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Research Article

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The Economics of Organic Agriculture: A Comparison with Conventional Agriculture in Terms of Costs, Returns, and Prices

Haifa Malik Ali Al-Luohaiby
College Kirkuk,Northem Technical University Kirkuk,36001- Iraq

INTRODUCTION

The agriculture sector has been undergoing rapid changes in the last few decades due to the environmental, economic and social problems. This has given rise to an increasing interest in the development of sustainable agricultural systems that can meet food security needs and maintain natural resources for future generations. Organic agriculture has become one of the most important modern agricultural systems based on the rational use of natural resources, the reduction of the use of chemical fertilizers and pesticides and the increase of soil fertility and biodiversity, which has resulted in a balance between the economic, environmental, and social aspects of agricultural development in this context. This way of farming is a part of contemporary agricultural policies in many countries around the world, thanks to its rising popularity due to consumer awareness for health and nutrition, as well as the growing demand for organic products in the international market.

Despite the environmental and health advantages of organic agriculture, there are still a number of economic constraints to its implementation: high cost of some inputs, lower productivity at conversion, certification requirements, and lack of market outlets in some countries. Conventional agriculture, on the other hand, is carried out by extensive use of chemical fertilizers, pesticides and agriculture mechanization that can attain high level of productivity. This strategy, however, has long-term environmental, health and economic implications, such as decreased soil fertility, increased production costs, and increased environmental hazards related to pollution and natural resource depletion.

The economic comparison of organic and conventional agriculture has been gaining increasing interest in the economic and agricultural literature, due to the questions it poses about the ability of both management systems to make efficient use of agricultural resources and ensure optimum economic returns for the farmer. The efficiency measurement of an agricultural system is not only based on production volume, but also on other measures, such as the cost structure, revenues, net profit, benefit–cost ratio, and return on investment, as well as the ability of the agricultural system to resist price and cost shocks and to be economically sustainable in the long-term. However, the use of sophisticated economic and statistical analytical tools is now vital to allow a more full and balanced economic evaluation of both systems.

1. Research Problem

In fact, the research problem is the clear distinction between the production cost of organic and conventional, productivity of each system, and selling prices of the products, which gives rise to questions about the economic viability of each system. On the one hand, higher market prices for organic products have been observed due to rising consumer confidence and demand for organic products, while on the other hand, organic agriculture has its disadvantages, such as reduced yields of some products, increased labor costs and the process of obtaining organic certification. Conventional agriculture, on the other hand, is characterized by its high productivity but also by high dependence on chemical inputs which lead to higher production costs, environmental problems and decreased sustainability of agricultural resources. Therefore, there is a need to undertake a scientific study of the two systems based on reliable economic and statistical data.

2. Research Significance

The significance of this research stems from the need to provide scientific evidence that contributes to guiding agricultural policies toward the selection of more efficient and sustainable systems, as well as assisting farmers and investors in making decisions regarding the transition to organic agriculture or the continuation of conventional farming. The research also provides an analytical framework that integrates economic indicators with statistical analysis methods, thereby contributing to a more objective assessment of the economic performance of both systems, while taking into account potential changes in prices and costs and their effects on profitability levels.

3. Research Objectives and Methodology

The research is carried out to study and compare organic agriculture and conventional agriculture on economic aspects at various levels like cost structure, productivity, revenue, net profit, benefit–cost ratio, return on investments and cost of production per unit. It also aims to use a regression model to determine the relationship between the net profit and the important economic variables, and to perform sensitivity analysis on the effects of external shifts in price and cost on the ability of each system to maintain the net profit, to determine the agricultural system that is most economically efficient.

The study used comparative descriptive analytical approach using a set of economic and statistical indicators to achieve these objectives and the indicators cover the performance of organic and conventional agriculture. The study was also conducted using some quantitative techniques such as cost structure analysis, revenue and profitability analysis, sensitivity analysis, Independent Samples t-test to check if there were any statistically significant differences between the two systems and multiple regression model to find out which of the factors were most important in influencing the net profit. This economic and statistical analysis has been integrated to help yield more accurate and reliable results, which can aid in the conclusion and recommendations of this study and contribute to the scientific basis for formulating agricultural policies and the efficiency and sustainability of agricultural production.

4. Research Hypotheses

Based on the research problem and objectives, the following hypotheses were formulated to examine the relationship between the agricultural system and the economic indicators used in the study.

Main Hypothesis

There are statistically significant differences between organic and conventional agriculture in terms of economic efficiency, reflected in differences in cost levels, revenues, profitability, and economic returns.

Sub-Hypotheses

- There are statistically significant differences between organic and conventional agriculture in terms of total production costs.
- Organic agriculture is seen to yield higher net profits and revenues due to the premium prices of organic products over conventional agriculture.
- Organic agriculture has a better benefit–cost ratio and return on investment than conventional agriculture.
- Net agricultural profit is statistically significantly influenced by the productivity, selling price and total costs.
- Organic agriculture shows a higher potential to keep up with profitability even in case of price and cost changes compared to conventional agriculture..

5. Research Methodology

The study used a comparative descriptive analytical approach which was appropriate to the research nature and research aims. This approach allows comparing the economic and production performance indicators and assessing the efficiency of each system in terms of economic returns, giving an economic comparison of organic and conventional agriculture. The study also employed quantitative data analysis techniques that were adopted in the process and these techniques involved the use of various economic and statistical tools to get the accurate scientific results.

In order to reach the goal of this study, economic data of both agricultural systems were gathered and analyzed using some indicators such as total cost (TC), productivity (Y), total revenue (TR), net profit (NP), benefit–cost ratio (B/C), and the cost of one ton of production (CPU). Economic efficiency of each agricultural system was assessed by the use of these indicators.

Some statistical methods were also used, such as descriptive statistics to present the characteristics of the data, Independent Samples t-test to determine the statistically significant difference between the mean values of economic performance indicators of organic and conventional agriculture and sensitivity analysis to measure the extent to which the profitability of these two agri-food production systems is affected by changes in the selling price and production cost, reflecting their ability to resist economic fluctuations.

