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Economic and Environmental Effects of Organic Farming: Analysing Implications and Solutions for Small-Scale Farmers in Developing Countries

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Introduction *– Meeting the growing food demand and producing enough food for that has always been a growing concern for farmers, food producers, policymakers, and other stakeholders worldwide. With rising adoption and focus on organic farming in mind, this research was done to determine the "factors affecting adoption of organic farming" along with main challenges and opportunities.*

Objective *– The "objective of this study is to find out the factors affecting adoption of organic farming", along with challenges and solutions for the farmers.*

Methodology *– In order to fulfil the above objectives, a survey was conducted to gather responses from farmers. A self-structured questionnaire was prepared on the basis of "5-Point Likert scale" and shared through Google Forms. The responses were interpreted through SPSS software by IBM. A total of 106 responses were collected through an online survey.*

Results *– The finding of the study suggests that there are five key factors influencing the adoption of organic farming, such as social, economic, cultivation, marketing, and govt. support. Social and Economic factors were found to be most important to influence all kinds of farmers. However, there are some challenges towards acceptance of "organic farming for small and medium farmers" like low yield, nutrition, market, and lack of government support.*

Keywords: *organic farming, economic effects, environmental effects, food demand, cultivation, social factor, economic factor*

1. Introduction

Organic farming has emerged as a promising alternative to conventional agriculture, particularly in the context of growing concerns about environmental degradation, climate change, and the long-term sustainability of food systems. In developing countries, where small-scale farmers constitute the majority of the agricultural workforce, the shift towards

organic farming presents both opportunities and challenges that demand critical examination. Economically, organic farming offers the potential for farmers to reduce dependence on costly chemical inputs such as pesticides and synthetic fertilizers, thereby lowering production costs in the long term. Moreover, the rising global demand for organic produce opens new avenues for farmers to access premium markets, secure higher prices, and improve their livelihoods. Yet, despite these prospects, small-scale farmers in developing nations often face barriers such as limited access to training, inadequate infrastructure, certification hurdles, and lack of financial support, all of which impede their ability to fully benefit from organic farming systems. The economic implications, therefore, are complex and deeply intertwined with broader structural inequalities in rural economies. While organic farming could serve as a pathway to poverty alleviation and rural development, its benefits are not automatically guaranteed and must be supported by robust policies, institutional frameworks, and capacity-building initiatives that empower smallholders to transition effectively.

At the same time, the environmental effects of organic farming are particularly significant for developing countries, which are disproportionately vulnerable to climate change, soil degradation, and biodiversity loss. By eliminating or reducing the use of harmful agrochemicals, organic practices help restore soil fertility, conserve water resources, and promote ecological balance through techniques such as crop rotation, composting, and integrated pest management. These practices not only sustain agricultural productivity but also enhance resilience against environmental shocks such as droughts and floods, which small-scale farmers frequently endure. Furthermore, organic farming fosters biodiversity both above and below the soil, creating ecosystems that are less reliant on external inputs and more capable of self-regulation. However, challenges remain: organic farming often results in lower yields in the short term compared to conventional methods, raising concerns about food security, especially in countries already grappling with hunger and malnutrition. The key, therefore, lies in balancing the ecological benefits of organic agriculture with the economic realities faced by smallholders. This balance requires context-specific solutions—such as localized training programs, affordable certification systems, supportive market linkages, and government subsidies—that can help mitigate initial losses while fostering long-term sustainability. In this sense, analyzing the economic and environmental implications of organic farming in developing countries is not only crucial for shaping inclusive agricultural

policies but also for ensuring that small-scale farmers remain at the center of global efforts to build a sustainable and equitable food system.(Creswell, J,2017)

1.1 Background

With a total of 157.35 million hectares of farmland, India stands second for having the largest agricultural land in the world. India, indeed, has 46 types of soil ideal for agriculture out of total 60 fertile soil types. India is more likely to produce organic crops than any other country in the world and become the top exporter of natural food and beverages in the "organic market" of the world with such a huge cultivation. Several studies have analysed factors affecting adoption of organic farming by farmers in various countries. Previous researchers also studied the relevance of data gathered, value of encouraging factors like environmental concerns for the decision of adoption, and role of sources of informal data for organic farming.

In addition, earlier studies have been based on the spatial impact of decision-making on acceptance of organic farming. Organic farming can have various benefits, such as saving non-renewable resources, environmental protection, and better food quality. It is still believed that organic farming can solve problems related to food safety, environmental quality, viability of markets and rural communities.(Kumar, J., Pradhan, M., & Singh, N,2018)

2. Literature Reviews

In earlier studies, it is observed that organic farmers are supposed to be women. Some have observed variances between traditional and organic farmers in environment, awareness level, food safety, and animal welfare. There is a rapid demand for organic produce but there is still a need to achieve a mass scale of organic farming in developing countries. There are some challenges in adopting organic farming which should be discussed.(Altenbuchner, C., Vogel, S,2018).

