



An Economic Study on the Current and Future Status of Organic Agriculture in Egypt

Gaber A. B. Shehata

Faculty of Agriculture (Saba Basha), Alexandria University

Karema Z. S. Ahmed

Agricultural Economics Research Institute, Agricultural Research Center, Egypt

Nadia F. Jumaa

Agricultural Economics Research Institute, Agricultural Research Center, Egypt

Shimaa M. B. Elewa

Agricultural Economics Research Institute, Agricultural Research Center, Egypt

Abstract

The agricultural sector is considered one of the main sectors in the Egyptian economy, as it contributes to achieving economic and social development, and the agricultural sector contributes about 15.3% of the gross domestic product, which is estimated at LE 671.8 billion in 2020, and in employing about 6.2 million workers working in this sector, representing about 29.2% of the total employment during the year 2020. Agricultural production represents a large proportion of the national income, which requires the use of modern methods of biotechnology and economic efficiency at the same time, so countries compete to increase the crop production of agricultural lands through horizontal expansion and vertical expansion using modern agricultural technologies to increase production such as non-traditional fertilizers and organic fertilizers, Which would lead to an increase in the competitiveness of countries that apply these technologies. As a result of the application of international standards and conditions on Egyptian agricultural exports, which led to a decrease in the amount of agricultural exports of most agricultural crops, especially food crops of vegetables and fruits. Therefore, exporters began to adopt an organic farming method that relies on organic fertilization and biological control as an alternative to traditional agriculture to produce food crops. Free of various pesticide residues. The research aims at an economic study on the current and future situation of organic agriculture in Egypt. A study of the impact of organic farming of the potato crop on some productive and economic indicators revealed a decrease in the productivity per feddan of the organic farming pattern by about 2 tons/feddan compared to the traditional farming pattern of the potato crop. The organic cultivation of the potato crop also resulted in an increase in the farm price, total revenue, and net yield per feddan, in addition to an increase in the cost and return of a ton produced from organic potatoes. The study showed an increase in the cost-return ratio of the organically grown potato crop by about 1.08, with a rate of change of about 74%. Likewise, the profit of the invested pound for the organically grown potato crop increased by about 0.08, with a rate of change of about 235%. The break-even point to cover the

total costs of the organically grown potato crop decreased by about 5.16 tons, with a decreasing rate of change of about 50.18%. The study also showed a decrease in the acre productivity of the organic farming pattern by about 1 ton / feddan compared to the traditional cultivation pattern of the grape crop, and an increase in the farm price, total revenue, and net yield per feddan, in addition to an increase in the cost and return of a ton produced from organic grapes, and an increase in the cost-return ratio. For organically grown grape crops by about 0.04, with a rate of change of about 1.47%, an increase in profit for the investor's pound for organically grown grapes by about 0.04, with a rate of change of about 2.34%, and a decrease in the amount of break-even to cover the total costs. The organically grown grape crop amounted to about 0.45 tons, with a decreasing rate of change of about 8.02%. The study also clarified the most important problems facing the expansion of organic agriculture in particular, the study that affects the quantities produced and prices, which causes severe fluctuations in the supply of that agriculture, which affects farmers' decisions in their production. The research, based on its results, reached some recommendations that could benefit the Egyptian economic policy makers in this field.

Keywords: Organic agriculture, Potato, Grape, Productivity, Revenue, Egypt

INTRODUCTION

The agricultural sector is considered one of the main sectors in the Egyptian economy, as it contributes to achieving economic and social development, and the agricultural sector contributes about 15.3% of the gross domestic product, which is estimated at about EGP 671.8 billion in 2020, and in employing about 6.2 million workers working in this sector, representing about 29.2% of the total employment during the year 2020. Agricultural production represents a large proportion of the national income, which requires the use of modern methods of biotechnology and economic efficiency at the same time, so countries compete to increase the crop production of agricultural lands through horizontal development and vertical development using modern agricultural technologies to increase production such as non-traditional fertilizers and organic fertilizers, Which would lead to an increase in the competitiveness of the countries that apply these technologies, in addition to the fact that the modern trend now is to differentiate between the production of one country and another, not through the quantity produced, but rather through the quality and quantity of the product, and this is the case of export crops of vegetables and fruits, which represent an important percentage of exports, as well as for field crops such as Egyptian cotton and rice, which is considered one of the most important crops that occupy a great place in the national economy, whether at the level of individual farms or at the national level.

RESEARCH PROBLEM

The recent years have witnessed a great interest in applying international conditions and standards on Egyptian agricultural exports, which led to a decrease in the amount of agricultural exports of most agricultural crops, especially food crops of vegetables and fruits. Biological as an alternative to traditional agriculture to produce food crops free from various pesticide residues.

RESEARCH OBJECTIVES

The research aims at an economic study on the current and future situation of organic agriculture in Egypt through studying the following sub-objectives:

1. The relative importance of organic agriculture in Egypt.
2. The current situation of organic and traditional cropping area in Egypt.
3. Evaluation of the impact of organic and traditional cultivation of potato and grape crops in Egypt.
4. The economic problems and returns facing the expansion of organic agriculture in the specific study.
5. Identifying the future situation resulting from the current situation of the production and export capacity of the study crops.

METHODOLOGY

In order to achieve the objective of the research, the study used the descriptive and quantitative statistical analysis method to explain and present the current and future situation of organic agriculture in Egypt, General trend function. Erma, Arima prediction model and χ^2 were used in the analysis. During the collection of questionnaires for an intentional sample that was collected during the agricultural season 2019-2020 through a personal interview with respondents at production sites in organic farms for the study crops from the governorates of El-Beheira governorate (potatoes) and Ismailia governorate (grapes). The sample consists of 30 farmers, of whom 15 are potato growers from the sample size, and 15 are grape growers, including traditional and organic, in addition to secondary data are collected from agricultural economic bulletins issued by the Central Administration of Agricultural Economics, and published and unpublished secondary data issued by official authorities, including the Ministry of Agriculture and Land Reclamation, and specialized centers. For organic agriculture, which is the Egyptian Center for Organic Agriculture, the Biodynamic Society, the Union of Producers and Exporters of Organic Agricultural Crops, the World Federation of the Organic Agriculture Movement, and the Food and Agriculture Organization, in addition to references, books, studies, and scientific research related to the subject of the study.

Different Concepts Related to Organic Farming

First: The Concept of Organic Farming:

It is the management of clean agricultural production that preserves the environment, biodiversity, cycles and activity of soil microorganisms. As an agricultural system, it is based on two main parts: organic fertilization and biological control, in contrast to traditional agriculture, which relies on chemical fertilization and chemical control.

Second: Concepts Related to Organic Farming:

They are as follows:

1. **The Concept of the Environment:** the environment is defined as the increasing and competing demand for environmental resources, which has become beyond the capacity of supply, which leads to the inability of resources to achieve the targeted development rates. In the nitrogen cycle in nature or the balance in the processes of evaporation, condensation and precipitation
2. **The Concept of Environmental Pollution:** It is the corruption of the components of the environment as a result of the presence of any substance or energy in a wrong place, time and quantity, i.e., the presence of extraneous materials that change the physical,

chemical or biological properties of all or some of the components of the environment so that these components are transformed from useful elements into elements Harmful loses its role in making life.

3. **Environmental Pollution and Agricultural Development:** To achieve the objectives of development, it is necessary to make the best use of the available economic resources while preserving those resources from deterioration.
4. **Imbalance in the Environmental Balance:** living organisms generally live in a natural balance, so if an interference occurs in this existing environmental balance, it must be disturbed, so the negative effects appeared as a result of human use of pesticides, the most important of which is the formation of strains resistant to pesticides, and the impact on the natural enemies of insects, as it is It is known that pests reproduce rapidly and natural enemies slow reproduction, so the use of pesticides on a large scale in agriculture leads to the elimination of a high percentage of pests and their natural enemies at the same time, in addition to that the remaining individuals of the pests can multiply quickly and return to their previous size, while Natural enemies cannot follow her.

Third: Organic Farming Projects in Egypt:

These are as follows:

1. **The government's draft law on organic agriculture:** The draft provides for the organization of organic agriculture as a global response to the negative effects resulting from the adoption of traditional farming methods, which depend on the expansion of the use of chemicals synthesized from plant and animal nutrition and their impact on the high percentage of pollutants in water, soil and agricultural products. And the associated decline in soil fertility, the high rate of desertification of agricultural lands, and the spread of dangerous diseases.
2. **The Green Gold Fertilizer Project** It is a national project for clean organic farming and export crops using extracts of seaweed "seaweed", which are used as fertilizers as well as pesticides for all fruit and vegetable trees, in addition to using them in agricultural greenhouses, which increases the yield by 40% and saves 90% of the price of pesticides 70% of the costs of nitrogenous, phosphate and potassium fertilizers.
3. **The Organic Egypt Project:** It started in 2018 and aims to develop and strengthen the organic agriculture sector. It works to empower farmers and producers under the organic farming system in cooperation with associations and local training centers to expand the market for organic products. The project is funded by European agencies.
4. **Forecasting using the ARIMA and ERMA model:** using the Autoregressive Integrated Moving Average model, known as the ARIMA Model, where Box Jenkins applied this model to predict time series data, and ARIMA mixed models are successfully used to express stable time series in many practical applications. The ARTMA model consists of four phases, which can be explained as follows:
 1. **Identification Stage:** It is the stage of identifying the model where the ranks of p,d,q are identified so that a number of the most appropriate models can be formulated that accurately describe the stable time series:
 - a) **Autoregressive (AR) Model:** where $Y_t = a_1 Y_{t-1} + U_1$ is of the first degree, and if it is of degree p, then it is AR (P).
 - b) **The Moving Average Model:** where $Y_t = u + B_1 U_{t-1}$ in the case of the first degree, and if it is of degree q, then it is MA (q).

c) The Autoregressive Integrated- Moving Average Model, Called (p, d, q) ARTMA: where $Z_t + \text{BoutBut-1}Y_t = u + aY_{t-1} +$, this model is characterized by three ranks:

P shows the rank of the autoregressive measure, which means the number of periods slowed down by Z_{t-1} . If $P = 1$, the dependent variable Z_t also means a slowing period equal to one ($Z-1$), meaning that the rank of the autoregressive measure may be equal to zero, one, or two. Where:

d: shows the order of the normal first difference used in the original series, which makes it stable, or the statistical construction of the series must be independent of time, and this also includes the stability of the model, and the first difference may be used $d = 1$ or the second difference $d = 2$ in the original series, i.e. the difference order may be equal to Zero, one, or two.

q: shows the rank of the moving average scale and shows the number of periods slowed down by the observed residuals. If $q = 1$, the residual A_t will slow down one period (A_{t-1}), meaning that the rank of the moving average scale may be equal to zero, one, or two.