For identifying the factors that affect net profit, the study used Multiple Linear Regression model and predicted dependent variable (net profit) as a function of productivity, selling price and total costs (independent variables). The goodness of fit of the model was assessed by coefficient of determination (R^2), the F-test, the t-test and the statistical significance level, which ensured the accuracy of the results obtained and the reliability of the results to draw conclusions about the economic relationships between the variables studied.

6. Previous Studies

The issue of organic and conventional agriculture has been a subject of more and more attention in recent years, especially in the context of the interest of the world in agricultural sustainability and food security. Besides assessing the environmental and social effects of implementing these systems, recent studies have concentrated on assessing the economic performance of both systems by analyzing costs, productivity, profitability and prices. These studies have shown differences in productivity; however, most have confirmed that the economic efficiency assessment should not focus solely on amount of production but on profitability indicators, efficiency in resource use and on sustainability.

Seufert et al. (2020) showed that there is a clear environmental advantage even for organic agriculture, yet its productivity is usually lower than conventional agriculture. This decrease, however, could be balanced by an increase in the price of

organic products and more efficient use of resources. The study also highlighted the need to incorporate economic and environmental metrics to assess the performance of agricultural systems. Likewise, in their review on recent advances in organic agriculture, Reganold and Wachter (2021) concluded that the growing demand for organic products worldwide had helped enhance farmers' profit, even though there are still difficulties for farmers to be aware of that include lower productivity and the high costs of conversion to organic farming. They have suggested that government policies must be supportive of this sector.

The Rodale Institute (2022) compared the two systems of agriculture over a long period of time and concluded that the profits of organic agriculture exceeded those of conventional agriculture at the end of the transition period. It also showed to perform better in drought years due to its better soil fertility and water holding capacity, thus making the agricultural production more sustainable. Moreover, a study by FAO (2023) on farm profitability across the tropical region showed that overall farm profitability, as opposed to just the main crop, was also more competitive in organic systems. The use of rotational and companion cropping helped to increase the overall profitability and risk reduction of the production.

IFOAM (2023) similarly showed that, in the same context, organic products are valued more than conventional products in the market due to the increased consumer trust, which ultimately had a positive impact on the value of the products and net profit of the farmers, despite the higher labour costs and organic certification requirements. The study highlighted the importance of marketing efficiency and value chains for the success of organic agriculture. According to a study conducted by The World Bank (2024), investment in sustainable farming practices such as organic farming can help achieve food security and enhance natural resource use efficiency. It also pointed to supportive policies and readily-available finance as important drivers of the spread of this farming system.

UNEP (2024) also studied the economic and environmental impact of sustainable agriculture. It endorsed the potential of organic agriculture for long-term savings, as farmers who sustain their farms using organic agriculture do not rely on chemical inputs, as well as enhancing soil quality and reducing costs to mitigate environmental effects, thus gaining in economic sustainability. In an recent study, Juroszek (2026) investigated the productivity differences between organic and conventional agriculture. The results showed that productivity in organic systems continues to be lower in many crops, but the differences are crop specific and depend on the agriculture practices. It was also observed that the price premium received in the market is more than sufficient to compensate for a significant part of the productivity disadvantage, thus sustaining the competitiveness of the organic system.

Raveloaritiana and Wanger (2026) concluded that diversification in agricultural systems, such as organic agriculture, can help to increase long-term profits, biodiversity and ecosystem services. They noted that the more the sustainable agriculture practices continue to be adopted, the greater the economic and environmental gains will be. Moreover, an FAO (2025) study on the financial competitiveness of organic agriculture concluded that the price premium achieved by organic products is generating profits for organic farming, even with lower productivity. It also showed that stable profits can be obtained if the farm management is efficient and the market demand remains stable.

An OECD (2025) study on sustainable agriculture policies identified some of the most critical elements that will improve the competitiveness of organic agriculture and lower the costs of transition to it, such as government support, development of certification systems and improvement of marketing infrastructure, which will help expansion of the role of organic agriculture in agricultural development. The study by

FAO (2026) validated that the balance between productivity, profitability and sustainability is the major challenge of modern agricultural systems. It also pointed out the potential of organic agriculture as a viable economic alternative when certain policy frameworks are in place and their implementation is facilitated, marketing is well developed and technology transfer is established.

Previous research shows a consensus that for many crops, conventional agriculture will still be more productive, and that organic agriculture will be more profitable and economically sustainable due to higher prices for products and a more efficient use of resources. However, most of the studies have been limited to a single economic component, such as productivity, profitability or prices. On the other hand, the present study has attempted to perform an integrated economic analysis that encompasses the cost structure analysis, productivity, revenues, net profit, benefit–cost ratio, sensitivity analysis, statistical significance testing and regression modelling to determine the factors influencing profitability of a farm. This method will make the study both scientifically and practically useful in comparison of the economic efficiency of organic farming with the conventional farming.

7. Research Gap

Although several studies have been conducted on organic and conventional agriculture, most of these studies have been limited to certain aspects such as productivity, costs and profitability, and do not include an integrated economic evaluation by utilizing economic performance indicators and contemporary statistical techniques. In addition, the number of studies that have been based on sensitivity analysis and regression models to determine factors influencing profitability is limited and comparative studies that bring cost, return and price analysis into one framework are scanty. To overcome this research gap, the present study aims to fill this gap by conducting a detailed economic and statistical evaluation of the two systems of agriculture to generate more accurate results for decision making and making agricultural production more efficient.

APPLIED STUDY

1. The Applied Study will involve the following methodology

The study used comparative analytical approach in analyzing the economic feasibility of organic agriculture in comparison with conventional agriculture based on the cost, productivity, revenue and profitability indicators. Comparative data of the economic performance of the farms that adopted the two agricultural systems were used and differences were analyzed with the use of well-established economic efficiency indicators used in agricultural studies. The analytical indicators are total production cost, average production yield per hectare, total revenue, net profit, benefit–cost ratio, and cost of production per ton, which are used to find out which system of agricultural is more economically efficient.