Despite having several aids of organic farming and food, adoption of this method has only a small part of total farmland available in the world. Only 0.7% of total fertile land is used for this type of farming in India. It poses a serious concern on the farmer's interest and policymaking in organic farming. Agricultural policies are witnessing a great trend to be eco-friendly in various countries. Farmers are being motivated to adopt organic farming with various financial incentives and conversion subsidies.

It takes around 3 years to transform traditional method with organic farming, and it is also believed that overall production of crop declined dramatically during the old period of conversion and affects profit significantly. Hence, the government provides subsidies for crop conversion to promote organic farming. There are two groups of factors driving adoption of organic farming by farmers – non-economic and economic factors. Earlier studies have already tested the economic factors and discussed economic concern as the key adoption driver. Financial factors are the most important factors to adopt organic production. As long as a less secure economic environment is provided by the organic sector than traditional farming, the conversion of farming methods has been a matter of concern.

Some studies have suggested that proper price premium and market demand for organic produce would bring reasonable profit for organic farmers. However, some research works have found that farmers engaged in organic farming in the long term and ideal crop rotation has to be in a very profitable shape as compared to traditional farming even when there is no price premium. Irrespective of this, a lot of studies have observed that financial constraints are not the only concern for farmers to adopt organic farming, it also relies on their attitude, behaviour, opinions, lifestyle, and objectives.

Risk-taking farmers who have just started controlling farms are more inclined towards saving the environment and generating job opportunities. They are more likely to adopt organic farming. Environmental concern of the farmers is a strong influencer and motivator to adopt organic farming. A lot of farmers are also encouraged to adopt organic farming for non-economic causes like environment, social concern, chemical-free food, health benefits, and food quality. There are around 80% of marginal and small farmers in India with around 2 acres of land or below. Financial problems are the major concern for such farmers as conversion cost is involved in adoption of organic farming along with investments like certification cost.(Azam, M. S et al,2015).

Research has also highlighted that proper price details, market demand, and price premium are important for organic produce to get reasonable profits for organic farmers. A study on Sikkim, which has achieved 100% organic farming in India, indicated that infrastructure facilities like power, transportation, and irrigation issues are some of the major challenges to adopt organic farming. The effects of organic farming on daily lives of small farmers were also evaluated, and it was observed that training provided by the government can improve the

likelihood of adoption of organic farming. Further, the effects of social factors like support and capacity building on adoption from the communities, as well as gender-specific challenges and environmental factors, were explored.

2.1 Research Gap

The agricultural pattern in India was originally chemical-free and British rulers were the first to introduce chemicals in the Indian agricultural pattern. Sikkim is the only state which adopted 100% organic farming in India. Over 11.8 lakh hectares of land, i.e., only 0.7% is being utilised for organic farming these days. Despite having various benefits of organic consumables, adopting organic farming is still challenging for Indian farmers. Hence, this study fills this gap by focusing on organic farming in the Indian context.

2.2 Research Question

- What are the "factors affecting adoption of organic farming in India"?
- What are the challenges and solutions for small-scale farmers for adopting organic farming in India?

2.3 Research Objectives

- To conduct empirical analysis on the role of "several factors affecting adoption of organic farming"
- To examine the challenges and solutions for "small scale farmers to adopt organic farming in India"

3. Research Methodology

3.1 Research Method & Design

In order to address the above research objectives, this study is based on mixed methodology design which is emerging in various areas. In this method, both quantitative and qualitative data will be collected to serve the research purpose. The research sample consists of all small, marginal, and large-scale farmers in India to analyse the factors affecting them from adopting organic farming.

3.2 Research Approach

IBM SPSS 20.0 software will be used to interpret survey data collected through self-structured questionnaires. In addition, secondary data would be collected from recent and previous studies on organic farming that are published in peer-reviewed journals and databases like Scopus, ScienceDirect, Google Scholar, etc.

