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ECONOMIC EFFICIENCY OF ORGANIC WHEAT AND PADDY FARMING IN MALWA REGION OF PUNJAB

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Abstract

Agricultural production and ecosystem sustainability necessitate adaptive and climate-resilient agriculture practises at the local, regional, and global scales. Such policies should be ecologically, economically, and socially acceptable, with the hope of ensuring sustainable production systems and lowering environmental impact. To examine the economic efficiency, a sample of 500 farmers selected from Malwa Region of Punjab through stratified random sampling technique. SPSS version 23 was used for statistical analysis and mean, percentage, standard deviation, regression & correlation was main statistical tools was applied. The results of study stated that the Cost & revenue of paddy per Hectare found to highest among organic farmers in Punjab. The findings of the cost of wheat cultivation per Hectare found to highest among organic farmers in Punjab.

Key words: Ecological, Economic Efficiency, Farming Scale, Organic Farming, Sustainability

1. Introduction

Numerous climate consequences develop over time slowly and gradually. As part of its inquiry into the productivity of agricultural practises, organic agriculture looks at agro ecosystems and their long-term implications. To prevent problems with soil fertility and pests, the goal is to generate food while protecting the environment. Organic farming uses a proactive approach rather than dealing with complaints as they happen. The issue of sustainable development has gained attention and generated action on a global scale for a considerable amount of time. The fundamental driver behind achieving this goal of sustainable development is sustainable farming. The goal of sustainable farming is to meet changing human requirements by choosing conservative control methods like the use of herbicides, insecticides, and fungicides, some of which may be natural, while also maintaining or improving the environment and holding onto natural resources. In order to meet the demand for food for all humanity, agriculture expansion can be maintained by safeguarding the natural resources. The socio-economic and ecological dimensions of development are included in the output, which is not simply one metric of development. Organic farming and the concept of sustainable agriculture are very similar.

The various methods of organic farming can be chosen in order to achieve the goal of sustainable agriculture. The phrase "sustainable development" is an assertion that may or may not be true depending on whether or not specific agricultural techniques would protect natural resources, increase economic returns, and increase production to meet shifting societal demands. The current agricultural system heavily relies on the usage of chemical fertilisers,

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insecticides, and herbicides, as well as labor-saving techniques and farm machinery. Production has increased as a result of the application of these inputs. However, over time, these techniques' detrimental effects have given rise to problems with soil quality, productivity, and natural resources.

The rapid changes in fertiliser and pesticide consumption are causing the soil's health to decline and the contamination of air, water, and food. The practise of organic farming is gaining relevance globally as a result of the growing concern about global environmental change since it enables you to expand a sustainable and environmentally friendly agriculture production system.

A slow transition from conventional to organic farming practises has been observed as a result of these unfavourable effects of current agriculture systems in both the short and long term. Globally, interactions between subsystems, such as those between soil, minerals, water, plants, microflora, insects, animals, and people, are fundamental to organic farming. By utilising on-farm inputs, organic farming maximises the benefits of available natural resources and upholds ecological stability.

2. Literature Review

In the United States, sustainable agriculture is one of the most critically needed projects. We are in the midst of an environmental, health, and rural economic crisis. Sustainable agriculture should be a welcoming profession because of its social importance. However, practically everyone who works in agriculture in the United States is currently unwelcoming. According to Timmerman and Felix, sustainable agriculture is one of the most critically needed projects in the United States (2015). They claim that minimising our carbon footprint, reducing air and water pollution, preserving water and energy, and improving access to nutritious food are all dependent on sustainable agriculture.

Agriculture has contributed to pollution in the environment, which has a negative impact on food security, human health, and the climate. There is a need to transition from "unclean" to "sustainable" methods. African and Asian countries require regional adjustments or intervention in agri-food practises. Agriculture was responsible for more than 40% of worldwide methane emissions (FAO, 2013).

China's maize–soybean intercropping could reduce air pollution by up to 1.5 mg m–3 and have a net economic gain of US$67 billion per year, with US$13 billion in health expenditures saved and US$15 billion in reduced air pollution. According to the United Nations, the global population will reach 9.5 billion people by 2050, double the demand for food crops. Globally, farmland development has displaced more than half of grasslands and more than 30% of forests.