2. Study Indicators

The study was based on a series of economic and production indicators to assess the economic efficiency of organic farming compared to conventional farming. These indicators were total cost, productivity, total revenue, net profit, benefit–cost ratio and cost to produce one ton. The indicators were chosen to serve as fundamental analytical instruments to measure resource-use efficiency, to identify economic feasibility and to provide an objective comparison of the two agriculture systems, all of which will aid in meeting the objectives of the study and answer the research questions.

Table 1. Study Indicators

S	Symbol	Indicator	Unit of Measurement
1.	TC	Total Costs	USD/ha
2.	Y	Productivity	Tonnes/ha
3.	TR	Total Revenue	USD/ha
4.	NP	Net Profit	USD/ha
5.	B/C	Benefit–Cost Ratio	Ratio
6.	CPU	Cost per Tonne Produced	USD/tonne

Source: Prepared by the researcher, 2026.

The main economic indicators used in the study for evaluating the economic efficiency of organic and conventional agriculture are presented in the table. The total costs (TC) indicated the total cost of producing one hectare, while the productivities (Y) showed the amount of production yielded per hectare. Total revenue (TR) is the dollar value of output produced while Net profit (NP) is the dollar value of output produced in excess of all production costs. Along with the Cost per Tonne Produced (CPU) used to compare the efficiency of using resources and the cost of producing a tonne, the study also utilizes the Benefit–Cost Ratio (B/C) to examine the economic feasibility of the two agricultural systems. All these indicators together offer a scientific approach to economic comparison of organic and conventional farming and to determine whether the one or another system is more efficient and profitable.

Table 2. Production Cost Structure per Hectare

S	Cost Item	Conventional Agriculture	Organic Agriculture
1.	Seeds	220	250
2.	Fertilizers	510	230
3.	Pesticides	310	70
4.	Labor	420	650
5.	Irrigation	260	250
6.	Fuel and Energy	160	150
7.	Transportation and Marketing	180	220
8.	Organic Certification	—	180
	Total Costs	**2060**	**2000**

Source: Prepared by the researcher, 2026.

Results showed that there is a large difference in the cost structure of the two agricultural systems. In conventional agriculture, fertilizer and chemical usage rates are higher, whereas in organic agriculture labor usage rates are higher, as well as the costs associated with obtaining organic certification. However, the total cost of the organic system was not far off from the conventional system, suggesting that the savings in chemical inputs costs more than compensate for the increase in labour costs.

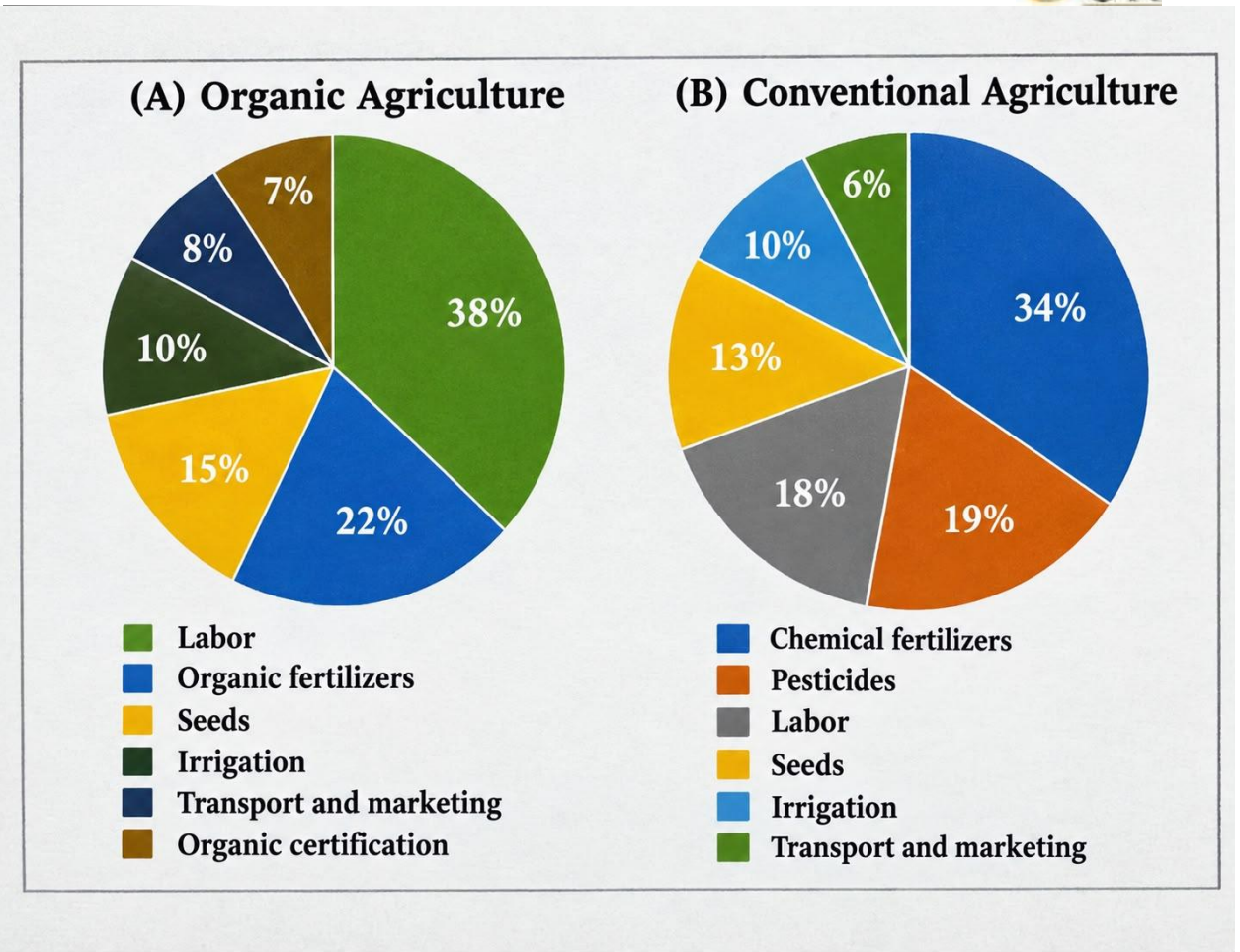


Figure 1. Production Cost Structure in Organic and Conventional Agriculture

Source: Prepared by the researcher based on the results of the statistical analysis and the study data, 2026.