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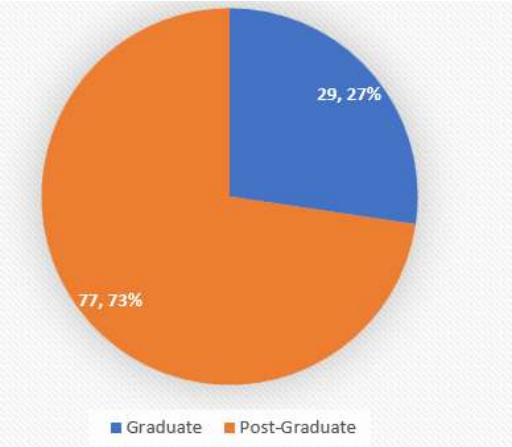
4. Analysis of Study

In this survey, a total of 106 responses were collected from organic farmers. When it comes to education level, the majority (72.6%) farmers were post-graduate and 29 farmers (27.4%) were graduates (Table 1) (Figure 1).

Table 1 - Education Level

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Graduate	29	27.4	27.4	27.4
	Post-Graduate	77	72.6	72.6	100.0
	Total	106	100.0	100.0	

Figure 1 – Education Level of Participants



In this study, 43 (40.6%) participants were small-scale farmers, 38 (35.6%) were medium-scale farmers and 25 (23.6%) were large-scale farmers (Table 2) (Figure 2).

Table 2 - Scale of farming

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Large-scale farmers	25	23.6	23.6	23.6
	Moderate	38	35.8	35.8	59.4

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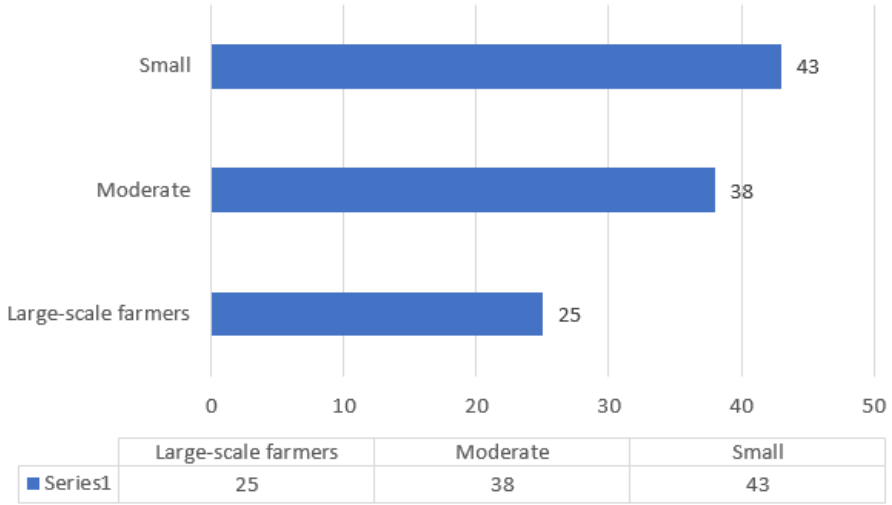
	Small	43	40.6	40.6	100.0
	Total	106	100.0	100.0	

Figure 2 – Scale of Farming



Majority of farmers, i.e., 77 (72.6%) have average experience in farming, while 29 (27.4%) farmers have less experience in farming (Table 3) (Figure 3).

Table 3 - Experience in farming

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Average	77	72.6	72.6	72.6
	Less experience	29	27.4	27.4	100.0
	Total	106	100.0	100.0	

Figure 3 – Experience in farming

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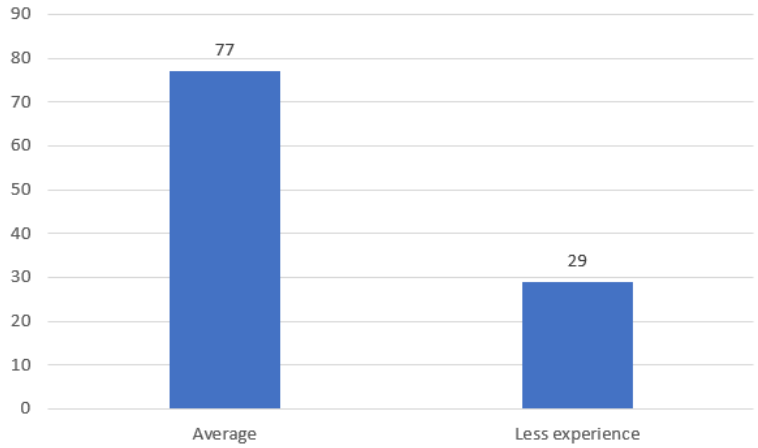
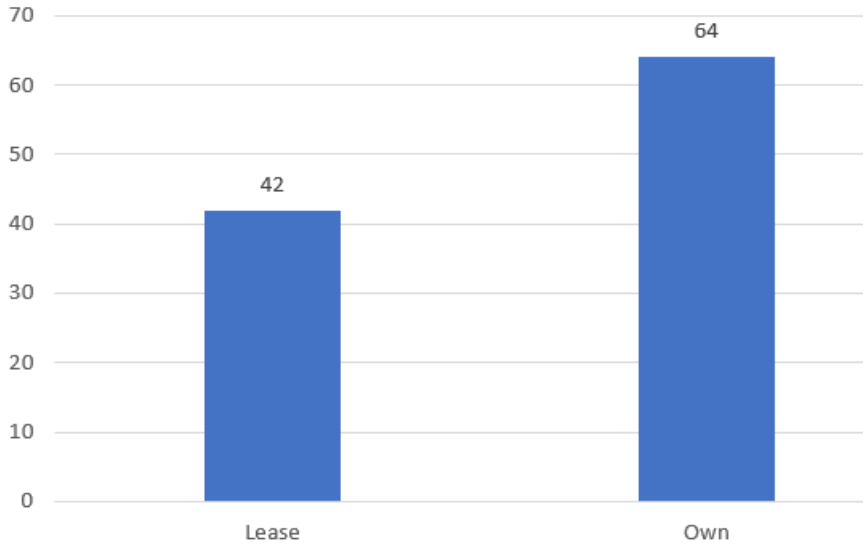