According to a review, extraversion, openness to new experiences, and lifestyle farming goals are associated with greater adoption of sustainable practises. Farmers who are resistant to change and motivated by economic goals are more likely to be hesitant to adopt sustainable practises than farmers who are motivated solely by these factors. Farmers are more likely to

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adopt sustainable practises if they listen to the advice of their peers who support them and are willing to gain social status. Policy options include raising farmers' awareness of sustainable practises and framing costs and benefits to debias their perceptions.

Environmental sustainability in agriculture refers to excellent stewardship of the natural systems and resources on which farms rely. A scoping review looks at nearly 18,000 papers to see if incentive-based programmes contribute to the adoption of sustainable practises. We find that programmes that are tied to a short-term economic advantage are more likely to be adopted than those that are exclusively oriented at providing an ecological service. Adopting sustainable agricultural methods has the potential to directly contribute to several of the United Nations Sustainable Development Goals (SDGs) for 2030.

The Smallholder's Future Farming in India is critical to achieving climate resilience and agroecological sustainability. While it is necessary to improve farmer livelihoods, it is even more critical to improve the rural economy as a whole. The issue of sustainability is pushing fundamental transformation in the agri-food sector and in society. The Asia & Pacific area has the world's smallest holdings. Smallholder and marginal farmers with less than two hectares of land account for 86.2 percent of all farmers in India, while they possess just 47.3 percent of arable land. Traditional food crops have been proposed as a long-term solution for local farming systems and nutritional security. Traditional farming systems give models that support biodiversity, thrive without agrochemicals, and are environmentally friendly.

The study by Sapbamrer et al.,(2021) An Organized Model of the Factors Affecting Farmers' Adoption of Organic Agriculture Information on the following significant factors is provided by this study: (4) Aspects associated with organic agriculture (training, technology support, organic farmer neighbors, information acquisition, membership in an association, and extension contacts). By analysing the dissemination process, this study aims to improve our understanding of organic agricultural promotion. In contrast to the conventional division between adopters and non-adopters, the study offers a distinction between adopters and non-adopters that is more nuanced. Using multinomial logistic analysis, it is possible to look into factors that are unique to each group. Thus, we investigate whether changes in policy during the dissemination process affect adoption-related features.

Veisi et al. (2017), the primary drivers of organic farming are financial incentives, health and safety concerns, and environmental considerations. Veisi performed research in the Iranian provinces of Khorasan and Tehran's Damadvan area and Gonabad. To gather data, a descriptive survey research method was created. The design of the questionnaire was done using the Likert scale technique. A sample of 136 farmers, 22 certified organic apple growers, and 114 organic saffron growers were obtained from these districts using the purposive sampling technique. The data were analysed using the factor analysis method at the.45 level of significance. According to the study's findings, organic growers were primarily driven by economic and environmental factors, but there was a lack of marketing, inputs, and outside assistance.

A report was created in 2016 by Gaur Manisha to analyse organic farming in India. A secondary data-based analysis was presented in order to assess and evaluate the aspects that can make the

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adoption of organic farming in the nation easier. According to her, conventional farming is having negative consequences for farmers, while organic farming is only recently gaining ground. We can maintain ecological equilibrium by doing this. The cost of synthetic chemicals might be decreased to some extent.

3. Research Methodology

3.1 Research Question

- Is organic farming more economic viable than conventional farming?
- Is there any relation between economic efficiency and farming scale?

3.2 Objectives of the study

- To evaluate the state of organic farming in the Punjabi region that was chosen.
- To determine and compare the economic viability of organic farming with conventional farming.

3.3 Hypothesis of the study

H01: There is no difference in economic efficiency between organic farming and conventional agriculture.

Ha1: There is difference in economic efficiency between organic farming and conventional agriculture.

H02: There is no effect of farming scale on agriculture system.

Ha2: There is effect of farming scale on agriculture system.