2. **Estimation Stage:** After selecting a model to describe the time series, the parameters of this model are estimated from the observed data using statistical estimation methods for the time series.
3. **Diagnostics Checking:** Where the previously estimated models are checked to identify the most appropriate model for describing the data by conducting tests on application errors to see the extent to which the observations correspond to the values calculated from the model that has been determined and the validity of the model's assumptions.
4. **Forecasting Stage:** where the most appropriate model is used and future prediction is made for the required period and the model's ability to predict is confirmed through the sum of the error squares, and the best model in forecasting is the one that has the least sum of error squares.

RESEARCH RESULTS AND DISSCUSION

First: The Relative Importance of Organic Agriculture in Egypt

By studying the current situation of organic agriculture through the relative importance of the total organic crop area of the traditional crops, the relative importance of the total cropped area of organic vegetables and fruits to the conventional ones, as well as the relative importance of the cropped area of the two crops of potatoes, grapes as the two most important crops in terms of production And export of organic crops, and then study the current situation of the traditional and organic production capacity of the two crops during the study period (2000-2020).

The Relative Importance of the Total Organic Cropped Area Compared to the Traditional Area:

By studying the relative importance of the organic cropped area to the total traditional cropped area, it was found that the average amounted to about 0.64%, ranging between a minimum of about 0.17% in 2000, and a maximum of about 1.1%. 75% in 2019 during the study period, Table No. (1).

The Relative Importance of the Total Area of Organic Vegetables Compared to the Traditional Area:

By studying the relative importance of the total area of organic vegetables from the traditional area, it was found that the average amounted to about 1.66%, ranging from a minimum of about 0.50% in 2004, to a maximum of about 5.0%. 13% in 2020, during the study period, Table No. (1).

The Relative Importance of the Total Organic Fruit Area Compared to the Traditional Area:

By studying the relative importance of the total organic fruit area compared to the traditional area, it was found that the average amounted to about 1.49%, ranging between a minimum of about 0.79% in 2014, and a maximum of about 2.0%. 14% in 2012 during the study period, Table No. (1).

Table (1) -The relative importance of the total area organic crops from the traditional vegetable and fruit crops during the study period (2000-2020).

Year	Total organic crop area (10 ³ feddan)	Total traditional crop area (10 ⁶ feddan)	Relative importance %	Cropped area of organic vegetables (10 ³ feddan)	Cropped area of traditional vegetables (10 ⁶ feddan)	Relative importance %	Crop area for organic fruit (10 ³ feddan)	Crop area for traditional fruit (10 ⁶ feddan)	Relative importance %
2000	23.49	13.92	0.17	12.59	1.84	0.68	10.89	0.89	1.22
2001	24.20	14.03	0.17	12.51	1.93	0.65	11.89	0.91	1.31
2002	26.40	14.35	0.18	19.60	1.87	1.05	11.90	0.93	1.28
2003	28.72	14.48	0.20	19.69	1.94	1.02	11.95	0.95	1.26
2004	32.48	14.55	0.22	10.15	2.04	0.50	12.21	0.96	1.27
2005	32.72	14.91	0.22	12.13	1.80	0.67	12.30	1.01	1.22
2006	34.84	14.92	0.23	13.38	1.79	0.75	12.44	1.05	1.19
2007	36.86	15.18	0.24	15.93	1.87	0.85	12.63	1.07	1.18
2008	95.24	15.24	0.63	18.98	2.04	0.93	18.19	1.11	1.64
2009	134.40	15.49	0.87	22.60	2.15	1.05	17.47	1.13	1.55
2010	197.20	15.33	1.29	33.60	2.11	1.59	17.75	1.14	1.56
2011	197.20	15.35	1.29	49.30	2.07	2.38	25.04	1.17	2.14
2012	205.90	15.57	1.32	62.55	2.08	3.01	24.88	1.22	2.04
2013	205.90	15.49	1.33	63.63	1.99	3.20	22.65	1.29	1.76
2014	205.90	15.69	1.31	61.78	2.12	2.91	10.29	1.31	0.79
2015	204.00	15.64	1.30	59.16	2.16	2.74	24.48	1.35	1.81
2016	250.20	15.80	1.58	67.55	2.21	3.06	25.02	1.39	1.80
2017	254.20	16.05	1.58	68.63	1.65	4.16	25.42	1.38	1.84
2018	278.40	16.16	1.72	77.95	1.76	4.43	27.84	1.49	1.87
2019	279.20	15.92	1.75	80.15	1.68	4.77	28.15	1.62	1.74
2020	278.50	16.08	1.73	78.05	1.52	5.13	27.00	1.54	1.75
Average	144.09	15.25	0.64	40.95	1.93	1.66	18.59	1.19	1.49

Source: Collected from: The Egyptian Center for Organic Agriculture - The Biodynamic Society for Organic Agriculture., Economic Bulletins - Economic Affairs Sector.

The Relative Importance of The Organic Area of The Organic Potato Crop:

By studying the relative importance of the total organic area of the potato crop relative to the total organic area, it was found that the average amounted to about 5.54%, ranging between a minimum of about 1.24% in 2008, and a maximum of about 7.61% in 2015, while the average for organic vegetable crops was about 17.02%, ranging between a minimum of about 6.22% in 2008, and a maximum of about 27.8% in 2017 during the study period. Table No (1).

The Relative Importance of The Organic Area of The Organic Grape Crop:

By studying the relative importance of the total organic area of the grape crop relative to the total organic area, it was found that the average amounted to about 2.19%, ranging between a minimum of about 1.04% in 2008, and a maximum of about 3.14% in 2019, while the average for organic fruit crops was about 12.17%, it ranged between a minimum of about 2.94% in 2001, and a maximum of about 48.3% in 2014, during the study period (Table No. 1).

Second: Development of The Current Situation of The Organic and Traditional Crop Area in Egypt

By studying the current situation of the total organic and traditional crop area, as well as organic and traditional vegetable and fruit crops, as follows:

Development of the Organic Crop Area:

Data of Table No. (2) indicate that the average organic crop area amounted to about 144.1 thousand feddans, and its minimum amounted to about 23.49 thousand feddans in 2000, representing about 16.3%, while its maximum amount reached about 279,2 thousand feddans in 2019, representing about 193.8% of the average during the study period. By estimating the general time trend equation for the development of the total organic crop area, Table No. (3), it was found that it is taking an increasing and statistically significant trend at an annual rate of about 15.1%, The value of the determination coefficient (R^2) was about 0.880, which means that about 88% of the changes are due to factors whose effects reflect the time variable.

Development of the Traditional Cropped Area:

Table No. (2) show that the average traditional cropped area amounted to about 15.25 million feddans, which increased during the study period from about 13.92 million feddans in 2000, representing about 19.32%, while its maximum amount reached about 16.16 million feddans in 2018, representing about 106% of the average during the study period. By estimating the general time trend equation for development of the traditional cropped area, Table No. (3), it was found to be taking an increasing and statistically significant trend at an annual rate of about 0.7%. Determination coefficient (R^2) was about 0.924, which means that about 92.4% of the changes are due to factors whose effects reflect the time variable.

Development of the Cropped Area of Organic Vegetable Crops:

Table No. (2) indicates that the average cropped area of organic vegetable crops amounted to about 40.95 thousand feddans, and its minimum reached about 10.15 thousand feddans in 2004, representing about 24.79%, while it reached a maximum of about 80.15 thousand feddans in 2019, it represented about 195.7% of the average during the study period. By estimating the equation of the general time trend for development of the crop area of organic vegetable crops, it was found that it takes an increasing and statistically significant trend at an annual rate of about 11.4%, and the value of the determination coefficient (R^2) was about 0.855, which means that about 85.5% of the changes are due to factors whose effects reflect the time variable.

Development of the Cropped Area of Traditional Vegetable Crops:

Data of Table No. (2) indicate that the average cropped area of traditional vegetable crops amounted to about 1.93 million feddans, and its minimum reached about 1.52 million feddans in 2020, representing about 87.58%, while it reached a maximum of about 2.21 million feddans

in 2016, it represented about 114.3% of the average during the study period. By estimating the equation of the general time trend for development of the crop area for traditional crops, it was found that they take a decreasing and statistically insignificant trend at an annual rate of about 0.3%, and the value of the determination coefficient (R^2) was about 0.041, which means that about 4.1% of the changes are due to factors whose effects reflect the time variable.

Development of the Cropped Area of Organic Fruit Crops:

Table No. (2) indicates that the average cropped area of organic crops amounted to about 18.59 thousand feddans, and its minimum reached about 10.29 thousand feddans in 2014, representing about 55.35%, while its maximum amount reached about 28.15 thousand feddans in 2019, representing about 151.4% of the average during the study period. By estimating the equation of the general time trend for the development of the crop area of organic fruit crops, it was found that it takes an increasing and statistically significant trend at an annual rate of about 5%, and the value of the determination coefficient (R^2) was about 0.704, which means that about 70.4% of the changes are due to factors whose effects reflect the time variable.

Development of the Cropped Area of Traditional Fruit Crops:

Data of Table No. (2) indicate that the average cropped area of traditional fruit crops amounted to about 1.19 million feddans, and its minimum reached about 0.89 million feddans in 2000, representing about 75.03%, while its maximum amount reached about 1.62 million feddans in 2019, representing about 136.6% of the average during the study period. By estimating the equation of the general time trend for the development of the crop area of traditional fruit crops, Table No. (3), it was found that it takes an increasing and statistically significant trend at an annual rate of about 2.9%, and the value of the determination coefficient (R^2) was about 0.987, which means that about 98.7% of the changes are due to factors whose effects reflect the time variable.

Table (2)- The relative importance of the cultivated area for organic potato and grape crops during the period (2000-2020).