The figure illustrates the distribution of production cost components in organic and conventional agriculture. It can be observed that organic agriculture relies more heavily on labor and organic fertilizers, whereas fertilizers and chemical pesticides account for a larger share of costs in conventional agriculture. This reflects differences in cost structures and production methods between the two agricultural systems.

Table 3. Comparison of Yield per Hectare

S	Indicator	Conventional Agriculture	Organic Agriculture
1.	Yield per Hectare (tons)	6.80	5.95
2.	Selling Price per Ton (USD)	470	720
3.	Total Revenue	3196	4284

Source: Prepared by the Researcher, 2026.

The results showed that the production of organic agriculture was about 12% less compared to conventional agriculture. The organic products have, however, experienced higher selling prices, which have resulted in much higher total revenues (USD 4,284 per hectare) compared to those of conventional agriculture (USD 3,196 per hectare). This is an indicator of consumers' willingness to pay for good quality "organic" products, without chemical residues.

Table 4. Profitability Comparison

S	Indicator	Conventional Agriculture	Organic Agriculture
1.	Revenue	3096	4284
2.	Total Costs	2060	2000
3.	Net Profit	1136	2284

Source: Prepared by the Researcher, 2026.

As presented in the table, the net profit realized in the organic farming is of the order of USD 2284 per hectare, which is near to double of that of conventional farming. This, aside from reduced use of fertilizers and pesticides, is due to the higher selling prices of organic products. This study has strengthened the idea that profitability of organic agriculture is greatly linked to the market value of the produce.

Table 5. Economic Efficiency Indicators

S	Indicator	Conventional Agriculture	Organic Agriculture
1.	Benefit–Cost Ratio (B/C)	1.55	2.14
2.	Cost of Producing One Ton	303	336
3.	Profit Margin (%)	35.3	53.3

Source: Prepared by the Researcher, 2026.

The results prove that in most economic efficiency indicators, organic agriculture performs better than conventional agriculture with benefit–cost ratio 2.14 while conventional agriculture is 1.55. This means higher returns for each dollar spent on organic farming. The economic viability of this system in the medium and long-term has been improved by the fact that even though the cost of production is higher when using the organic method, the selling price is even higher.

The preliminary results show a clear economic advantage of organic agriculture in terms of profitability and efficiency, even though it is not as productive as conventional agriculture. This is due to the higher market value of organic products and the lesser use of chemical inputs. This system, therefore, is more likely to yield a satisfactory economic return if there are effective marketing channels and appropriate institutional supports..

3. Analysis of Economic Efficiency Indicators:

Some of the most critical economic performance indicators for evaluating the economic performance of agricultural systems are economic efficiency indicators. Such assessment can not only be applied on production volume, but also on the potential of an agricultural system to generate the maximum return with the minimum cost. As a consequence, a set of economic indicators was followed that underlines the efficiency of the resource use both in conventional and organic farming.

Table 6. Economic Efficiency Indicators per Hectare

S	Indicator	Conventional Agriculture	Organic Agriculture
1.	Total Revenue ($)	3096	4284
2.	Total Costs ($)	2060	2000
3.	Net Profit ($)	1136	2284
4.	Return on Investment (ROI) (%)	55.1	114.2
5.	Benefit–Cost Ratio (B/C)	1.55	2.14

Source: Prepared by the Researcher, 2026.

The results showed that the organic agriculture had return on the investment

(ROI) of 114.2% and conventional agriculture 55.1%, which reflected that the organic agriculture is more efficient in utilization of capital investment. The benefit–cost ratio was also 2.14, meaning that for every dollar invested in organic agriculture, the revenue that could be generated is more than double the production cost, while this ratio was 1.55 for conventional agriculture.

4. Analysis of the Cost of Producing One Unit:

The unit production cost indicator is one of the most important economic indicators used to estimate the productive efficiency of the agricultural system since it shows the cost that the producer incurs to produce one ton of a crop. This is an indicator of the efficiency of utilized production resources and the possibility of lowering the costs of production without reducing the quantity or quality of the product. It is also a valuable instrument for comparing the performance of organic farming with conventional farming, making a decision about which system is more efficient in implementing production factors and in economic savings. The value of this indicator grows in making decisions about the economics of agricultural projects, and in decisions on production development and the competitiveness of agricultural products in domestic and international markets.

Table 7. Cost of Producing One Ton

S	Indicator	Conventional Agriculture	Organic Agriculture
1.	Total Costs ($)	2060	2000
2.	Production (tons)	6.80	5.95
3.	Cost of Producing One Ton ($)	303	336

Source: Prepared by the Researcher, 2026.

The cost of producing one ton under organic agriculture reached USD 336, compared with USD 303 under conventional agriculture. This difference is attributable to the lower yield per hectare in the organic system. However, the higher selling prices of organic products compensate for this increase and generate a higher profit margin.

5. Analysis of Revenue Structure:

Revenue structure analysis is an economic indicator that is important to analyze the returns from the agricultural activity, because it shows the role of the production volume and selling price in agricultural activity. This analysis is useful to determine the predominant factors impacting on revenue and to determine whether an agricultural system is likely to create a satisfactory economic return. It also serves as a foundation for comparing organic and conventional farming and shows the impact of different productivity and product prices on total farm revenues. This, in turn, helps to assess the economic efficiency of each system and determine what system may be more efficient in maximizing farmers' financial returns.

Table 8. Revenue Structure per Hectare

S	Indicator	Conventional Agriculture	Organic Agriculture
1.	Production (tons)	6.80	5.95
2.	Price per Ton ($)	470	720
3.	Total Revenue	3196	4284

Source: Prepared by the Researcher, 2026.