3.4 Data sources

A sample of 500 farmers was selected though random stratified sampling from Malwa region of Punjab. A structured questionnaire was designed to collect the response. Secondary data was also used for the study. Information essential to the study has also been gathered from internet sources such the Google scientists, ResearchGate, Springer, and Wiley's online library Science website. By employing internet resources like these in the process of gathering it, it is possible to compile relevant literature for the current study.

3.5 Statistical Tools

SPSS version 23 was used and statistical tools applied to obtain findings, namely, frequency, percentages, mean, standard deviation, t test, correlation, Regression, ANOVA, EFA, and Garrett Ranking.

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4. Data Analysis

4.1 Economic Analysis of Paddy Crop

Table 4.1.1: Cost of Paddy (Per Hectare)

Cost of paddy per hectare	Inorganic Farmers	Percentage	Organic Farmers	Percentage
Minimum 30,000	6	2.89	21	7.16
30,000-45000	67	32.36	122	41.63
45000-60000	88	42.51	132	45.05
60000 and above	46	22.24	18	6.16
Total	207	100	293	100

The findings of the study analysed the Cost of paddy per Hectare (Cost of Paddy Cultivation) and stated the cost is '45000-60000' (N= 132, 45.05%) in case of organic farmers and '45000-60000' (N= 88, 42.41%) in case of in organic farmers followed by '30,000-45000' (N= 122, 41.63%) in case of organic farmers and also '30,000-45000' (N= 67, 32.36%) in case of inorganic farmers. The cost of paddy per hectare found to be least in '60000 and above' (N= 18, 6.16%) in case of organic farmers and 'Minimum 30000' (N=6, 2.89%) in case of inorganic farmers. Therefore, the findings of the Cost of paddy per Hectare found to highest among organic farmers in Punjab.

Table 4.1.2: Revenue Paddy (Per Hectare)

Revenue Paddy (Per Hectare)	INORGANIC FARMERS	Percentage	ORGANIC FARMERS	Percentage
Less than 60,000	4	1.93	29	9.89
60,000-80,000	17	8.21	75	59.05
80,000-120,000	88	42.51	127	43.34
120,000 above	98	47.34	62	21.16
TOTAL	207		293	

Table 4.1.2, The findings of the study analysed the Revenue Paddy Per Hectare and stated the cost is '80000-1200000' (N= 127, 43.34%) in case of organic farmers and '120000 and above' (N= 98, 47.34%) in case of in organic farmers followed by '60000-80000' (N=75, 59.05%) in case of organic farmers and '80000-120000' (N= 88, 42.51%) in case of inorganic farmers. The Revenue Paddy per hectare found to be least in 'less than 60000' (N= 29, 9.89%) in case of organic farmers and 'less than 60000' (N=4, 1.93%) in case of inorganic farmers. Therefore, the findings of the Revenue of paddy per Hectare found to highest among organic farmers in Punjab.

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4.2 Economic Analysis of Wheat Crop

Table 4. 2.1: Cost of Wheat Cultivation

Cost Of Wheat Cultivation				
Cost Of Wheat (Per Hectare)	**Inorganic Farmers**	**Percentage**	**Organic Farmers**	**Inorganic Farmers**
Less than 30,000	10	4.83	16	5.46
30,000-45,000	74	35.74	152	51.87
45,000-60,000	101	48.79	95	32.42
60,000 above	22	10.62	30	10.23
TOTAL	207		293	

Table 4.2.1, The findings of the study analysed the cost of wheat cultivation per hectare and stated the cost is '30000-45000' (N= 152, 51.87%) in case of organic farmers and '45000-60000' (N= 101, 48.79%) in case of inorganic farmers followed by '45000-60000' (N= 95, 32.42%) in case of organic farmers and '30000-45000' (N= 74, 35.74%) in case of inorganic farmers. The cost of wheat cultivation per hectare found to be least in 'less than 30000' (N= 16, 5.46%) in case of organic farmers and 'less than 30000' (N=10, 4.83%) in case of inorganic farmers. Therefore, the findings of the cost of wheat cultivation per Hectare found to highest among organic farmers in Punjab.