Year	Total organic crop area 10 ³ (feddan)	Organic crop area of vegetable crops (10 ³ feddan)	Cropping area of organic potatoes (10 ³ feddan)	Relative importance of organic potatoes to the total %	Relative importance of organic potatoes to vegetable %	Organic crop area of fruit crops (10 ³ feddan)	Cropping area of organic grape (10 ³ feddan)	Relative importance of organic grape to the total %	Relative importance of organic grape to fruits%
2000	33.49	12.59	1.58	4.72	12.5	10.89	0.476	1.42	4.37
2001	24.2	12.51	1.7	7.03	13.6	11.89	0.35	1.45	2.94
2002	26.4	19.6	1.85	7.01	9.44	11.9	0.59	2.23	4.96
2003	28.72	19.69	1.59	5.54	8.08	11.95	0.634	2.21	5.31
2004	32.48	10.15	1.86	5.73	18.3	12.21	0.679	2.09	5.56
2005	32.72	12.13	2.28	6.97	18.8	12.3	0.698	2.13	5.67
2006	34.84	13.38	2.35	6.75	17.6	12.44	0.784	2.25	6.3
2007	36.86	15.93	2.48	6.73	15.6	12.63	0.881	2.39	6.98
2008	95.24	18.98	1.18	1.24	6.22	18.19	0.99	1.04	5.44
2009	134.4	22.6	3.1	2.31	13.7	17.47	2.73	2.03	15.63
2010	197.2	33.6	3.43	1.74	10.2	17.75	3.12	1.58	17.58
2011	197.2	49.3	4.22	2.14	8.56	25.04	3.787	1.92	15.12
2012	205.9	62.55	7.34	3.56	11.7	24.88	3.98	1.93	16
2013	205.9	63.63	10.2	4.97	16.1	22.65	4.6	2.23	20.31
2014	205.9	61.78	12.6	6.12	20.4	10.29	4.972	2.41	48.32
2015	204.0	59.16	15.5	7.61	26.3	24.48	5.122	2.51	20.92
2016	250.2	67.55	17.4	6.95	25.8	25.02	5.72	2.29	22.86
2017	254.2	68.63	19.1	7.52	27.8	25.42	6.72	2.64	26.44
2018	278.4	77.95	20.7	7.42	26.5	27.84	8.52	3.06	30.6
2019	279.2	80.15	19.6	7.03	24.5	28.15	8.76	3.14	31.12
2020	278.50	78.05	20.15	7.24	25.8	27.995	8.64	3.10	30.86
Average	144.57	40.05	4.96	5.54	17.02	17.46	3.46	2.12	12.17

Source: Collected from: The Egyptian Center for Organic Agriculture - Biodynamic Society for Organic Agriculture, Economic Bulletins - Economic Affairs Sector.

Table No. (3)- Time trend equations for the total cropped area and total organic and traditional vegetable and fruit crops during the period (2000-2019).

Item	Depend variable	Equation	R ²	F	Growth rate %
Organic	Crop area	$\hat{Y}_t = e^{2.926 + 0.151Xt}$	0.880	139.59*	15.1
	Vegetable area	$\hat{Y}_t = e^{2.212 + 0.114Xt}$	0.855	112.27*	11.4
	Fruit area	$\hat{Y}_t = e^{2.306 + 0.050Xt}$	0.704	45.09*	5
Traditional	Crop area	$\hat{Y}_t = e^{2.648 - 0.007Xt}$	0.924	232.03*	0.7
	Vegetable area	$\hat{Y}_t = e^{2.212 - 0.003Xt}$	0.041	0.813	0.7
	Fruit area	$\hat{Y}_t = e^{-0.765 + 0.029Xt}$	0.987	1403.25*	2.9

$\hat{Y}_t$: the estimated value of the variable under study.

T: the time variable

* Significant at the 0.01 level

** Significant at the 0.05 level

Source: Calculated from the results of data analysis of Table No. (1).

Table No. (4)- The impact of organic farming of the potato crop on some cost items during the agricultural season 2019-2020

Types of farming Cost items (EGP)	Types of farming				Impact	
	Organic farming		Traditional farming		Amount of change	Rate of change
	Value	%	Value	%		
Human labor	5000	19.53	4800	25.95	200	4.17
Automated work	1200	4.688	1000	5.405	200	20.00
Seeds	6960	27.19	4500	24.32	2460	54.67
Compost	4320	16.88	1000	5.405	3320	332.00
Pest resistance	3520	13.75	3000	16.22	520	17.33
Chemical fertilizer	-	0.00	3000	16.22	(3000)	(100)
Variable costs	21000	82.03	14300	77.30	6700	46.85
Rent	4500	17.58	4000	21.62	500	12.50
General expenses*	100	0.39	200	1.081	-100	-50.00
Total costs	25600	100	18500	100	7100	38.38

Source: Collected and calculated from the questionnaires prepared for the study, * The numbers in brackets are negative values.

The value of mechanized work for the potato crop grown organically amounted to about EGP 1200 /feddan, representing about 3.25% of the total costs, while the value of mechanized work for the potato crop grown traditionally amounted to about EGP 1000 /feddan, representing about 2.85% of the total costs. the college. This means that the organic cultivation of the potato crop has resulted in an increase in the value of automated work estimated at about EGP 200 /feddan, with a rate of change of about 20%.

The value of seeds for the traditionally grown potato crop amounted to about 6960 pounds/feddan, representing about 25.54% of the total costs, while the seed value for the organic potato crop amounted to about EGP 4500 /feddan, representing about 17.79% of the total costs. This means that the organic cultivation of the potato crop resulted in an increase in the value of seeds estimated at EGP 2460 /feddan, with a rate of change of about 54.67%. The value of organic fertilizer (compost) for the potato crop grown organically amounted to about EGP 4320 /feddan, representing about 9.58% of the total costs.

While the value of organic fertilizer (compost) for the traditionally grown potato crop amounted to about EGP 1000 / feddan, representing about 3.56% of the total costs, which means that the organic cultivation of the potato crop has resulted in an increase in the value of organic fertilizer (compost) estimated at about EGP 3320 /feddan, with a rate of change of about 332%.

While the pest resistance value of the organically grown potato crop amounted to about EGP 3520 / feddan, representing about 19.66% of the total costs, while the pest resistance value of the traditionally grown potato crop amounted to about EGP 3000 / feddan, representing about 21.35% of the total costs, which means that the organic cultivation of this crop has resulted in an increase in the value of pest resistance estimated at EGP 520 / feddan, with a rate of change of about 17.33%.

The value of chemical fertilizers for the traditional potato crop amounted to about EGP 3000 /feddan, representing about 10.68% of the total costs, while chemical fertilizers were not used in organic farming, which means that the traditional cultivation of potato crops resulted in an increase in the value of chemical fertilizers. It is estimated at EGP 3000 /feddan, with a rate of change of about 100%. Hence, the average total variable costs of organic potatoes amounted to about EGP 21000 / feddan, representing about 86.11% of the total costs, while the average total variable costs for the traditional crop amounted to about EGP 14300 / feddan, representing about 84.70% of the total costs, which means that the organic farming of the potato crop has resulted in an increase in variable costs estimated at EGP 6700 /feddan, with a rate of change of about 46.85%.

The average general expenditures for organic cotton were about EGP 100 /feddan, representing about 0.591% of the total costs, while the average public expenditures for the traditional crop were about EGP 200 /feddan, representing about 1.07% of the total costs. This means that the organic cultivation of the potato crop has resulted in a decrease in public expenditures estimated at about EGP 100 /feddan, with a rate of change of about 50%.

While the opportunity cost of the organic grown potato crop is about EGP 4500 /feddan, representing about 13.30% of the total cost, while the average opportunity cost for the traditional crop was about EGP 4000 /feddan, representing about 14.23% of the total cost, which means that the organic cultivation of the potato crop has resulted in an increase in the opportunity cost estimated at EGP 500 /feddan, with a rate of change of about 12.50%.

As for the average total costs of organic cotton about EGP 25600 /feddan, while the total average total costs of the traditional crop amounted to about EGP 18500 /feddan, which means that organic farming of the potato crop has resulted in an increase in the average total costs estimated at EGP 7100 /feddan, with a rate of change of about 38.38%.

By arranging the relative importance of the cost items in the potato crop in the two farming patterns, it is clear that:

- 1- In the case of organic cultivation of the potato crop, the value of rent (opportunity cost) came in the first place in terms of the importance of cost items, followed by the value of human labor in the second place, then the values of organic fertilizer (compost) in the third place, followed by mechanical work, resistance to Pests, public expenses, then the value of seeds in the last place.
- 2- In the case of traditional potato cultivation, the rent value (opportunity cost) came in the first place in terms of the importance of cost items, followed by human labor in the second place, then the values of chemical fertilizer, mechanical work, public expenses, pest control, organic fertilizer, Then piety in last place.
- 3- By measuring the impact of organic farming on some cost items of the potato crop, the largest rate of change came in the value of organic fertilizer, followed by pest resistance.

The Impact of Organic Farming of The Potato Crop on Some Productive and Economic Indicators

To estimate the financial feasibility of the impact of organic farming on some indicators of the productive and economic efficiency of the potato crop, the study has dealt with some indicators of productive efficiency in order to analyze and compare some financial criteria such as

production costs, feddan productivity, and total revenues. , net return, average return per ton produced, average cost per ton produced as standards for production efficiency, the study also dealt with the return/cost ratio, the ratio of revenues to total variable costs, the ratio of revenues to total costs, the ratio of variable costs to the main output, the profitability of the invested EGP as criteria for economic efficiency, in addition to using the break-even price to cover total costs, break-even quantity to cover total costs, break-even price to cover variable costs, break-even quantity to cover variable costs.

1. The Impact of Organic Cultivation of The Potato Crop on Some Productive Indicators: The results shown in Table No. (5) indicate the following:

- a. Average Productivity:** The average productivity of the potato crop grown organically was about 13 tons/feddan, while the average productivity of the traditional crop was about 15 tons/feddan, which means that the organic cultivation of the crop has resulted in a decrease in productivity estimated at about 2 tons/feddan, at a decreasing rate of about 13.33%.
- b. The Farm Price:** The average farm price for the organic potato crop was about EGP 5000 /ton, while the average farm price for the traditional crop was about EGP 1800/ton, which means that the organic farming of the potato crop has resulted in an increase in the farm price at a rate of about EGP 3200 /ton, with a rate of change of about 177.8%.
- c. Total Revenue:** The average total revenue of the potato crop grown organically amounted to about EGP 65000 /feddan, while the average total revenue of the crop grown traditionally was about EGP 27000 /feddan. This means that organic farming has resulted in an increase in total revenue by about EGP 38000 /feddan, with a rate of change of about 140.74%.

