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Economics of Organic Versus Traditional Farming: A Comparative Analysis with Special Reference to Nanded District

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Abstract: *Organic farming or natural farming is becoming an imperative necessity of every economy to maintain the health of the people. Every farmer needs to adopt sustainable farming, which is possible when they adopt organic or natural farming. The study addressed various factors that differentiate organic farming and chemical farming. The findings of the study reveal the cost and profitability difference between organic and chemical farming. Although the yield was generated at the beginning stage, the farmers reported a satisfactory production level along with an improvement in soil health. The farmers also reported that they could generate a satisfactory level of income. The study determined that organic farming can serve as a sustainable and economically viable farming method other than traditional or chemical farming. The results suggest that the market availability, fair price, training for awareness, and technical and financial support can promote farmers to adopt organic or natural farming, which contributes to sustainable agriculture development.*

Keywords: Sustainable Agriculture, natural farming, chemical farming,

I. INTRODUCTION

Organic farming is an agricultural system that uses or employs the natural processes without us of synthetic chemicals or pesticides. The methods used to crop and raise livestock help protect the environment. It also maintains the soil fertility and avoids harmful pesticides or fertilizers. It ensures sustainable and environmentally friendly chemical-free production of agricultural produce. It maintains the health of soil, plants, animals, and humans.

The study aims to conduct a comparative analysis of organic farming and traditional or chemical farming to reveal the factors that significantly make organic farming different and more positive farming methods. The study can determine how organic farming not only provides the yield, but it also reduces the input, such as chemicals, pesticides, and the like. The study can explore the farmers' perspectives.

The study has conducted the interview of the farmers or respondents with standardized, structured, and non-structured questionnaire. This questionnaire has collected the farmers' experiences about the successful implementation of organic or natural farming and how it is significantly different than chemical farming. The comparative analysis of organic and chemical farming and justify how organic farming is a profitable alternative to conventional farming methods. Organic farming is cost-effective and enhances the farmer's capability to generate higher income than other farming methods. Organic farming provides ecological and societal benefits that have been acknowledged, and many farmers and professionals have accepted.

Organic farming is emerged as the imperative necessity of society to provide healthy food. The consumers, farmers, and authorities are aware of the importance of organic farming to produce healthy food, but fail to implement it successfully through the economic system of the nation. Many factors are responsible for avoiding and adopting

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organic farming methods. A few of the farmers have taken the initiative towards organic farming methods. Some of them have faced many challenges, whereas some have received better results from organic farming methods.

The study collected the information of results obtained by the farmers who have been practicing organic or natural farming for many years, along with traditional or chemical farming. Many farmers have been presented with their experience of natural or organic farming methods as well as chemical or traditional farming methods. Farmers themselves have been realizing how organic farming or natural farming can influence their overall profitability by reducing the input cost to negligible. The study addresses the various aspects of organic farming that can be a successful business model through the implementation of the concerned methods. The study has taken a sample of the farmers who have gone through the experiences of organic farming practices. These farmers explored the actual challenges they faced during the implementation of organic farming methods and value chain execution.

II. REVIEW OF LITERATURE

The book "Organic Agriculture" is written and published by the Directorate of Extension Education, G.B. Pant University of Agriculture & Technology, Pantnagar (Uttarakhand), and National Institute of Agricultural Extension Management (MANAGE), Hyderabad. The book is edited by Dr. B. D. Singh and Dr. P.L. Manohari. The book focuses on workers, students, research scholars, and academicians in the field of agriculture and various allied sectors to make them more educated towards organic farming.

The Book "Organic Farming" (concept scenario, principles and practices) was published by the National Centre of Organic Farming under the guidance of Dr. Kishan Chandra and T. K. Ghosh, compiled by Dr. A. K. Shukla, Dr. Shahina Tabassum, Dr. Rashmi Singh, and Dr. V. Praveen Kumar. This book describes the principles of organic farming in the context of all the necessary practices. The book described how integrated farming can be implemented with organic farming practices. It explores various forms of organic management, such as Rishi Krishi, Panchagavya Krishi Homa farming, etc., which help the farmers to ensure excellence in the implementation of organic farming.