In this study, 64 (60.4%) farmers have their own farmland while 42 (39.6%) farmers have their farmlands on lease (Table 4) (Figure 4).

Table 4 - Type of farmland

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Lease	42	39.6	39.6	39.6
	Own	64	60.4	60.4	100.0
	Total	106	100.0	100.0	

Figure 4 – Type of Farmland



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To evaluate the reliability of all the variables and ensure the consistency of scales, reliability analysis was performed using SPSS, and the Cronbach Alpha value was evaluated considering 0.70 as the acceptable cut-off value. The Cronbach α value for all 22 items was 0.719, which is significantly good (Table 5).

Table 5 - Reliability Statistics

Cronbach's Alpha	N of Items
.719	22

4.1. Role of Several "Factors Affecting Adoption of Organic Farming"

In order to fulfil the first objective, "factors affecting adoption of organic farming" were analysed. Five factors were identified through the questionnaire, i.e., "economic, social, cultivation, marketing, and government policy". All of these factors have a total of 22 variables which have been "ranked on the basis of Mean and SD" of available responses from 1 to 10 to know the most influencing factors (Table 6).

Table 6 – Factors and variables affecting Adoption of Organic Farming

Factors	**Mean**	**SD**	**Rank**
Economic			
Price Premium	4.28	0.802	*7*
High production/yield	4.08	0.739	*9*
Low Input Cost	2.79	1.093	
Less Overall Risk	1.62	1.117	
Low Overall Profitability	4.03	0.762	*10*
Social			
Food Quality	4.92	0.265	*2*
Chemical-free	4.79	0.672	*3*
Health Benefits	5.00	0.000	*1*
Environment	5.00	0.000	*1*

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Collective Farming	4.36	0.482	*5*
Cultivation			
Soil Fertility	5.00	0.000	*1*
Less Manpower	3.23	1.181	
Easy availability of inputs	3.85	1.678	
Less irrigation	3.08	1.220	
Marketing			
Lack of Awareness	4.24	0.578	*8*
Certification benefits	4.30	0.917	*6*
Assured Demand	3.60	1.160	
Lack of warehousing	3.95	0.785	
Govt. Policy			
Loan/Credit facilities	3.34	1.379	
Conversion Compensation	3.12	1.278	
Training and Tools	3.15	1.554	
Fertiliser/Manure subsidy	4.58	0.894	*4*

It is observed that the mean score for soil fertility, health benefits, and environment is the highest among all variables, as many farmers agreed that organic farming improves soil fertility, provides health benefits, and is good for the environment. Increasing awareness of health and environmental benefits of organic farming has improved the overall demand for organic produce across the world, and these have been key factors encouraging farmers to choose organic farming. In addition, farmers also adopted organic farming because of improved food quality (4.92), chemical-free production (4.79), manure/fertiliser subsidy from the government (4.58), and the concept of collective farming (4.36).

A survey revealed that there were financial reasons behind the adoption of organic farming, as many farmers wanted to convert their farmlands for economic benefits. In this study, price premium (4.28) achieved the highest score in terms of economic benefits. Moreover, there was a noticeable gap in government support for organic farming, as only fertiliser/manure subsidy scored highest, while loan/credit facilities (3.34), conversion compensation (3.12), and training and tools (3.15) were not even ranked significantly.