Table (5)- The impact of organic cultivation of the potato crop on some productive indicators during the production season 2019-2020.

Item	Types of farming		Impact	
	Organic farming	Traditional farming	Organic farming	Traditional farming
Average productivity (tons)	13	15	(2)	(13.33)
Farm price (EGP)	5000	1800	3200	177.8
Total Revenue (EGP)	65000	27000	38000	140.74
Net return (EGP)	39400	8500	30900	363.53
Cost (EGP /ton)	1969	1233	736	59.67
Average yield (EGP/ton)	3031	1800	736	59.67

Source: Data collected and calculated from the questionnaire prepared for the study.

- d) Net Feddan Yield:** The average net yield per feddan of the comparative organic potato crop was about EGP 39400 /feddan, while the average net yield per feddan of the traditional crop was about EGP 8500 /feddan, which means that the organic farming of the potato crop has resulted in an increase in the net yield feddan at a rate of about EGP 30900 /feddan, with a rate of change of about 363.53%.
- e) The Cost of a Ton Produced:** The cost average of a ton produced for an organically grown potato crop was about EGP 1969 /ton, while the average cost of a ton produced for a traditionally grown crop was about EGP 1233 /ton. This means that

the organic farming of the potato crop has resulted in an increase in the cost per ton produced by about EGP 736 /ton, with a rate of change of about 59.67%.

- f) Yield Per Ton Produced:** The average yield per ton produced for the organically grown potato crop was about EGP 3031 /ton, while the average yield per ton produced for the traditionally grown crop was about EGP 1800 /ton. This means that the organic cultivation of the potato crop has resulted in an increase in the yield of the produced ton by an amount of about EGP 1231 / ton, with a rate of change of about 68.38%.

From the above it is clear that:

1. The decrease in the productivity per feddan of the organic farming pattern by about 2 tons / feddan compared to the traditional farming pattern of the potato crop.
2. The organic cultivation of the potato crop resulted in an increase in the farm price, the total revenue, and the net yield per feddan, in addition to an increase in the cost and revenue of a ton produced from organic potatoes.

2. The Impact of Organic Cultivation of The Potato Crop on Some Economic Indicators: The results shown in Table No. (6) indicate the following:

- a) Revenue/Cost Ratio:** The cost-return ratio for the comparatively grown organic potato crop was about 2.54 times, while the cost-return ratio for the traditional crop was about 1.36 times, which means that the organic cultivation of that crop has resulted in an increase in the cost-return ratio by It reached about 1.08 times, with a rate of change of about 74%.
- b) The Ratio of Revenues to Total Variable Costs:** The ratio of revenues to total variable costs of the potato crop grown organically amounted to about 309.5%, while the ratio of revenues to total variable costs of the traditionally grown crop amounted to about 188.8%, which means that traditional agriculture resulted in a decrease in the ratio of revenues to total variable costs by about 120.71%.
- c) The Profit of The Invested Pound:** the profit of the invested pound for the potato crop grown organically amounted to about EGP 1.54, while the profit of the invested pound for the crop grown traditionally amounted to about EGP 0.46, which means that the organic farming of the potato crop has resulted in an increase in the profit of the invested pound by an amount of about EGP 1.08, with a rate of change of about 235%.
- d) The Break-Even Price to Cover the Total Costs:** The break-even price to cover the total costs of the potato crop grown organically amounted to about EGP 1379, while the break-even price to cover the total costs of the comparative crop grown traditionally amounted to about EGP 80.8. This means that the organic cultivation of the potato crop has resulted in an increase in the break-even price to cover the total costs by an amount of about EGP 1299, with a rate of change of about 1608%.
- e) The Break-Even Point to Cover the Total Costs:** The break-even point to cover the total costs of the organic grown potato crop was about 12.5 tons, while the break-even point to cover the total costs of the traditionally grown crop was about 10.28 tons. This means that the organic cultivation of the potato crop has resulted in a decrease in the break-even point to cover the total costs by an amount of about 5.16 tons, and with a decreasing rate of change of about 50.18%.

Table No. (6)- The impact of organic farming of the potato crop on some economic indicators during the production season 2019-2020.

Item	Types of farming		Impact	
	Organic farming	Traditional farming	Organic farming	Traditional farming
Return to cost ratio (times)	2.54	1.46	1.08	74
% of revenue to total variable costs	309.5	188.8	120.7	63.93
Profitability of the pound spent (in EGP)	1.54	0.46	1.15	292
Break-even price to cover total costs (in EGP)	1379	80.8	1299	1608
Break-even amount to cover total costs. (in ton)	5.12	10.28	(5.16)	(50.18)
Break-even price for variable costs (in EGP)	1615	953	662	69
Break-even quantity for variable costs. (ton)	4.20	7.9	(3.74)	(47.13)

Source: Collected and calculated from the questionnaires prepared for the study.

* The numbers in brackets are negative values.

- f) The Break-Even Price to Cover the Variable Costs:** The break-even price to cover the variable costs of the potato crop grown organically amounted to about EGP 1615, while the break-even price to cover the variable costs of the crop grown traditionally amounted to about EGP 953, which means that the organic cultivation of cotton has resulted in an increase in the break-even price to cover the variable costs, with amount of about EGP 662, with a rate of change of about 69%.
- g) The Break-Even Point to Cover the Variable Costs:** The break-even point to cover the variable costs of the potato crop grown organically amounted to about 4.20 tons, and the break-even point to cover the variable costs of the crop grown conventionally reached about 7.9 tons, which means that the organic cultivation of the potato crop has resulted in a decrease The break-even point to cover variable costs amounted to about 3.74 tons, with a rate of change of about 47.13%.

From the above it is clear that:

1. Increasing the rate of return to costs for the organically grown potato crop by an amount of about 1.08, with a rate of change of about 74%.
2. Increasing the profit of the invested pound for the organically grown potato crop by about 0.08, with a rate of change of about 235%.
3. Decreasing the amount of break-even to cover the total costs of the organically grown potato crop by an amount of about 5.16 tons, with a decreasing rate of change of about 50.18%.

The Impact of Organic Farming of The Potato Crop on Both Agricultural Production and Income

With the aim of using organic farming to reduce the use of chemical fertilizers and pesticides and their harmful effects on human health, as well as achieving the largest net return as a result of the high prices of organic products and thus increasing agricultural income, as well as increasing export opportunities for organic products.

- a) Impact of Organic Farming of The Potato Crop on Agricultural Production:** Table No. (7) show the impact of the generalization of organic farming on the agricultural production of the potato crop through the proportions of organic farming replacing traditional farming potato will be 5.494 million tons, and if 10% of the area cultivated traditionally is replaced by organic farming for the potato crop, the expected production

will be 5.578 million tons, with a decrease of about 84.5 thousand tons, and a rate of change of about 1.54%, while in the case of replacing 20% of the traditionally cultivated area with organic cultivation of the potato crop, the expected production will be 6,296 million tons, with a decrease of about 718 thousand tons, with a rate of change of about 12.88%, while in the case of replacing 40% of the conventionally cultivated area with organic cultivation the expected production is 7.649 million tons, with a decrease of about 1.35 million tons, with a rate of change of about 21.48%, while in the case of replacing 50% of the traditionally cultivated area with organic farming, the expected production is 2.367 million tons, with an increase of about 5.283 million tons, at a rate of change of about 60.06%. In the case of replacing the total traditionally cultivated area with 100% organic cultivation of the potato crop, the expected production will be 6.339 million tons, with a decrease of about 3.972 million tons, and a rate of change of about 167.9%.

Table No. (7)- Impact of organic cultivation of the potato crop on agricultural production during the production season 2019-2020.

Replacement percentage %	Cultivated area (10 ³ feddan)		Expected production (10 ³ ton)		Expected total impact of production (10 ³ ton)	amount of change (10 ³ ton)	Rate of change %
	Traditional	Organic	Traditional	Organic			
0%	422.6	-	5493.8	-	5493.8	-	-
10%	380.3	42.26	4944.4	633.9	5578.3	(84.5)	(1.54)
20%	338.1	126.8	4395	1901.7	6296.7	(718)	(12.88)
40%	295.8	253.6	3845.7	3803.4	7649.1	(1352)	(21.48)
50%	84.52	84.52	10989.8	1267.8	2366.6	5283	69.06
100%	-	422.6	-	6339	6339	(3972)	(167.9)

Source: Collected and calculated from the questionnaire prepared for the study.

b) The Impact of Organic Farming of The Potato Crop on Agricultural Income: Table No. (8) shows the expansion of organic farming on the agricultural income of the potato crop through the proportions of organic farming replacing traditional farming and its impact on the total revenues, as it becomes clear that when the volume of traditional production 100%, the total revenues of the potato crop amount to about EGP 25.76 million, and in the event that 10% of the area cultivated traditionally is replaced by organic farming for the potato crop, the expected revenues will be EGP 26.05 million, an increase of about EGP 286 thousand, and a rate of change of about 1.10%, but if 20% of the volume of traditional production is replaced by organic cultivation of the potato crop, the expected revenues will be EGP 25.47 million, with a decrease of about EGP 572 thousand, and a change rate of about 2.25%. and in the event that 40% of the volume of traditional production is replaced by organic cultivation of the potato crop, the expected revenues will be EGP 27.76 million, an increase of about EGP 2290 thousand, and a change rate of about 8.25%, while in the case of replacing 50% of the volume of traditional production with organic cultivation of the potato crop, the expected revenues will be EGP 35.30 million, an increase of about EGP 7441 thousand, with a rate of change of about 21.1%, but in the case of the complete replacement of organic farming for the potato crop, where 100% of the volume of production is organic, then the expected revenues are EGP 41.21 million, an increase of about EGP 6010 thousand, and a change rate of about 14.58%.