The research article titled " Economic Impact of Organic Agriculture: Evidence from a Pan-India Survey" presented by A. A. Reddy, Indrek Melts, Geetha Mohan, Ch Radhika Rani, Vaishnavi Pawar, Vikas Sing, Manesh Choubey, Trupti Vashistha, A Suresh, and Madhusudan Bhattarai focused specifically on the implementation of the Government program Paramparagat Kaushalya Vikas Yojana PKVY. This program contributed significantly to the increase in certified organic farming. The study has focused on various prospects of implementing the Paramparagar Kaushlya Vikas Yojana PKVY. The study presented the difference in difference regression result, which describes a comparison between conventional farming and organic farming in numbers. The study has taken wheat, soybean, and paddy to compare the cost and profitability between conventional farming practices and organic farming practices. This study focused on how marginal cost and marginal profit are influenced by organic farming practices and how they can be profitable.

The Research of Arvind Pratap Singh titled "Study On Awareness, Adoption Extent And Attitude Towards Organic Farming Among The Farmers In Eastern Uttar Pradesh" (2010) explores the sources of awareness about organic farming along with various perspectives of their attitude towards organic farming practices. The study says the farmers have less trust in organic farming. As per the study, the farmers agree on the provision of an organized training program and demonstration for the technical knowledge of organic farming.

The Research Work by Somya T. M. in the study "A Study on Farmers' Behavioural Changes in the Transitional Period Towards Organic Farming in Karnataka" revealed that the irrigated farmers have moderate, 32 percent show a greater extent, and 31 percent show a lower extent of their behavioural change towards organic farming practices. The study found that the age, experience of farming, extension contact, land holding, extension participation, organic practices followed, organizational participation, and training significantly contributed to the changes in behavior of farmers toward organic farming. Also, these factors have a positive relationship with the behavioral change of farmers towards organic farming. The study found that the transportation cost and labour cost are the major problems the farmers have faced during the transition.

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III. RESEARCH METHODOLOGY

The study is based mostly on the primary data collected through the structured and non-structured interviews of farmers or respondents. The standardized questionnaire was used to conduct the interview with farmers. The study has collected data from government officers, also about the current status of the farmers who have been practicing organic, chemical, or traditional farming.

3.1 Problem Definition

Farmers are adopting the organic or natural farming methods only when successful farmers practice close management and can generate more profit. The technical and financial support via government policy can play a vital role. The study compared how organic farming or natural farming is more sustainable and profitable than chemical or traditional farming.

3.2 Objectives of the Study:

To study the cost of generating yield with organic farming and chemical farming
To study the overall profitability of organic and chemical farming

3.3 Hypothesis

Null: There is no significant difference between organic farming and traditional or chemical farming.
Alternative: There is a significant difference between organic farming and traditional or chemical farming

3.4 Sample Size

According to the Cochran's formula, the calculated necessary sample size is 384..16, which is approximately taken as 385. Hence, the research study has taken 385 respondents as the sample size.

3.5 Profile of Sample Size:

The sample of 385 includes 300 farmers, 50 consumers, and 35 distributors or retailers. These respondents have provided the necessary information regarding the demand and supply of organically cultivated vegetables, fruits, and cereals.

3.6 Sampling methods used:

Stratified sampling method: The study utilized the stratified sampling method to collect the necessary and sufficient data. Different strata were made to collect the data as follows

Based on the type of farming:
Farmers who practice Organic farming on full-size land
Farmers who practice organic farming on partial land
Farmers who are aware but yet to start practicing

Based on the Size of Farm:
less than 5 acres, 5 to 10 acres, more than 10 acres

Based on socioeconomic factors:
Literacy level, financial status
Based on the location or Geographical area
Different talukas of the district are categorized as strata

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Snowball Sampling Method

As the specified list is not available, which indicates or displays the number of farmers who have been practicing organic farming, the study has used references through which potential respondents or farmers had been addressed and interacted with to get appropriate data.

IV. DATA ANALYSIS AND INTERPRETATION

4.1 Cost comparison between organic farming and traditional farming

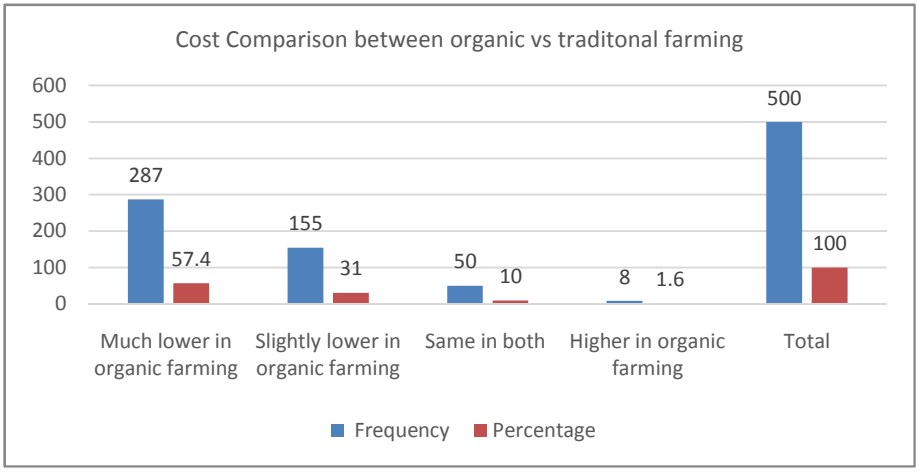
The input cost of organic farming is much less than that of traditional farming. The following table 1.1 describes the farmers' opinion based on their experience about the input cost in organic versus traditional farming. The study found that natural farming can be organic farming, which needs zero input cost as it enables farmers to produce all the necessary inputs in the farm itself using available resources.