Table 7 – Key factors influencing organic farming

Factors	Mean	SD	Rank	Key Variables
Social	24.07	0.699	1	Food Quality
Economic	16.80	1.424	2	Price Premium
Marketing	16.09	2.04	3	Certification benefits
Cultivation	15.16	3.286	4	Soil Fertility
Govt. Policy	14.19	3.981	5	Fertiliser/Manure subsidy

Furthermore, five key factors have been analysed and ranked as per their "Mean value to know the least and most important factors affecting the adoption of organic farming". It is observed that social (24.07) was the most important factor followed by economics and marketing for acceptance of organic farming. Food quality has been found to be the most important indicator among all the variables which lead to organic farming adoption (Table 7).

4.2. Challenges And Solutions for "Small Scale Farmers to Adopt Organic Farming"

Irrespective of the numerous benefits of organic farming and organic produce, its acceptance still covers only a small portion of the total agricultural land globally. In India, organic farming accounts for only 0.7% of total arable land, raising serious concerns about policymaking and farmers' interest in this sector. Agricultural policies in many countries are increasingly shifting towards eco-friendly practices, and farmers are being encouraged to adopt organic farming with various financial incentives and conversion subsidies. Typically, it takes at least three years to convert traditional farming practices into organic methods, during which overall production declines significantly, affecting profitability. To mitigate this, governments often provide conversion subsidies to promote organic farming.

Both economic and non-economic factors play a vital role in the adoption of organic farming. Economic factors such as financial security, profitability, price premiums, and market demand remain the most critical, as the economic environment for organic farming is often less secure than for traditional methods. Some studies have noted that long-term organic farmers, especially those practicing proper crop rotation, achieve higher profitability than conventional farmers, even without price premiums. However, adoption is not solely driven

by financial concerns; farmers' lifestyle choices, attitudes, objectives, and social values also influence their decisions. Risk-taking farmers, motivated by environmental protection and local job creation, are more inclined towards recommending organic practices. Environmental concerns, chemical-free produce, health benefits, social responsibility, and improved food quality are among the non-economic motivators driving adoption.

In India, over 80% of farmers are marginal and smallholders with landholdings below two acres. For these farmers, financial barriers such as conversion costs, certification expenses, and infrastructure deficits—particularly in irrigation, electricity, and transportation—pose significant obstacles. Profitability in organic farming, therefore, depends on clear price structures, consistent demand, and fair market premiums. At present, Sikkim remains the only Indian state to have achieved 100% organic production, serving as a model for the rest of the country. The success of organic farming in similar contexts relies heavily on supportive government policies, training initiatives, and infrastructure development. Moreover, social factors such as community support and capacity building further strengthen the adoption of organic farming, helping farmers overcome challenges and improving their livelihoods.

5. Results

Sustainable lifestyle and economic benefits for farmers have been the major concerns associated with organic farming. The adoption of organic farming largely depends on supportive government policies. It is important for the government to encourage farmers through conversion schemes, as it generally takes up to three years to achieve complete organic production and profitability. Emphasis should also be placed on highlighting the environmental benefits of organic farming while ensuring that farmers are motivated to adopt these practices for both ecological and financial gains.

A lack of access to credit and loan facilities remains one of the key challenges for farmers, alongside inadequate government support, which continues to act as a roadblock to widespread adoption. Social, economic, and marketing factors are among the most significant drivers of organic farming adoption, and government efforts must focus on addressing these through targeted schemes. Establishing separate markets for organic produce and promoting awareness through different media channels would further encourage farmers to adopt organic practices. In India, a large proportion of farmers are still small and marginal producers with limited incomes, making them heavily reliant on government schemes for

sustaining their agricultural activities. Therefore, this study underscores the need for government bodies, policymakers, and associated organizations to enhance support and interventions for small-scale farmers who either own minimal landholdings or no land at all. Increased awareness campaigns, coupled with structured training programs, would play a vital role in equipping less-experienced and new farmers with the necessary knowledge of social, economic, and marketing dimensions, ultimately fostering a more inclusive and sustainable organic farming sector.

6. Conclusion

In a nutshell, adoption and promotion of organic farming is not that simple without proper government support as a lot of farmers are still marginal and small and illiteracy is a major concern for the agriculture industry. Proper training, certification, awareness program, individual organic produce market, organic input availability, collective farming, and compensation for conversion are some of the encouraging factors for organic farming. In addition, profitability and productivity are very important for conversion, which varies on soil type, soil condition, proper irrigation, and climate. More R&D is needed from the government to conduct large-scale research on organic farming.

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