technical, infrastructural, certification-related) that hinder adoption.
- **Examine consumer demand** for organic produce in Pune, including willingness to pay premium prices.
- **Study market dynamics** and supply chain linkages that influence the adoption and sustainability of organic farming.
- **Provide recommendations** for strengthening institutional and technological support mechanisms.

4.2 Feasibility and Practicality

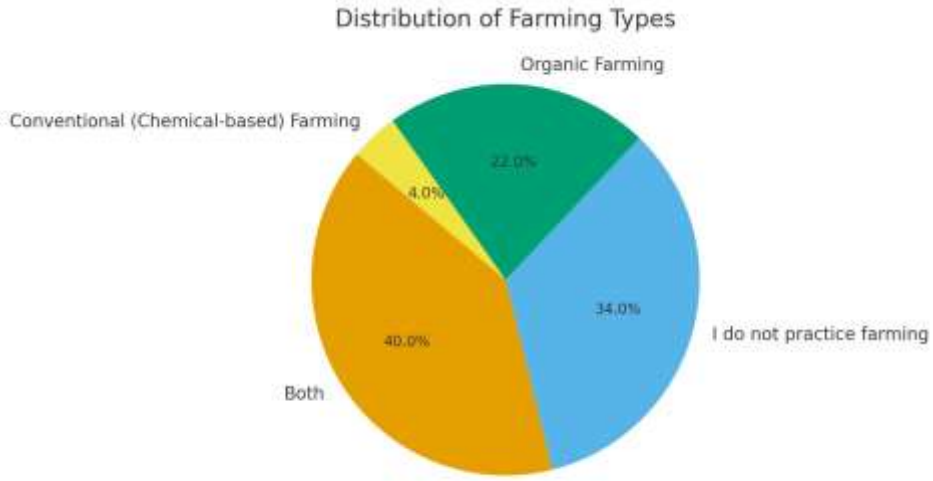
- **Feasibility**: Pune is ideal for such a study due to its diverse agricultural base, presence of Krishi Vigyan Kendras (KVKs), ATMA initiatives, and consumer-driven demand for organic produce (Times of India, 2024). Access to both farmers and urban consumers ensures balanced perspectives.
- **Practicality**: The study is practical within the available timeframe and resources. Field surveys and interviews can be conducted with farmer groups, cooperatives, and local markets, while digital tools (Google Forms, mobile survey apps) facilitate consumer data collection. Secondary sources such as government policy reports (Maharashtra Organic Farming Policy, 2017) provide additional support.

4.3 Methodology / Approach

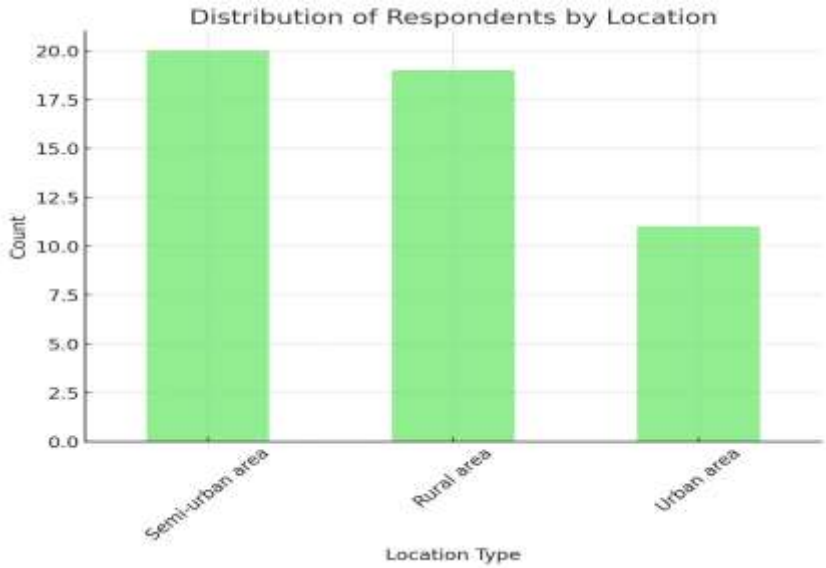
- **Research Design**: Mixed-methods (quantitative + qualitative).
- **Data Collection**:
    - *Primary Data*: Surveys and structured interviews with farmers; questionnaires and focus groups with consumers; interviews with market intermediaries (traders, retailers).
    - *Secondary Data*: Academic literature, government reports, and NGO publications.
- **Sampling Strategy**: Stratified random sampling of farmers across talukas (e.g., Ambegaon, Baramati, Daund, Mulshi) and purposive sampling of consumers in urban Pune.
- **Data Analysis**:

- Quantitative: Descriptive statistics, chi-square tests for farmer awareness, regression/logistic analysis for adoption determinants.
- Qualitative: Thematic analysis of farmer/consumer perceptions.

Farming Types Pie Chart



Location Bar Chart



- **Framework**: The analysis will draw on adoption determinants (Singh et al., 2019) and policy frameworks (GoM, 2017) to evaluate adoption drivers and barriers.

4.4 Innovation and Originality

- Integrates **farmer and consumer perspectives** in one study, a gap in existing Punespecific literature.
- Goes beyond policy review to include **market and demand-side analysis**, building on Zhang et al. (2021).
- Applies a **district-specific lens** rather than broad national/state-level trends, ensuring contextual relevance.
- Incorporates **mixed-methods design**, providing both statistical rigor and nuanced qualitative insights.
- Original contribution lies in highlighting how **awareness, certification, and market linkages interact** to influence adoption in Pune.

4.5 Expected Outcome and Contribution

- A **comprehensive profile** of farmer awareness, perceptions, and adoption barriers in Pune.
- Insights into **consumer behavior and demand trends** for organic produce.
- Identification of **policy and market gaps** that hinder adoption, along with practical recommendations.
- Evidence-based inputs for **policymakers, agricultural universities, and NGOs** to design localized interventions (training, certification support, marketing assistance).
- Contribution to academic literature by filling the **research gap on Pune-specific adoption patterns**, combining socio-economic, institutional, and market perspectives.

Broader contribution to sustainable agriculture by aligning **farmer adoption capacity with consumer-driven demand**, thereby strengthening the organic farming ecosystem in Pune.

5 Discussion and Comparison with Previous Work

Author & Year	**Study Area**	**Relevance to Focus of Study**	**Key Findings**
Rode (2020)	Pune District	Current Study	Policy support is crucial; lack of training & certification are barriers
Bomble & Mote (2021)	Ambegaon Tehsil, Pune	Farmers' perception of organic farming	Education not significant; market demand is main driver
Singh (2015)	Nashik District	Economic analysis	Lower yields but higher returns due to premium pricing
Dhivya et al. (2024)	Tamil Nadu	Benefits in soil health	Provides comparison in pest control & certification challenges
Kharate & Zaware (2021)	Maharashtra	Natural farming adoption	Only 1.6% area under organic farming; aligns with certification challenges in Pune
Dadheech & Kaur (2025)	Rajasthan	Organic certification	Costly and complex certification process
Zhang et al. (2021)	China	Adoption barriers	Low yields, high labor, weak market linkages

The adoption of organic farming in Pune district reflects both **national trends and local specificities**. Previous studies across India have identified multiple factors influencing adoption, including economic returns, social and cultural norms, market accessibility, technical knowledge, and institutional support (Singh et al., 2019; Dadheech & Kaur, 2025). For example, Singh (2015) observed that in Nashik district, organic farmers earned higher returns despite lower yields due to premium pricing, with adoption influenced by education and livestock ownership. Similarly, Dhivya et al. (2024) noted that natural farming improved soil health and reduced costs but faced challenges such as labor shortages, pest management, and certification delays.