Table No. (8)- The impact of organic cultivation of the potato crop on agricultural income during the production season. 2019 / 2020

Replacement percentage %	Cultivated area (10 ³ feddan)		Expected production (10 ³ ton)		Expected total impact of revenue (10 ³ ton)	amount of change (10 ³ ton)	Rate of change %
	Traditional	Organic	Traditional	Organic			
0%	5493.8	-	25.750	-	25.759	-	-
10%	4944.4	633.9	23,183	2862	26.045	286	1.10
20%	4395	1901.7	20.321	5152	25.473	(572)	(2.25)
40%	3845.7	3803.4	17.459	10.304	27.762	2290	8.25
50%	10989.8	1267.8	14.597	20.607	35.204	7441	21.1
100%	-	6339	-	41.214	41.214	6010	14.58

Source: Collected and calculated from the questionnaire prepared for the study.

From the above it is clear that:

1. In the event that 10% of the traditionally cultivated area is replaced by organic cultivation of the potato crop, the expected production will be 5493.8 thousand tons, with a decrease of about 84.5 thousand tons, with a rate of change of about 1.54%, and the expected revenue volume will be about EGP 25.76 million, with a decrease of about 286 million pounds, with a rate of change of about 1.10%.
2. In the event that 100% of the traditionally cultivated area of the potato crop is replaced by organic cultivation, the expected production will be 6339 thousand tons, a decrease of about 3872 thousand tons, and a change rate of about 167.9%, with an expected revenue volume of about EGP 41.21 million, an increase of about it amounts to about EGP 6010 thousand, with a change rate of about 14.58%.

Fourth: Evaluation of The Impact of Organic and Traditional Agriculture of The Grape Crop in Egypt

This part of the study deals with an evaluation of the impact of organic and traditional farming on the grape crop in Egypt, by studying the impact of organic and traditional cultivation of the grape crop on some cost items of the grape crop in Egypt.

1. **Impact of Organic Farming of the Grape Crop on Some Cost Items:** In order to estimate the financial feasibility of using the organic farming method, the study dealt with the effect of some cost items as a comparison between each of the organic and traditional farming methods, in terms of the most important items of variable costs represented in the value of human labor, the value of work automation, the value of seeds, the value of organic fertilizer (compost), the value of pest resistance, the value of chemical fertilizer, in addition to the rental value (opportunity cost), and general expenses, and then an estimate of the total costs for both organic and traditional farming methods.

It is clear from the data of Table No. (9) that the value of human labor for grapes grown organically amounted to about EGP 10.510 thousand / feddan, representing about 37.29% of the total costs, while the value of human labor for grapes grown traditionally amounted to about EGP 7500 thousand / feddan, which represents about 37.5% of the total costs, which means that the organic cultivation of the grape crop has resulted in an

increase in the value of human labor estimated at EGP 3010 / feddan, with a rate of change of about 40.1%.

The value of mechanized work for grapes grown organically amounted to about EGP 2.640 /feddan, representing about 9.37% of the total costs, while the value of mechanized work for grapes grown traditionally amounted to about EGP 1000 /feddan, representing about 5% of the total costs, which means that the organic cultivation of the grape crop has resulted in an increase in the value of mechanical work estimated at EGP 1640 /feddan, with a rate of change of about 164%, and the value of organic fertilizer (compost) for grapes grown organically amounted to about EGP 6640 /feddan, representing about 23 percent. 56% of the total costs, while the value of organic fertilizer (compost) for the traditionally grown grape crop amounted to about EGP 1000 / feddan, representing about 7.50% of the total costs, this means that the organic cultivation of the grape crop has resulted in an increase in the value of organic fertilizer (compost) estimated at EGP 5,640 pounds/, with a rate of change of about 564%.

Table No. (9)- The impact of organic farming of the grape crop on some cost items during the agricultural season 2019-2020

Types of farming Cost items (EGP)	Types of farming				Impact	
	Organic farming		Traditional farming		Organic farming	Traditional farming
	Value	%	Value	%		
Human labor	10510	37.3	7500	37.50	3010	40.1
Automated work	2640	9.37	1000	5.00	1640	164.0
Seeds	0.0	0.0	0.0	0.0	0.0	0.0
Compost	6640	23.56	1000	5.00	5640	564.0
Pest resistance	2676	9.49	1500	7.50	1176	78.4
Chemical fertilizer	0.0	0.00	3000	15.00	(3000)	(100)
Variable costs	22466	79.7	14000	70.00	8466	60.5
Rent	5000	17.7	4500	23.1	500	11.1
General expenses*	720	2.55	1000	5.00	(280)	(28)
Total costs	28186	100	20000	100	8186	40.9

Source: Collected and calculated from the questionnaires prepared for the study, * the numbers in brackets are negative values.

While the value of pest resistance for grapes grown organically amounted to about EGP 2676 / feddan, representing about 9.49% of the total costs, while the value of pest resistance for grapes grown traditionally amounted to about EGP 1500 / feddan, representing about 7.50% of the total costs. This means that the organic cultivation of this crop resulted in an increase in the value of pest resistance estimated at EGP 1176 /feddan, with a rate of change of about 78.4%. The value of chemical fertilizers for the traditional grape crop amounted to about EGP 3000 /feddan, representing about 15% of the total costs, while chemical fertilizers were not used in organic farming, which means that the traditional cultivation of the grape crop has resulted in an increase in the value of chemical fertilizers estimated at about EGP 3000 /feddan, with a rate of change of about 100%.

Hence, the average total variable costs for organic grape amounted to about EGP 22.466 thousand / feddan, representing about 79.7% of the total costs, while the average total variable costs for the traditional crop amounted to about EGP 14 thousand / feddan, representing about 70% of the total costs. This means that the organic cultivation of the grape crop has resulted in an increase in variable costs estimated at EGP 8.466 /feddan, with a rate of change of about 60.5%, and the average public expenditures for organic grape has reached about EGP 720 /feddan, representing about 2.55% of the total costs, while the average public expenditures for the traditional crop amounted to about 1000 pounds/feddan, representing about 5% of the total costs, which means that the organic cultivation of the grape crop resulted in a decrease in public expenditures estimated at about EGP 280 /feddan, with a rate of change of about 4.7%, while the opportunity cost of the grape crop grown organically amounted to about EGP 5000 /feddan, representing about 17.7% of the total costs, while the average opportunity cost of the traditional crop was about EGP 4500 /feddan, representing about 23.1% of the total costs, this means that the organic cultivation of the grape crop has resulted in an increase in the opportunity cost estimated at EGP 500 /feddan, with a rate of change of about 11.11%. As for the total average total costs of organic grape about 28.186 thousand /feddan, while the total average total costs of the traditional crop amounted to about EGP 20 thousand /feddan, which means that the organic cultivation of the grape crop has resulted in an increase in the average total costs estimated at about EGP 8.186 thousand pounds/feddan, with a rate of change of about 40.9%.

By arranging the relative importance of the cost items in the grape crop in the two farming patterns, it is clear that:

1. In the case of organic cultivation of the grape crop, human labor came in the first place in terms of the importance of cost items, followed by a value in the second place, then the values of organic fertilizer (compost) in the third place, followed by mechanical work, pest control, public expenses, and then the value of the seeds is in last place.
2. In the case of the traditional cultivation of the grape crop, human labor came in the first place in terms of the importance of cost items, followed by chemical fertilizers in the second place, then the rental value (opportunity cost), mechanical work, public expenses, pest control, and organic fertilizer, then the seeds in last place.
3. By measuring the effect of organic farming on some cost items of the grape crop, the largest rate of change came in the value of organic fertilizer, followed by pest resistance.

2. The Impact of Organic Farming of Grapes on Some Productive and Economic Indicators:

To estimate the financial feasibility of the impact of organic farming on some indicators of productive and economic efficiency of the grape crop, the study has dealt with some indicators of production efficiency in order to analyze and compare some financial criteria such as production costs, productivity per feddan, total revenues, net yield, average yield per ton produced, average cost per ton produced. As criteria for productive efficiency, the study also dealt with the ratio of revenue / costs, the ratio of revenues to total variable costs, the ratio of revenues to total costs, the ratio of variable costs to the main output, the profit of the invested pound as criteria for economic

efficiency, in addition to using the break-even price to cover total costs, the break-even point to cover total costs, the break-even price to cover variable costs, and the break-even quantity to cover variable costs.

3. The Effect of Grape Cultivation on Some Indicators:

The indicators shown in Table No. (10) refer to the following:

- a) **Average productivity per feddan:** The average feddan of crop was about 14 tons/feddan, which means that the organic farming of the crop has resulted in a decrease in feddan estimated at (1) tons/feddan, with a decreasing change of about 6.7%.
- b) **Farm price:** The average farm price for organic grapes was about EGP 5500 /ton, while the average farm price for the traditional crop was about EGP 3500 /ton. This means that the organic cultivation of the grape crop has resulted in an increase in the cultivated price by about EGP 2000 /ton, with a rate of change of about 57.1%.
- c) **Total revenue:** The average total revenue of grapes grown organically amounted to about EGP 77 thousand /feddan, while the average total revenue of crops grown traditionally amounted to about EGP 52.500 thousand /feddan, which means that organic farming has resulted in an increase in total revenue by about EGP 24.500 /feddan, with a rate of change of about 46.7%.
- d) **Net yield per feddan:** The average net yield per feddan of the comparatively grown grape crop was about 48,814 thousand pounds/feddan, while the average net yield per feddan of the traditional crop was about 33 thousand pounds/feddan, which means that the organic cultivation of the grape crop has resulted in an increase net yield per feddan amounted to about EGP 15.814 /feddan, with a rate of change of about 47.9%.

Table (10)- Impact of organic farming of the grape crop on some productive indicators during the production season 2019-2020.

Item	Types of farming		Impact	
	Organic agriculture value	Traditional agriculture value	amount of change (10 ³ ton)	Rate of change %
Average of productivity (ton)	14	15	(1)	(6.7)
Farm price (EGP)	5500	3500	2000	57.1
Total revenue (EGP)	77000	52500	24500	46.7
Net revenue (EGP)	48814	33000	15814	47.9
Cost (EGP/ton)	2013	1300	713.3	54.9
Average of revenue (EGP/ton)	3487	2200	1287	58.5

Source: Collected and calculated from the questionnaires prepared for the study.

- e) **The cost of a ton produced:** The average cost of a ton produced for grapes grown organically was about EGP 2013 /ton, while the average cost of a ton produced for crops grown traditionally was about EGP 1333 /ton, which means that organic farming of grapes has resulted in an increase in the cost of a ton produced. At a rate of about EGP 679.95 / ton, with a rate of change of about 51%.
- f) **Yield per ton produced:** The average yield per ton produced for grapes grown organically was about EGP 3487 /ton, while the average yield per ton produced for crops grown traditionally was about EGP 2200 /ton, which means that organic

farming of grape crops has resulted in an increase in yield per ton produced. At a rate of about EGP 1287 / ton, with a rate of change of about 58.5%.