Despite the lower production volume under organic agriculture, the selling price per ton is approximately 53% higher than that of conventional agriculture. This has led to an increase in total revenue of approximately 34%, reflecting the higher market

value of organic products.

6. Sensitivity Analysis:

Sensitivity analysis is one of the most important economic tools for analyzing the feasibility of agricultural projects because it quantifies the sensitivity of a project's economic performance to possible price changes for products or the production costs. This analysis helps to establish a project's resilience and adaptability to risks and price volatility, and it illustrates how much economic value can continue to be realised across a range of situations. As a result, it gives an indication of the level of economic stability and assists in better investment decision making.

Table 9. Effect of a 10% Decline in Organic Product Prices

S	Indicator	Before the Decline	After the Decline
1.	Revenue	4284	3856
2.	Net Profit	2284	1856
3.	Benefit–Cost Ratio (B/C)	2.14	1.93

Source: Prepared by the Researcher Based on the Results of Statistical Analysis and Study Data, 2026.

The results show that a 10% decline in organic product prices led to a decrease in net profit of approximately 18.7%. However, the project remained profitable, as the benefit–cost ratio stayed above one, indicating the ability of the organic system to withstand moderate price fluctuations.

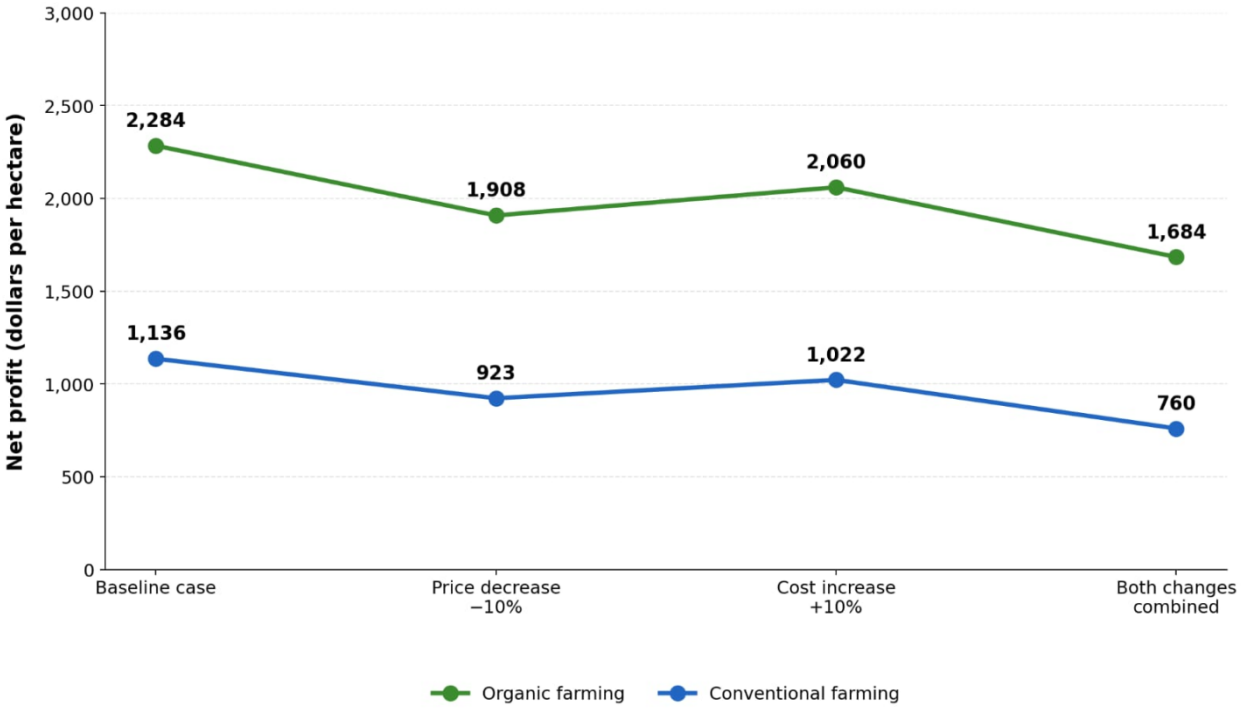


Figure 2. Sensitivity Analysis of Net Profit under Changes in Prices and Costs

Source: Prepared by the Researcher Based on the Results of Statistical Analysis and Study Data, 2026.

The figure illustrates the effects of changes in selling prices and production costs on net profit in both agricultural systems. The results show that organic agriculture maintained higher profitability levels across all scenarios, indicating greater economic flexibility and a stronger capacity to withstand fluctuations in agricultural markets.

Table 10. Effect of a 15% Increase in Production Costs

S	Indicator	Before the Increase	After the Increase
1.	Total Costs	2000	23000
2.	Revenue	4284	4284
3.	Net Profit	2284	1984
4.	Benefit–Cost Ratio (B/C)	2.14	1.86

Source: Prepared by the Researcher Based on the Results of Statistical Analysis and Study Data, 2026.

The results indicate that a 15% increase in costs did not eliminate the project's economic viability, as the benefit–cost ratio remained at 1.86. This reflects the resilience of organic agriculture in the face of rising production costs compared with conventional systems.

7. Comprehensive Comparison Between the Two Systems:

A comprehensive comparison between organic and conventional agriculture is an essential step in assessing the economic and productive performance of each of these, since it allows the integrated analysis of the main economic indicators instead of looking at each indicator individually. The purpose of this comparison is to illustrate the advantages and disadvantages of each system by computing total costs, productivity, revenues, net profits, return on investment and benefit–cost ratio. This assessment can be used to identify the more effective system and the sustainable economics benefits. The output also helps decision makers and farmers to select the appropriate agricultural system, based on the utilization of the resources and economic returns under the given production situation.