Table 4.2.2: Revenue Wheat (Per Hectare)

Revenue Wheat (Per Hectare)	**Inorganic Farmers**	**Percentage**	**Organic Farmers**	**Percentage**
Less than 60,000	7	3.38	11	3.75
60,000-80,000	21	10.14	79	26.96
80,000-120,000	119	57.48	102	34.81
120,000 above	60	28.98	101	34.47
TOTAL	207		293	

The findings of the study analysed the Revenue Wheat per hectare and stated the cost is '80000-120000' (N= 102, 34.81%) in case of organic farmers and 80000-120000' (N= 119, 57.48%) in case of inorganic farmers followed by '120000 above' (N= 101, 34.47%) in case of organic farmers and '120000 above' (N= 60, 28.98%) in case of inorganic farmers. The Revenue Wheat per hectare found to be least in 'less than 60000' (N= 11, 3.75%) in case of organic farmers and 'less than 60000' (N=7, 3.38%) in case of inorganic farmers. Therefore, the findings of the Revenue Wheat per hectare found to highest among inorganic farmers in Punjab.

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Hypothesis Testing Outcome:

By applying t test the findings of the study stated that status of economic efficiency between organic farming and conventional agriculture in Punjab. Therefore, null hypothesis which is there is no difference in economic efficiency between organic farming and conventional agriculture is rejected and alternative hypothesis which is there is difference in economic efficiency between organic farming and conventional agriculture is accepted.

4.3 Effect of Farming Scale

4.3.1 Effect of Farming Scale

Effect of Scale of Farming on the return of a farm								
	Conventional Farming				Organic Farming			
	Frequency	Percent	Valid Percent	Cumulative Percent	Frequency	Percent	Valid Percent	Cumulative Percent
Strongly Agree	60	28.98	28.98	28.98	86	29.35	29.35	29.35
Agree	91	43.96	43.96	72.94	45	15.35	15.35	44.70
Neutral	23	11.11	11.11	84.05	71	24.23	24.23	68.93
Disagree	19	9.17	9.17	93.24	42	14.35	14.35	83.28
Strongly Disagree	14	6.76	6.76	100	49	16.72	16.72	100
Total	207	100	100		293	100	100	

The percentage and frequency analysis on effect of Scale of farming on the return of a farm stated that majority of farmers in case of conventional farming effect of Scale of farming on the return of a farming by respondents is as ‘Agree’ (N=91, 43.96%) and in case of organic farming is ‘Strongly Agree’ (N=86, 29.35%).

Descriptive statistics (Effect of Scale of Farming on the return of a farm)										
	Conventional Farming					Organic Farming				
	N	Minimum	Maximum	Mean	Std. Deviation	N	Minimum	Maximum	Mean	Std. Deviation
Strongly Agree	207	1	5	4.20	.989	293	1	5	4.24	.988
Agree	207	1	5	4.21	.988	293	1	5	4.23	.991
Neutral	207	1	5	4.13	.992	293	1	5	4.12	.995
Disagree	207	1	5	4.13	.992	293	1	5	4.10	.996
Strongly Disagree	207	1	5	4.09	.993	293	1	5	4.04	.997
Valid N (list wise)	207					293				

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Hypothesis Testing:

By applying descriptive Analysis, the findings of the study stated that effect of farming scale on agriculture system among farmers in Punjab is improving. Therefore, null hypothesis which is there is no effect of farming scale on agriculture system is rejected and alternative hypothesis which is there is effect of farming scale on agriculture system is accepted.

Conclusions:

Given the current state of the environment, which includes air, water, and land pollution as well as a decline in biodiversity and other ecosystem services, it is difficult for a green revolution to succeed. There needs to be a big and quick change in the nation's farming practises and agricultural systems. Because of this, organic farming is the only viable and effective method for resolving these pressing problems. Society as a whole benefits from the reduction in pollution and other associated issues brought about by organic farming. Organic farming needs to be both ecologically and economically viable in order to be more generally accepted, to safeguard livelihoods, and to ensure consumer affordability at the end of the supply chain. As per data analysis results of the study stated that cost of wheat & paddy cultivation is high in organic farming and revenue from wheat productions is high in inorganic farming. In case of paddy, revenue is high in paddy production. A national and state organic strategy that is efficient and focused on results is required given the current situation. A national and state organic strategy that is efficient and focused on results is required given the current situation.

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