From the above it is clear that:

1. The decrease in the productivity per feddan of the organic farming pattern by about 1 ton/feddan compared to the traditional farming pattern of the grape crop.
2. The organic cultivation of the grape crop resulted in an increase in the farm price, the total revenue, and the net yield per feddan, in addition to an increase in the cost and revenue of a ton of organic grapes.

Impact of Organic Farming of the Grape Crop on Some Economic Indicators: The Results Shown in Table No. (11) Indicate the Following

- a) **Revenue/cost ratio:** The cost-return ratio for the comparatively grown organic grape crop was about 2.48 times, while the cost-return ratio for the traditional crop was about 2.63 times, which means that the organic cultivation of that crop has resulted in an increase in the cost-return ratio. by an amount of about 0.14 times, with a rate of change of about 5.39%.
- b) **The ratio of revenues to total variable costs:** The ratio of revenues to total variable costs of grapes grown organically amounted to about 311.6%, while the ratio of revenues to total variable costs of crops grown traditionally amounted to about 375%, which means that traditional agriculture has resulted in the percentage of revenues to total variable costs decreased by about 63.42%.
- c) **The profit of the invested pound:** the profit of the invested pound for the grape crop grown organically amounted to about EGP 1.73 \, while the profit of the invested pound for the crop grown traditionally amounted to about EGP 1.63, which means that the organic cultivation of the grape crop has resulted in an increase in the profit of the invested pound by an amount It amounted to about EGP 0.04, with a rate of change of about 2.34%.
- d) **The break-even price to cover the total costs:** The break-even price to cover the total costs of the grape crop grown organically amounted to about EGP 5224, while the break-even price to cover the total costs of the comparative crop grown traditionally amounted to about EGP 316. This means that the organic cultivation of the grape crop has resulted in an increase in the break-even price to cover the total costs by about 4908 pounds, with a rate of change of about 1552%.
- e) **The amount of break-even to cover the total costs:** The amount of break-even to cover the total costs of the grape crop grown organically amounted to about 5.12 tons, while the amount of break-even to cover the total costs of the crop grown conventionally amounted to about 5.71 tons. This means that the organic cultivation of the grape crop has resulted in a decrease in the amount of break-even to cover the total costs by an amount of about (0.45 tons), and with a decreasing rate of change of about (8.02%).
- f) **The break-even price to cover the variable costs:** The break-even price to cover the variable costs of the grape crop grown organically amounted to about EGP 1605, while the break-even price to cover the variable costs of the crop grown traditionally amounted to about 933 pounds, which means that the organic cultivation of cotton has resulted in an increase in the break-even price to cover the variable costs. An amount of about EGP 671, with a rate of change of about 71.9%.

- g) The break-even amount to cover the variable costs:** the break-even amount to cover the variable costs of the grape crop grown organically amounted to about 4.08 tons, and the break-even amount to cover the variable costs of the crop grown traditionally amounted to about 4 tons, which means that the organic farming of the grape crop has resulted in a decrease in the break-even amount to cover Variable costs amounted to about 0.08 tons, with a rate of change of about 2.12%.

Table No. (11)- Impact of organic farming of the grape crop on some economic indicators during the production season 2019-2020.

Item	Types of farming		Impact	
	Organic farming	Traditional farming	Organic farming	Traditional farming
Return to cost ratio	2.73	2.69	0.04	1.47
% of revenue to total variable costs	311.6	375	(32.26)	(8.60)
Profitability of the pound spent (EGP)	1.73	1.69	0.04	2.34
Break-even price to cover total costs (in EGP)	5224	316	4908	1552
Break-even amount to cover total costs. (ton)	5.12	5.57	(0.45)	(8.02)
Break-even price for variable costs (EGP)	1605	933	671	71.9
Break-even quantity for variable costs. (ton)	4.08	4.00	0.08	2.12

Source: Collected and calculated from the questionnaires prepared for the study,

* the numbers in brackets are negative values.

From the above it is clear that:

1. Increasing the cost-return ratio of organically grown grapes by about 0.04, with a rate of change of about 1.47%.
2. Increasing the profitability of the invested pound of grapes grown organically by an amount of about 0.04, with a rate of change of about 2.34%.
3. A decrease in the amount of break-even to cover the total costs of the organically grown grape crop by about 0.45 tons, with a decreasing rate of change of about 8.02%.

Impact of Organic Farming of The Grape Crop on Both Production and Agricultural Income:

With the aim of using organic farming to reduce the use of chemical fertilizers and pesticides and their harmful effects on human health, as well as achieving the largest net return as a result of the high prices of organic products and thus increasing agricultural income, as well as Increasing export opportunities for organic products.

a. The Impact of Organic Farming of The Grape Crop on Agricultural Production:

Table No. (12) shows the impact of the generalization of organic farming on the agricultural production of the grape crop through the proportions of organic farming replacing traditional farming. Grapes are 6.667 million tons, and if 10% of the traditionally cultivated area is replaced by organic cultivation for the grape crop, the expected production will be 2.686 million tons, an increase of about 163.5 thousand tons, and a change rate of about 16.13%. While in the case of replacing 20% of the traditionally cultivated area with organic cultivation of the grape crop, the expected production will be 2.991 million tons, with an increase of about 776.5 thousand tons, with a rate of change of about 28.91%, while in the case of replacing 40% of the area cultivated with traditional With organic cultivation, the expected production is 3.581

million tons, with an increase of about 138.96 thousand tons, with a rate of change of about 46.46%, while if 50% of the grape area is replaced by traditional organic cultivation, the expected production is 1.105 million tons, by An increase of about 470 thousand tons, with a rate of change of about 131.23%. In the case of replacing the total area of grapes with traditional 100% organic cultivation of the grape crop, the expected production will be 2.858 million tons, with an increase of about 401 thousand tons, and a rate of change of about 362%.

Table No. (12)- Impact of organic cultivation of the grape crop on agricultural production during the production season 2019-2020

Replacement ratio	Grape area (10 ³ ton)		Expected production (10 ³ ton)		Total expected impact of Production (10 ³ ton)	Amount of change	Rate of change %
	Traditional	Organic	Traditional	Organic			
0%	190.5	-	266.7	-	266.7	-	-
10%	171.5	19.1	2400.3	285.75	2686.1	(163.5)	(6.13)
20%	152.4	57.2	2133.6	857.3	2990.9	(776.5)	(28.91)
40%	133.4	114.3	1866.9	1714.5	3581.4	(1389.6)	(46.46)
50%	38.1	28.1	533.4	571.5	1104.9	4700	131.23
100%	-	190.5	-	2857.5	2857.5	(1005)	(362)

Source: Collected and calculated from the questionnaires prepared for the study.

* The numbers in brackets are negative values.

- b. Impact of organic farming of the grape crop on agricultural income:** Table No. (13) shows the expansion of organic farming on the agricultural income of the grape crop through the rates of substitution of organic farming for traditional farming and its impact on the total revenues, as it is clear that when the volume of traditional production 100%, the total revenues of the grape crop amount to about EGP 52500, and in the event that 10% of the area cultivated traditionally is replaced by organic cultivation of the grape crop, the expected revenues will be EGP 53083, an increase of about EGP 5.83 thousand, and a rate of change of about 1.10 %, but in the case of replacing 20% of the volume of traditional production with organic cultivation of the grape crop, the expected revenues will be EGP 52.500 thousand, an increase of about EGP 583 thousand, and a change rate of about 1.11%. In the case of the complete replacement of grapes by organic agriculture, where 100% of the volume of production is organic, the expected revenues will be EGP 84 thousand pounds, an increase of about EGP 10.500 million, and a change rate of about 12.50%.

Table No. (13): Impact of organic farming of the grape crop on agricultural income during the production season 2019-2020.

Replacement ratio	Expected production (10 ³ ton)		Expected Revenue (EGP 10 ⁶)		Total expected impact of revenue (EGP10 ³)	Amount of change	Rate of change %
	Traditional	Organic	Traditional	Organic			
0%	266.7	-	52500	-	52500	-	-
10%	2400.3	285.75	47250	5833	53083	(583)	(1.10)
20%	2133.6	857.3	42000	10500	52500	583	1.11
40%	1866.9	1714.5	36750	21000	57750	(5250)	(9.09)
50%	533.4	571.5	31500	42000	73500	(15750)	(21.43)
100%	-	2857.5	-	84000	84000	(10500)	(12.50)

Source: Collected and calculated from the questionnaires prepared for the study.

* The numbers in brackets are negative values.

Fifth: The Problems Facing The Expansion of Organic Agriculture in The Study Sample:

Organic agriculture is exposed to many problems that affect the quantities produced and prices, which causes severe fluctuations in the supply of that agriculture, which affects farmers' decisions in their production and by exploring the opinions of farmers about the problems facing the expansion of organic agriculture in the study sample showed that it was represented by the population increase, the issue of food security, and the increase in demand for agricultural commodities, especially food, with 27 farmers representing about 90% of the total sample, while one farmer representing about 3.33% believes that to some extent there is a problem, while 2 farmers represent about 6.67 % that there is no problem, the fragmentation of possession resulting from the small size of agricultural holdings by 25 farmers representing about 83.33% of the total sample, the high costs of organic farming with the decrease in feddan productivity by 22 farmers representing about 73.33% of the total sample, while 5 farmers representing about 16.67% think that there is some extent a problem, while 3 farmers represent about 10% that there is no problem, the absence of marketing structures that guarantee marketing the organic product to ensure a rewarding return for the farmer, with 21 farmers representing about 70% of the total sample, while 7 farmers representing about 23.33% think that there is some kind of problem, while 3 farmers represent about 10% that there is no problem, low demand for organic products Because of their high prices compared to their traditional counterpart, 19 farmers representing about 63.33% of the total sample, while 9 farmers representing about 30% think that there is some kind of problem.

That 2 farmers represent about 6.67% that there is no problem, low treatment expenses for diseases resulting from environmental pollution and thus the development of human resources by the number of 19 farmers representing about 63.33% of the total sample, while 7 farmers representing about 23.33% see that to some extent there is a problem, that 4 farmers representing about 13.33% believe that there is no problem, not making use of human, animal and plant waste for organic fertilization, with 18 farmers representing about 60% of the total sample, while 9 farmers representing about 30% think that to some extent there is a problem, that one farmer represents About 10.00% that is no problem. Table No. (14).