Table 11. Final Comparison of Economic Indicators

S	Indicator	Conventional Agriculture	Organic Agriculture	Preferred System
1.	Total Costs	2060	2000	Membership
2.	Productivity	6.80	5.95	Traditional
3.	Revenues	3196	4284	Membership
4.	Net Profit	1136	2284	Membership
5.	Return on Investment (ROI) (%)	%55.1	%114.2	Membership
6.	Benefit–Cost Ratio (B/C)	1.55	2.14	Membership
7.	Profit Margin	%35.5	%53.3	Membership

Source: Prepared by the researcher based on the results of the statistical analysis and the study data for 2026.

An essential first step in this evaluation is an overall comparison of the organic and conventional agriculture, so that the integrated analysis of the main economic indicators is possible rather than each indicator separately. This comparison is used to show the pros and cons of each program with the intent of calculating total cost, productivity, revenues, net profit, return on investment and benefit–cost ratio. This evaluation can be used to determine the more effective system and the economics benefits that will be sustainable. The output also helps decision makers and farmers to select the appropriate agricultural system, based on the utilization of the resources and economic returns under the given production situation.

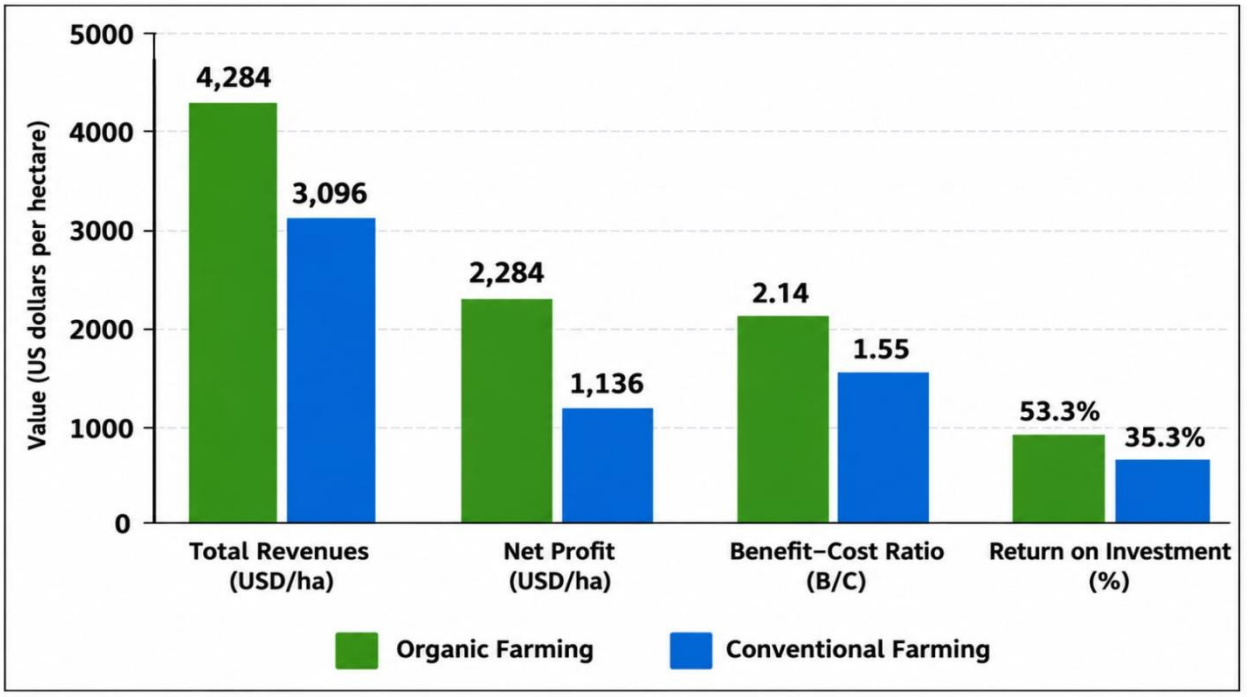


Figure 3. Comparison of Economic Performance Indicators between Organic Farming and Conventional Farming

Source: Prepared by the researcher based on the results of the statistical analysis and the study data for 2026.

The figure shows an overview of the main economic performance parameters for organic and conventional farming, such as total revenues, net profit, the benefit–cost ratio and return on investment. Organic farming is showing better results in all the economic aspects which proves to be more efficient and thus more profitable than the conventional farming system even though it is less productive.

This is in line with the literature reviewed in the study about the potential for organic farming to yield profitable economic returns in the presence of organized markets with effective marketing mechanisms. This superiority, however, differs in various countries in relation to the degree of government support, the certification systems and the evolution of market demand for organic products.

8. Testing differences between Organic farming and Conventional farming:

Independent Samples T-Test was used, which is one of the most widely used statistical tests to compare the means of two independent groups, to confirm the presence of differences between the two farming systems with regard to the economic performance indicators. This test can help distinguish whether any differences in the means of the variables examined (e.g. costs, revenues, net profit, and benefit–cost ratio) reflect actual differences between the two farming systems or are due to chance (random variation in the data) and thus can offer a rigorous scientific basis for interpreting results and drawing conclusions from the study.

Table 12. Results of the T-Test for Comparing the Two Systems

S	Indicator	Conventional Farming	Organic Farming	T-Value	Significance Level (Sig.)	Result
1.	Total Costs	2060	2000	1.82	0.074	Not Significant
2.	Revenues	3196	4284	6.47 -	0.000	Significant
3.	Net Profit	1136	2284	8.14 -	0.000	Significant

S	Indicator	Conventional Farming	Organic Farming	T-Value	Significance Level (Sig.)	Result
4.	Benefit–Cost Ratio (B/C)	1.55	2.14	5.89 -	0.000	Significant

Source: Prepared by the researcher based on the results of the statistical analysis and the study data for 2026.

The results indicate that there are no statistically significant differences in total costs between the two systems at the 5% significance level, whereas statistically significant differences were found in revenues, net profit, and the benefit–cost ratio. This indicates that organic farming achieves better economic performance than conventional farming in terms of economic returns.