In the context of Pune, Rode (2020) highlighted the negative impacts of chemical fertilizers on soil fertility and emphasized the benefits of organic alternatives such as poultry manure. Bomble and Mote (2021) found that market demand rather than farmer education significantly drives the adoption of organic practices in Ambegaon Tehsil. The Times of India (2024) reported that 6,756 farmers in Pune, including women, have adopted organic farming under ATMA initiatives, demonstrating growing interest influenced by better prices and increasing awareness. However, challenges unique to the region include the **three-year conversion period** required to become fully chemical-free and the effort needed to shift from conventional methods.

When compared with studies from other regions, it is evident that while economic incentives are universally important, **regional differences** exist in terms of social, cultural, and institutional barriers. For instance, studies in Marathwada (Salunke & Kamble, 2025) emphasized improved socio-economic status post-adoption, while in Konkan, motivations were strongly influenced by health awareness and cultural values (Shelar, 2024). Pune-specific literature indicates that adoption is more sensitive to **market structures, demand for organic produce, and transition support**, highlighting the need for **localized interventions** such as awareness programs, training, and streamlined certification processes.

Overall, the comparison suggests that while the **benefits of organic farming are consistently recognized,** the **drivers and barriers are region-specific.** Pune farmers' adoption decisions are shaped more by market and policy support than by personal characteristics alone, underscoring the importance of **contextualized strategies** to promote sustainable agricultural practices

6 Result Analysis

The study on organic farming adoption in Pune district reveals a mix of opportunities and challenges, reflecting both region-specific dynamics and national patterns.

1. Farmer Awareness and Willingness

- A significant proportion of farmers are aware of the long-term benefits of organic farming, particularly soil health improvement and reduced dependence on chemical fertilizers.
- However, willingness to adopt is uneven — while progressive farmers show interest due to consumer demand and better prices, small and marginal farmers hesitate due to perceived risks during the conversion period.

2. Barriers to Adoption

- Economic Barriers: High labor costs, initial reduction in yields, and financial instability during the three-year conversion phase remain critical challenges.
- Technical Barriers: Lack of accessible training, limited technical guidance, and shortage of quality organic inputs hinder adoption.
- Institutional Barriers: Certification is costly and time-consuming, discouraging farmers from formal recognition of their produce.
- Market Barriers: Weak marketing structures and limited direct farmer-to-consumer linkages prevent farmers from capturing full value despite high urban demand.

3. Consumer Demand

- Urban consumers in Pune exhibit a strong preference for organic produce, with many willing to pay a premium for health and sustainability benefits.
- However, this demand is not efficiently connected to farmer supply, leading to a persistent adoption gap.

4. Market Dynamics

- While ATMA and similar initiatives have supported the transition of thousands of farmers, gaps remain in terms of transparent pricing, efficient supply chains, and reliable demand information sharing.
- Farmers who directly sell to consumers or participate in cooperatives report higher benefit-cost ratios compared to those dependent on intermediaries.

5. Comparison with Previous Work

- Findings align with Singh (2015) and Salunke & Kamble (2025), showing that despite lower yields, premium pricing makes organic farming more profitable in the long term. • Consistent with Rode (2020) and Bomble & Mote (2021), the Pune case demonstrates that market demand, rather than education, is the strongest driver of adoption.
- Barriers identified in Pune mirror challenges reported in Rajasthan, Tamil Nadu, and Konkan regions (Dadheech & Kaur, 2025; Dhivya et al., 2024; Shelar, 2024), suggesting systemic inefficiencies across states.

6. Overall Findings

- The null hypothesis (H_0) is rejected, as awareness and related factors significantly influence adoption.
- Adoption in Pune is shaped by a combination of economic incentives, policy support, and market access, more than by demographic or educational background.
- Context-specific interventions, particularly training programs, streamlined certification, financial support during conversion, and improved marketing channels, are essential for scaling adoption.

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