By using χ^2 test to determine the extent of the problems-within-problems relationship and by comparing χ^2 value calculated with its tabular theory at the usual levels of significance, it was

found that the relationship between problems within problems was not significant at the 0.01 level of significance.

Table No. (14): Problems facing the expansion of organic farming, in the sample of the study, during the production seasons 2019-2020.

Problems	Yes		To some extent		No		χ^2	χ^2 tabular at (1) degrees of freedom and a significant level	
	Repetition	%	Repetition	%	Repetition	%		0.05	0.01
1- The population increase, the issue of food security, and the increase in demand for agricultural commodities, especially food	27	90.00	1	3.33	2	6.67	38.48	21.03	26.22
2- Possessive fragmentation resulting from the small size of agricultural holdings.	25	83.33	3	10.00	2	6.67			
3- High costs of organic farming with low productivity per feddan.	22	73.33	5	16.67	3	10.00			
4- The lack of marketing structures that guarantee the marketing of the organic product to ensure a rewarding return for the farmer.	21	70.00	7	23.33	3	10.00			
5- Low demand for organic products due to their high prices compared to their traditional counterparts.	19	63.33	9	30.00	2	6.67			
6- Decrease in treatment expenses for diseases resulting from environmental pollution, and thus the development of human resources.	19	63.33	7	23.33	4	13.33			
7- Not making use of human, animal and plant waste for organic fertilization.	18	60.00	9	30.00	3	10.00			
Total	30	100	30	100	30	100			

Source: Collected and calculated from the questionnaires prepared for the study

The Economic Returns of Organic Farming in The Study Sample

By surveying the opinions of farmers about the economic returns of organic farming, it is clear from the data of Table No. (15) the following:

1. Increasing exports of organic agricultural products, whether manufactured, semi-processed or raw, to foreign markets by 25 farmers representing about 83.33% of the total sample.
2. Making use of human, animal and plant waste for organic fertilization and increasing the fertility and vitality of the soil by 22 farmers representing about 73.33% of the total sample.
3. Protecting the environment and cleaning it from waste by recycling it and using it in a healthy way, and reducing air, surface and ground water pollution by 20 farmers, representing about 66.67% of the total sample.
4. Providing what is spent on purifying drinking water and treating waste water by 17 farmers, representing about 56.67% of the total sample.
5. Obtaining a clean agricultural product free from harmful effects, with 15 farmers representing about 53.33% of the total sample.

Table No. (15) The economic returns of organic farming in the study sample during the 2019-2020 production season.

Returns	Frequency	%
1- Increasing exports of organic agricultural products, whether processed, semi-processed or raw, to foreign markets	25	83.33
2- Utilizing human, animal and plant waste for organic fertilization and increasing soil fertility and vitality	22	73.33
3- Protecting the environment and cleaning it from waste by recycling and using it in a healthy way, and reducing air, surface and ground water pollution	20	66.67
4- Saving what is spent on purifying drinking water and treating waste water	20	66.67
5- Providing treatment expenses for diseases resulting from environmental pollution, and thus developing human resources	17	56.67
6- Obtaining a clean agricultural product free from harmful effects	15	50.00
Total	30	100.00

Source: Collected and calculated from the questionnaires prepared for the study.

Second: Prediction Results Using the Arima Model for The Production Capacity of Potato and Organic Grape Crops in Egypt

1- Potato Crop: By studying the production capacity of the potato crop, it was found that by examining the statistical models, the best two models were chosen (1,0,2)) ARTMA, (1,2,2) ARTMA, and by comparison between them, the best model that was reached was chosen, as it gives the least total square error (LSS) is estimated at about 422.78, so that the difference between the actual and the estimated model is as low as possible, which is the ARTMA 1,0,2 model.

$$Y_t = 5.55 - 0.043t$$

$$(6.98) ** (-9.77) **$$

Results of the forecast for the production capacity contained in Table No. (16), Figure (1), show that it reached about 345.12 thousand tons in 2022, then increased to about 400.36 thousand tons in 2030, and it ranged between two minimum and maximum levels, reaching about 657.32 and 143.39 thousand tons in 2030.

Table No. (16) The expected production capacity of the potato crop in Egypt during the period 2022-2030.

Year	Lower limit	Upper limit	Forecasting
2022	304.82	385.43	345.12
2023	280.01	437.16	358.58
2024	246.21	482.34	364.27
2025	221.89	518.21	370.05
2026	202.08	549.77	375.92
2027	185.02	578.75	381.89
2028	169.86	606.04	387.95
2029	156.09	632.12	394.10
2030	143.39	657.32	400.36
2031	131.55	681.86	406.71

Source: Collected and calculated from the sample questionnaire.

Residue Error Test (Ljuny Box Q (18)): To test the importance of the autocorrelations of the residuals, through a statistic that follows the chi-square distribution, as it reached about 9.7 in the analysis of the residuals. It is evident that the probability P value is greater than 0.05, which indicates that the model is random and follows a normal distribution, as the P value was about 0.38.

2- Grape Crop: By studying the production capacity of the grape crop, it was found that by examining the statistical models, the best two models were chosen (ARTMA, 1,2,2) 2,1,2), and by comparison between them, the best model was chosen, as it gives the least The total square error (RSS) is estimated at about 67.86, so that the difference between the actual and the estimated model is as low as possible, which is the ARTMA 2,1,2 model.

$$Y_t = 4.73 - 0.155 t$$

$$(7.63) ** (-13.76) **$$

The results of the forecast for the production capacity in Table No. (17) and Figure (2) show that it reached about 101.79 thousand tons in 2022, then decreased to about 109.11 thousand tons in 2031, and it ranged between two minimum and maximum levels that reached about 208.53 and 9.68 thousand tons in 2031.

Table No. (17) The expected production capacity of the grape crop in Egypt during the period 2022-2030.

Year	Lower limit	Upper limit	Forecasting
2022	85.64	117.94	101.79
2023	79.69	127.58	99.14
2024	57.31	143.35	100.33
2025	47.52	155.55	101.54
2026	39.44	166.09	102.76
2027	32.38	175.62	104.00
2028	26.03	184.48	105.25
2029	20.21	192.84	106.52
2030	14.78	200.83	107.81
2031	9.68	208.53	109.11

Source: Collected and calculated from the sample questionnaire.

Residual Errors Test (Ljuny Box Q (18)): To test the significance of the autocorrelations of the residuals, through a statistic that follows the chi-square distribution, as it reached about 11.5 in the residual analysis. It is evident that the probability P value is greater than 0.05, which indicates that the model is random and follows a normal distribution, as the P value was about 0.24.

Third: Prediction Results Using the Arima Model for The Export Capacity of Organic Potato and Grape Crops in Egypt

1- Potato Crop: By studying the export capacity of the potato crop, it was found that by examining the statistical models, the best two models were chosen (1,0,2))ARTMA, 1,2,2))ARTMA, and by comparison between them, the best model that was reached was chosen, as it gives the least sum of squares error (LSS) is estimated at about 0.327, so that the difference

between the actual and the estimated model is as small as possible, which is the ARTMA 1,0,2 model.

$$Y_t = -2.32 - 4.04*t$$

$$(-1.49) ** (-9.23) **$$

The results of the forecast for the export capacity in Table No. (18), Figure (3) show that it reached about 3.03 thousand tons in 2022, then decreased to about 3.02 thousand tons in 2031, and it ranged between two minimum and maximum levels, reaching about - 0.960, 7.00 thousand tons in 2030.

Residual Errors Test (Ljuny Box Q (18)): To test the importance of the autocorrelations of the residuals, through a statistic that follows the chi-square distribution, as it reached about 6.5. It is evident that the probability P value is greater than 0.05, which indicates that the model is random and follows a normal distribution, as the P value was about 0.69.

Table No. (18) The expected export capacity of the potato crop in Egypt during the period 2022-2030.

Year	Lower limit	Upper limit	Forecasting
2022	4.15	1.91	3.033
2023	4.71	1.33	3.024
2024	5.14	0.904	3.024
2025	5.49	0.550	3.023
2026	5.80	0.241	3.023
2027	6.08	0.037-	3.023
2028	6.33	0.291-	3.023
2029	6.57	0.528-	3.023
2030	6.79	0.750-	3.022
2031	7.00	0.960-	3.022

Source: Collected and calculated from the sample questionnaire.

2- Grape Crop: By studying the export capacity of the grape crop, it was found that by examining the statistical models, the best two models were chosen ARTMA, (1,2,2), (2,1,2), and by comparison between them, the best model was chosen, as it gives the least The total square error (LSS) is estimated at about 140.37, so that the difference between the actual and the estimated model is as small as possible, which is the ARTMA 2,1,2 model.

$$Y_t = 6.01 - 0.208t$$

$$(6.30) ** (-7.60) **$$

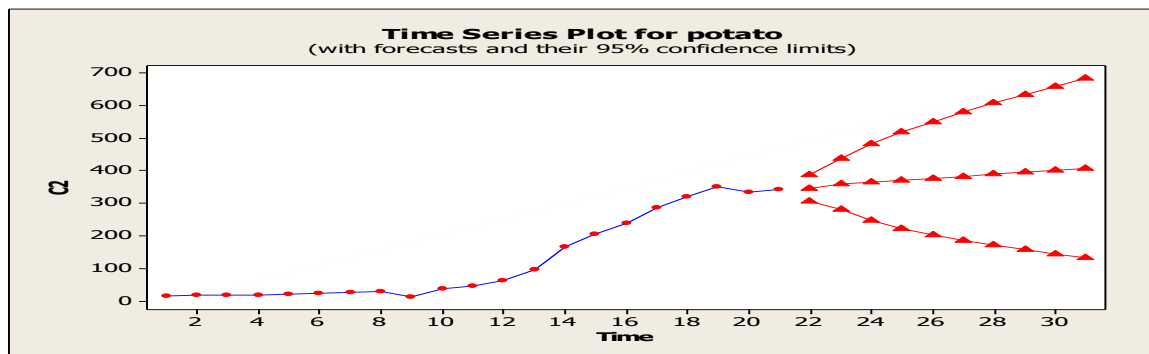
The results of the forecast for the export capacity in Table No. (19), Figure (4) show that it reached about -28.17 thousand tons in 2022, then decreased to about -1.52 thousand tons in 2031, and it ranged between two minimum and maximum levels, reaching about -79.50,76.44 thousand tons in 2031.