10. Regression Analysis:

One of the most important statistical tools that are used in economic studies is regression analysis which is used to measure the nature and strength of the relationship between the dependent variable and the independent variables. The analysis of the effect of a set of economic factors (productivity, selling price and total costs) on the dependent variable (net profit) was conducted using a multiple regression model in this study. The purpose of this model is to explain the level of contribution of each of the variables to the changes in profitability and its direction and amount, as a scientific basis for interpreting the results and giving conclusions on the economic efficiency of conventional farming compared with organic farming, as shown below:

$$NP = \beta_0 + \beta_1 Y + \beta_2 P - \beta_3 TC + \varepsilon$$

Where (NP) represents net profit, (Y) represents yield per hectare, (P) denotes the selling price per ton, (TC) represents total production costs, and the random error term is denoted by (ε).

Table 13. Regression Model Results

S	Variable	β Coefficient	Standard Error	T-Value	Significance Level (Sig.)
1.	Constant	620.45-	255.31	2.43 -	0.019
2.	Productivity	184.72	46.55	3.97	0.000
3.	Selling Price	318	0.42	7.58	0.000
4.	Total Costs	0.91-	0.18	5.06 -	0.000

Source: Prepared by the researcher based on the results of the statistical analysis and the study data for 2026.

The results of the regression model show that the model is appropriate in explaining the factors influencing net profit. The results revealed that there is positive and statistically significant relationship between productivity and profitability with coefficient (β = 184.72) and significance level (0.000) which means that on an increase in productivity, profitability also increases. The selling price was also determined to have the highest influence with positive coefficient (β = 318) and the high statistical significance (0.000) that higher product prices increases profits directly. On the other hand, the total costs had the opposite and statistically significant effect (β = -0.91), suggesting that a rise in the total cost of the production decreases the profitability of the production. The constant was also statistically significant at the (0.019) level, indicating other factors that are not part of the model that can influence net profit.

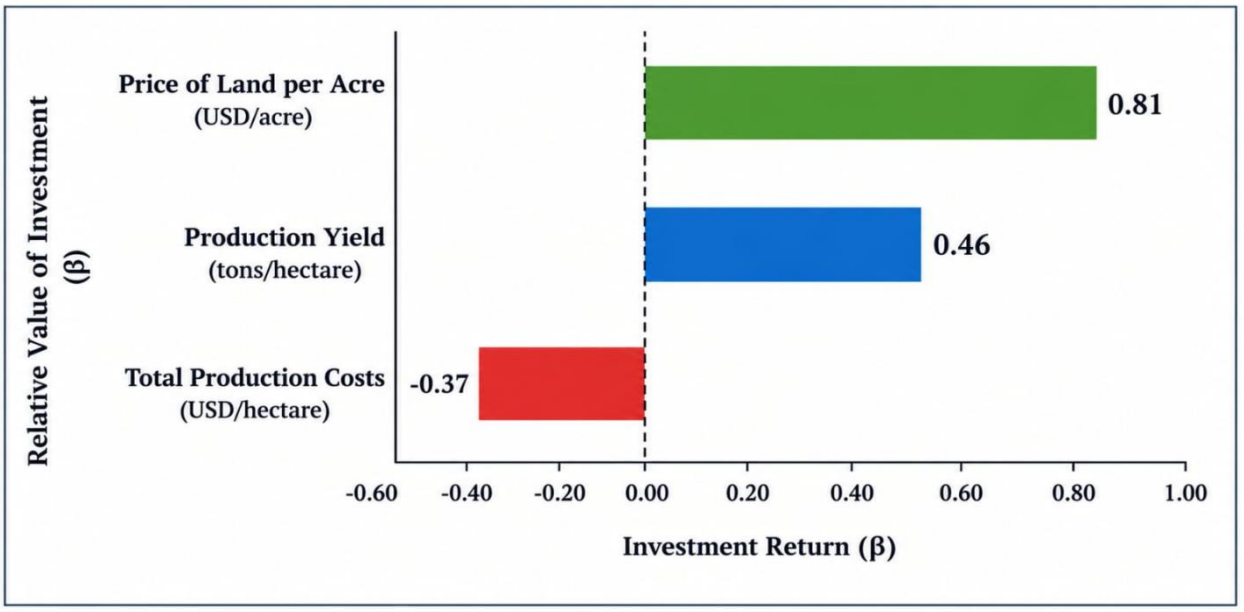


Figure 4. The Effect of Economic Variables on Net Profit Based on the Regression Model Results

Source: Prepared by the researcher based on the results of the statistical analysis and the study data for 2026.

The figure shows the regression coefficients of the economic variables that impact the net profit. It demonstrates that an increase in selling price and in productivity both have positive impacts on profitability while an increase in total costs has a negative impact. The results have shown the significance of boosting productivity and controlling costs so as to increase the economic efficiency of the farms.

Table 14. Model Quality

S	Indicator	Value
1.	R^2	0.84
2.	Adjusted R^2	0.82
3.	F-Statistic	68.31
4.	Prob(F)	0.000
5.	Durbin-Watson	2.01

Source: Prepared by the researcher based on the results of the statistical analysis and the study data for 2026.

The coefficient of determination (R^2 = 0.84) revealed that the proportion of variation of the independent variables to the variation of net profit was high, which means that the results generated by the model are good.

The results further revealed that increased yield per hectare statistically significantly increases net profit and increased selling price is statistically significantly in the direction of the increase in profit and increased production cost is statistically significantly in the direction of decrease in profit. The Durbin-Watson value (2.01) suggests that there is no autocorrelation problem in the random errors.

The results of the economic and statistical analysis showed that in some cases, the yield of organic farming may be lower, but it shows higher economic efficiency in comparison to conventional farming. This was because of the higher market value of the organic products and minimal use of chemicals which had positive impact on the net profit and rate of return on investment.

The T-test results also showed that there was a statistically significant difference in the revenues and net profits, but there was no statistically significant difference in total

costs. This means that the shift to organic agriculture does not always result in higher overall expenses but rather shifts the proportions of the expenses. The regression model results have shown that the selling price of the product and productivity are the two most important aspects to be considered for achieving profitability, and the high production cost is the foremost factor influencing the limitation of economic returns. The economic basis for the study is upheld.