Table 1.1 Cost Comparison between organic and traditional farming

Response	Frequency	Percentage
Much lower in organic farming	287	57.4
Slightly lower in organic farming	155	31
Same in both	50	10
Higher in organic farming	8	1.6
Total	**500**	**100**

Source: Field Survey

Chart 1.1 Cost Comparison between organic and traditional farming



Source: Field Survey

Table 1.1 and chart 1.1 illustrate the number of respondents or farmers who have experienced the input cost between organic farming and traditional farming. 287 farmers, which is 57.4 percent of the total sample size, have responded that the input cost of organic farming is much lower than that of traditional farming, as its inputs can be created in the farm itself. 155 farmers, which is 31 percent of total respondents, have experienced that the input cost of organic farming is slightly lower than that of traditional farming. Some farmers, about 50 farmers, said there is no significant

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difference between organic farming and traditional farming. Very few, about 8 farmers, said that the input cost of organic farming may be higher. But these farmers have failed to successfully implement organic farming. Actually, these farmers do not have the necessary knowledge about organic farming methods due to which failed to implement it successfully.

4.2 Comparison of the yield generated by organic vs. traditional farming

The yield or the productivity of the organic farming and traditional farming plays a vital role to be continue with the farming method. Table 1.2 and Chart 1.2 illustrate the number of farmers who could generate a higher yield with organic and traditional farming methods.

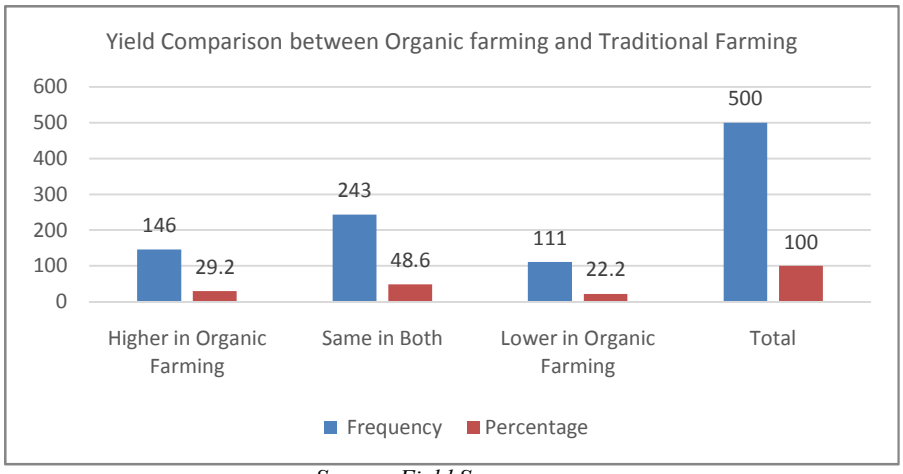
The table and Chart 1.2 describe the 243 farmers, who are 48.6 percent of the total sample, and say they could generate high yields in both the organic farming and traditional farming methods. 146 farmers' opinion is towards organic farming to generate more yield, with a percentage of 29.2 of total respondents. 22.2 percent of the total respondnets near about 111 farmers, opinion is negative about organic farming. They said organic farming produces lower yields compared to traditional farming. Actually, such farmers are unable to implement the organic farming methods properly and effectively. The study found that the farmers who are trained and aware of the organic farming methods or natural farming methods could generate more yield.

Table 1.2: Yield comparison between Organic and Traditional farming

Response	**Frequency**	**Percentage**
Higher in Organic Farming	146	29.2
Same in Both	243	48.6
Lower in Organic Farming	111	22.2
Total	**500**	**100**

Source: Field Survey

Chart 1.2: Yield comparison between Organic and Traditional farming



Source: Field Survey

4.3 Overall Profitability of Organic Farming vs. Traditional Farming

The total profitability of a farming method is based on things like the cost of inputs, the market price, and the amount of yield it produces. It talks about the general views of the farming approach, which show the best way to farm.