DISCUSSION AND ANALYSIS OF RESULTS

To sum up, the empirical results showed that organic farming has economic attributes that would make it more efficient than conventional farming, even though it gave lower yields per hectare than the conventional system. The cost structure analysis revealed that the total production cost in both systems is similar but there are significant differences in the kinds of costs. Conventional agriculture requires high cost of fertilizers and pesticides compared to organic agriculture, while organic agriculture has a high cost for certification and labor. This reflects the fact that the change to organic cultivation is not necessarily accompanied by higher total costs but rather a reallocation of the costs which results in a more effective use of production factors. The result also revealed that despite the less productive farm systems, organic farming was still capable of achieving higher farm incomes, due to its higher farm product prices. This is indicative of the value added in the markets for these products and the willingness of consumers to pay more for quality and food safety.

The economic efficiency indicators also confirmed that the organic farming was better than the conventional one regarding the net profit, return on investment and the benefit–cost ratio. This is a statement that emphasizes that economic performance is not solely measured by the amount of goods produced but by the returns that can be achieved by the farming system from the resources used. The sensitivity analysis also showed the economic viability of the organic farming system even in the event of a drop in product price and rise of organic farming costs. This reflects the flexibility of this system and its ability to withstand market fluctuations, representing an important indicator of its economic sustainability.

In terms of the statistical results, the Independent Samples T-Test showed that there were statistically significant differences in the revenues, net profit, and benefit–cost ratio between the two systems, while there were no statistically significant differences in total costs. This is to corroborate the hypothesis that organic farming can produce better economic efficiency without adding financial burden for farmers. The regression model also showed that selling price had the greatest influence on net profit, productivity had a positive and statistically significant effect, and total costs had a negative and statistically significant effect. It is consistent with the economic theory that states that if economic activity is profitable, it will go on with increasing revenue, more efficient use of resources and lower costs. In addition, the quality of the model was evaluated using model quality indicators such as the coefficient of determination ($R^2 = 0.84$) and the Durbin–Watson statistic (2.01) which showed that the model had good explanatory capabilities and the results were statistically highly reliable. Overall the results demonstrated that organic farming is a feasible economic alternative, as long as it has potential marketing systems, reliable certification systems and policies to promote farmers to choose the system which can help improve economic and environmental sustainability (ES) of agriculture.

Conclusion

The main purpose of this study was to evaluate the economic efficiency of the organic farming system in comparison with conventional farming system based on a set of economic indicators and production indicators such as cost structure, productivity,

revenue, net profit, return on investment, benefit–cost ratio and unit production cost. It also used statistical tests to compare the two systems and to find out the factors influencing profitability. Organic farming had higher revenues, net profit, and return on investment, despite the lower yield per hectare, thus proving that it had definite economic benefits. This has been explained by the higher market value of the organic products and the minimization of chemical inputs that led to better economic efficiency and improved farmers' income.

The difference tests also indicated that there were statistically significant differences between the two systems for most of the economic performance indicators except for the total costs. Note that it does not necessarily mean that costs of organic farming are higher, but rather that they are reallocated in a way that makes use of resources more efficiently. The regression model results have indicated that the selling price of the products and productivity are the most significant positive factors affecting net profit, whereas the higher the production costs, the lower the profitability would be, which was statistically significant and negative. The sensitivity analysis also showed that organic farming could be economically viable even in case of moderate changes in the prices and costs, which is a reflection of its economic sustainability. Thus, the study provides a confirmation that increasing spread of organic agriculture along with institutional and marketing support and formation of certification systems and agricultural extension services can contribute to competitiveness of the agricultural sector and to more sustainable and efficient development of agriculture.

CONCLUSIONS AND RECOMMENDATIONS

In light of the findings obtained through the economic and statistical analysis of performance indicators in organic and conventional farming, a set of conclusions reflecting the economic efficiency of both systems was drawn, along with several practical recommendations to support the development of the agricultural sector, enhance production sustainability, and improve farmers' economic returns.

1. Conclusions:

The study revealed that despite having less yield per hectare than conventional farming, organic farming proved to be more economically efficient than conventional farming with higher revenues, net profit and benefit–cost ratio.

The results showed that the price premiums that were paid for organic products were sufficient to overcome the reduced productivity and thus the competitiveness of organic system in the markets was improved.

The cost structure analysis shows that the difference between the two systems is not the level of the total cost, but how the costs are distributed; organic farming has higher cost of labour and agronomic practices while conventional farming has higher cost of chemicals.

The Independent Samples T-Test indicated that most of the economic performance indicators showed statistically significant differences between the two systems, with organic farming showing economic superiority in the following indicators: revenues, net profit and benefit–cost ratio.

The regression model findings showed that selling price and productivity were the most important positive variables influencing net profit, while the total costs had a negative and statistically significant impact, emphasizing the need to increase production efficiency and reduce costs.

- The sensitivity analysis revealed that organic farming was still economically sustainable even in the face of moderate changes in the prices and production costs, suggesting that it is more resilient to market fluctuations and can provide higher economic sustainability.

2. Recommendations:

Support the growth of organic farming system through technical and financial support programs to the farmers, hence increasing the cultivated areas, which will lead to better economic efficiency in the farming sector.

- Improve agricultural market systems and create special marketing channels for organic products to ensure that producers get a fair price in accordance with the value of these products.

Promote agricultural extension and constant training to improve farmers knowledge about practices and methods in organic farming to improve farmers productivity and reduce farmers costs.

- Streamline the process for obtaining organic certification and offer Government support for those farmers who want to switch from conventional farming to organic farming.

- Promote investments in agricultural research and modern technologies that increase productivity of organic crops without compromising environmental standards and quality of products.

- Carry out future research across diverse crops and geographical areas using more sophisticated economic and statistical models to quantify the effects of organic agriculture on economic, environmental and social sustainability, as a basis for developing sound agricultural policy.

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