Table 1.3 and chart 1.3 illustrate the number of respondents or farmers whose opinion is more positive towards the organic, natural, or traditional farming methods. The study found that 185 farmers who have been implementing natural farming methods presented their opinions. They said natural farming is the most profitable farming method. Actually,

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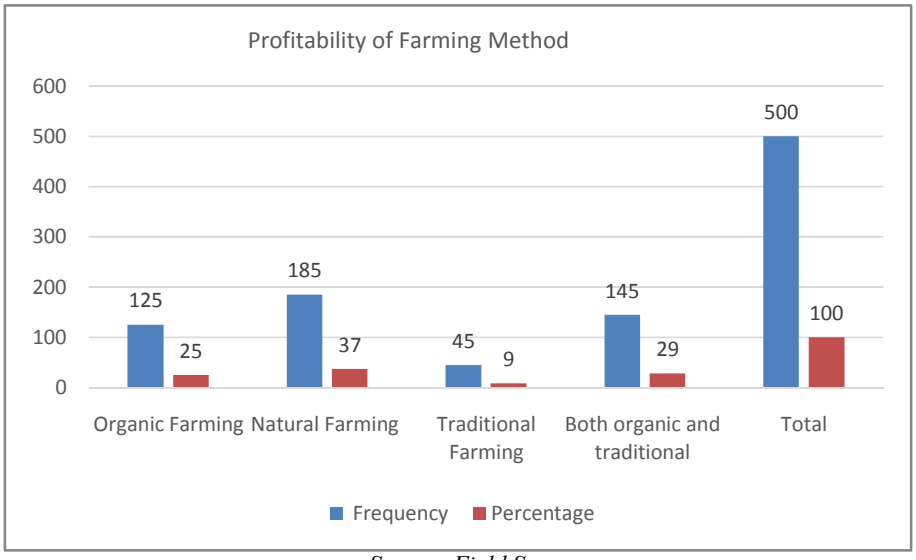
natural farming can be termed as organic farming only when no inputs from the market are used. 125 farmers, which is 25 percent of the total respondents, have preferred organic farming as the most profitable farming method. 25 farmers, which his 9 percent of the total respondents, were towards traditional farming methods about averall profitable farming method. 145 farmers who have been implementing both farming methods shared their opinions on both farming methods.

Table 1.3: Overall Profit Comparison between Organic and Traditional Farming

Response	**Frequency**	**Percentage**
Organic Farming	125	25
Natural Farming	185	37
Traditional Farming	45	9
Both organic and traditional	145	29
Total	**500**	**100**

Source: Field Survey

Chart 1.3: Overall Profit Comparison between Organic and Traditional Farming



Source: Field Survey

Table 1.3 and chart 1.3 illustrated the farmers' experiences on which farming method is most profitable from the perspectives of all factors. That is why some farmers said a specific farming method is the most profitable method described in the table and chart.

The research indicated that natural farming constitutes organic farming solely in the absence of market inputs. Then, the responses of 125 farmers who support organic farming and 185 farmers who support 125 farmers can be combined to show which agricultural technique is the most profitable overall. So, 62 percent of the total respondents (37 percent who were in favour of natural farming and 25 percent who were in favour of organic farming) were in favour of one of the two types of farming. These people think that organic farming is more profitable than standard farming methods.

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4.4 Hypothesis Test Calculations

4.4.1 Suitability of the Chi-Square Test for Independence

The Chi-square Test for Independence is the correct method as here are the measurements or investigation of the relationship between two categorical variables. The following are the categorical variables used in this hypothesis test. The Test for Independence is appropriate as it is used to determine if the distribution of one variable(Yield) is contingent upon another variable, that is, Farming Method.

1**. Independent Variable**: Farming method (Organic vs. Traditional)

2**. Dependent Variable:** Yield Level (High, Moderate, Low)

Conversely, the above hypothesis test investigates to see if yield depends on the type of farming, and independence is the mathematically appropriate method or framework.

In this test, the 2 X 3 contingency table is used. When the data requires a cross-tabulation of two different classifications, it defaults to the Test for independence.

Table 1.4 illustrates the observed frequencies of responses about the yield difference between the traditional pattern of cultivation and the organic pattern of cultivation.

Table 1.4 describes how much yield is generated through the organic pattern of cultivation and how much from the traditional pattern of cultivation. Most respondents are producing a moderate level of yield through the organic pattern of cultivation, whereas very few farmers reported high yields produced through the organic pattern of cultivation.

It has also been observed that the maximum, that is, 280 farmers, said that the traditional method gives a moderate level of yield, and very few farmers said low yield. In the case of organic yield, also, very few farmers said high yield and

Table 1.4 Contingency Table (Observed Frequencies)

Farming Method	High Yield	Moderate Yield	Low Yield	Row Totals
Organic (Q1)	50	280	170	**500**
Traditional (Q2)	100	340	60	**500**
Column Totals	**150**	**620**	**230**	**1000**

Source: Field Survey

Table 1.5 Expected Frequencies

Farming Method	High Yield	Moderate Yield	Low Yield	Row Total
Organic (Q1)	75	310	115	**500**
Traditional (Q2)	75	310	115	**500**
Column Total	**150**	**620**	**230**	**1000**

Source: Field Survey

Table 1.6 Chi-Square Test Calculations

Category	O	E	(O−E)	$(O-E)^2$	$(O-E)^2/E$
Organic High	50	75	-25	625	8.3333333
Organic Moderate	280	310	-30	900	2.9032258
Organic Low	170	115	55	3025	26.304348
Traditional High	100	75	25	625	8.3333333
Traditional Moderate	340	310	30	900	2.9032258
Traditional Low	60	115	-55	3025	26.304348
X^2					75.081814

Source: Field Survey

The Value of Chi-Square obtained from the chi-square formula is

$X^2 = 75.08$

Degree of freedom is df = (2-1) (3-1) = 2

The critical value for df = 2 and at a 0.5 significance level is 5.991

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Hence, the value of Chi Square $X^2 > 5.991$

75.08 > 5.991

Since the calculated value is greater than the critical or table value, we reject the null hypothesis and accept the alternative hypothesis that there is a significant difference between the traditional pattern of cultivation and the organic pattern of cultivation.

V. FINDING AND CONCLUSION

5.1 Findings

1. The study observed that 287 farmers or respondents experienced that organic farming or natural farming has a lower cost than traditional farming. 155 farmers or respondents have realized that the cost of organic farming is slightly lower than that of traditional farming. 50 farmers said there was no difference in the cost of both traditional and organic farming. Very few farmers, that is, 8 farmers, have somewhat different opinions due to the recent practice of organic farming and a lack of more awareness. These 8 respondents said that organic farming has a higher cost than traditional farming.

2. It has been observed that, from the research work, 125 farmers or respondents said that organic farming can give more overall profit than traditional farming. The new factor the study has addressed is the adoption of natural farming. Many farmers who have experience of organic farming have shifted to natural farming due to low or zero input costs. 185 farmers or respondents have said that natural farming gives more overall profit than traditional and organic farming, too. Very few, that is, 45 farmers or respondents, said that traditional farming gives more overall profit. 145 farmers or respondents said both organic and traditional farming can give more overall profit.

5.2 Conclusion

The study addressed the farmers' experience of practicing both traditional and organic farming. It has been observed that most of the farmers strongly agree with the major difference between the yield generated and the profitability of organic farming, natural farming, traditional farming, and chemical farming. Some farmers who have successfully implemented organic farming say that organic or natural farming is the most profitable method, which reduces the cost almost to negligible. Hence, the study says there is a significant difference between organic farming and chemical farming in the Nanded District.

The majority of the farmers were agree on organic farming can give significantly more profit than traditional or chemical farming by reducing the input cost. It has also been observed that such farmers have been providing valuable guidance and training to other farmers who are under the FPO. Specifically, the study reveals the name of such a farmer, Mr. Vishwanath Holge(Village: Dapshed, Sonkhed), who, under Arya farming, is providing training about organic or natural farming to demonstrate to farmers how organic and traditional farming are different and how organic farming or natural farming can reduce the input cost and enhance the overall profitability.

Although the organic farming at the beginning gives lower yield, not for all, but in some cases, its low dependency on chemicals and pesticides enables them to reduce the input cost significantly. Reduction in input cost contributes to the overall profitability. The study has determined that most of the farmers who practice organic farming have also started practicing natural farming, which prevents them from using input factors such as pesticides, manure, and the like. They could save more costs by avoiding the purchase of these factors from the market. Instead of buying it from the market, they prefer to create in the farm and reduce the cost, which contributes to better overall profitability.

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the interview conducted for the purpose of this study. I am grateful to my family members and friends for their moral support.

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