Table No. (19) The expected export capacity of the grape crop in Egypt during the period 2022-2030.

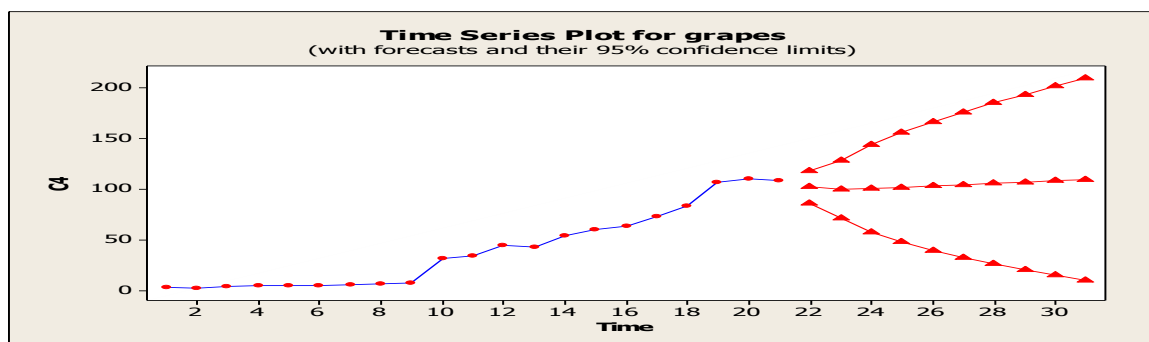
Year	Lower limit	Upper limit	Forecasting
2022	4.95 -	51.40 -	-28.17
2023	17.38	86.65 -	-34.63
2024	43.90	90.80 -	-23.44
2025	57.44	89.19 -	-15.87
2026	65.14	86.64 -	-10.75
2027	69.77	84.33 -	-7.27
2028	72.64	82.50 -	-4.92
2029	74.47	81.14	-3.33
2030	75.66	80.18	-2.25
2031	76.44	79.50 -	-1.53

Source: Collected and calculated from the sample questionnaire.

Residual Errors Test (Ljung Box Q (18)): To test the importance of the autocorrelations of the residuals, through a statistic that follows the chi-square distribution, as it reached about 5.5. It is evident that the probability P value is greater than 0.05, which indicates that the model is random and follows a normal distribution, as the P value was about 0.79.

**Figure (1) The expected production capacity of the potato crop in Egypt during the period 2022-2030.**

Source: Collected and calculated from the sample questionnaire.

**Figure (2) The expected production capacity of the grape crop in Egypt during the period 2022-2030.**

Source: Collected and calculated from the sample questionnaire.

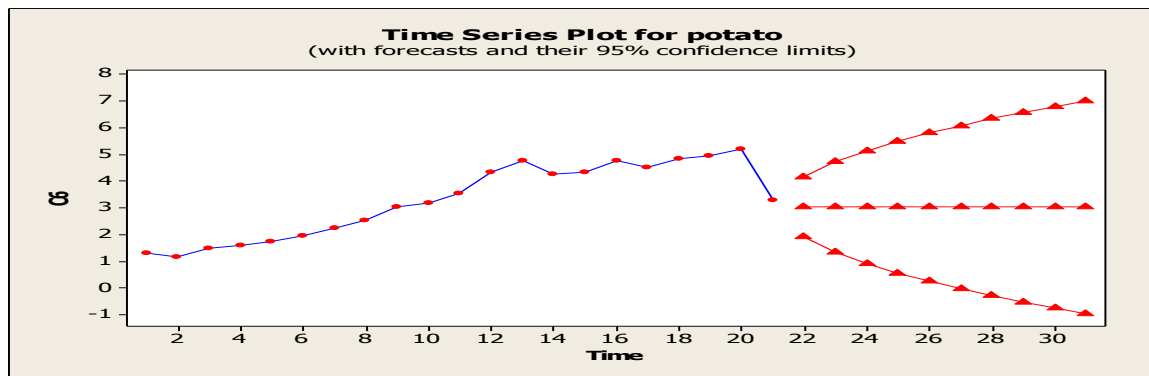


Figure (3) The expected export capacity of the potato crop in Egypt during the period 2022-2030.

Source: Collected and calculated from the sample questionnaire.

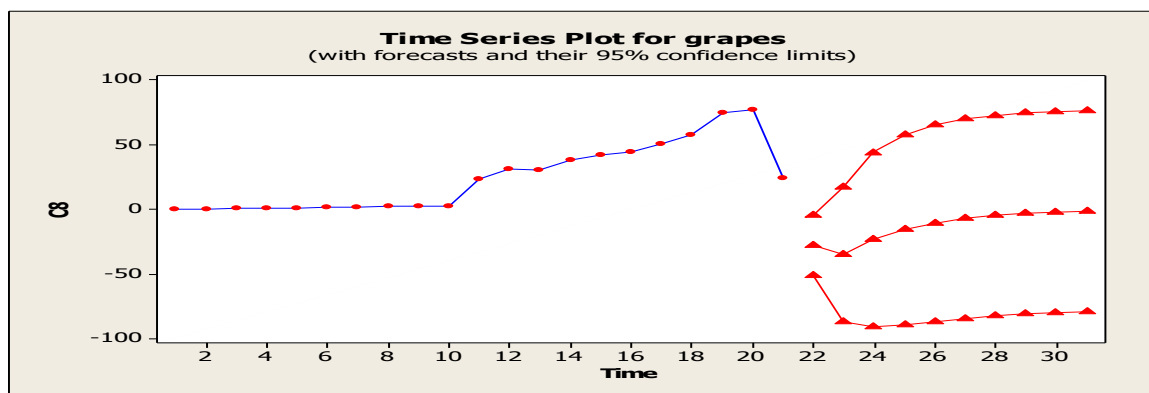


Figure (4) The expected export capacity of the grape crop in Egypt during the period 2022-2030.

Source: Collected and calculated from the sample questionnaire.

Recommendations

Related to the results obtain in the research. It recommends the following:

1. The need to pay attention to increasing the areas of organic farming in Egypt, given the steady global increase in the areas of organic farming, in order to meet the new global needs and requirements for healthy and safe food free from agricultural chemical residues.
2. Work to coordinate efforts between producers and exporters by exchanging information, publishing programs, and holding seminars and training courses in the field of growing crops that are in high demand in foreign markets.
3. The need to work to increase exports of organic agricultural products, whether manufactured, semi-processed or raw, as the export prices of organic products are several times the export prices of non-organic agricultural products, which contributes to an increase in foreign exchange.
4. Increasing interest in scientific research in deepening specialized studies and providing a database on the negative effects of the use of agricultural chemicals and their impact on human and animal health and the deterioration of soil productivity, while producing the necessary alternatives to produce clean agriculture, and introducing both the producer and the consumer to the benefits of organic farming.

CONCLUSION

The agricultural sector is considered one of the main sectors in the Egyptian economy, as it contributes to achieving economic and social development, and the agricultural sector contributes about 15.3% of the gross domestic product, which is estimated at about EGP 671.8 billion in 2020, and in employing about 6.2 million workers working in this sector, representing about 29.2% of the total employment during the year 2020 (). Agricultural production represents a large proportion of the national income, which requires the use of modern methods of biotechnology and economic efficiency at the same time, so countries compete to increase the crop production of agricultural lands through horizontal development and vertical development using modern agricultural technologies to increase production such as non-traditional fertilizers and organic fertilizers, Which would lead to an increase in the competitiveness of the countries that apply these technologies, in addition to the fact that the modern trend now is to differentiate between the production of one country and another, not through the quantity produced, but rather through the quality and quantity of the product, and this is the case of export crops of vegetables and fruits, which represent an important percentage of exports, as well as for field crops such as Egyptian cotton and rice, which is considered one of the most important crops that occupy a great place in the national economy, whether at the level of individual farms or at the national level.

The recent years have witnessed a great interest in applying international conditions and standards on Egyptian agricultural exports, which led to a decrease in the amount of agricultural exports of most agricultural crops, especially food crops of vegetables and fruits. Biological as an alternative to traditional agriculture to produce food crops free from various pesticide residues.

The research aims at an economic study on the current and future situation of organic agriculture in Egypt through studying the following sub-objectives:

- The relative importance of organic agriculture in Egypt.
- The current situation of organic and traditional cropping area in Egypt.
- Evaluation of the impact of organic and traditional cultivation of potato and grape crops in Egypt.
- The economic problems and returns facing the expansion of organic agriculture in the specific study.
- Identifying the future situation resulting from the current situation of the production and export capacity of the study crops.

In order to achieve the objective of the research, the study used the descriptive and quantitative statistical analysis method to explain and present the current and future situation of organic agriculture in Egypt, General trend function. Erma, Arima prediction model and χ^2 were used in the analysis. During the collection of questionnaires for an intentional sample that was collected during the agricultural season 2019-2020 through a personal interview with respondents at production sites in organic farms for the study crops from the governorates of El-Beheira governorate (potatoes) and Ismailia governorate (grapes). The sample consists of 30 farmers, of whom 15 are potato growers from the sample size, and 15 are grape growers, including traditional and organic, in addition to secondary data are collected from agricultural economic bulletins issued by the Central Administration of Agricultural Economics, and

published and unpublished secondary data issued by official authorities, including the Ministry of Agriculture and Land Reclamation, and specialized centers. For organic agriculture, which is the Egyptian Center for Organic Agriculture, the Biodynamic Society, the Union of Producers and Exporters of Organic Agricultural Crops, the World Federation of the Organic Agriculture Movement, and the Food and Agriculture Organization, in addition to references, books, studies, and scientific research related to the subject of the study.

As a result of the application of international standards and conditions on Egyptian agricultural exports, which led to a decrease in the amount of agricultural exports of most agricultural crops, especially food crops of vegetables and fruits. Therefore, exporters began to adopt an organic farming method that relies on organic fertilization and biological control as an alternative to traditional agriculture to produce food crops. Free of various pesticide residues. The research aims at an economic study on the current and future situation of organic agriculture in Egypt.

A study of the impact of organic farming of the potato crop on some productive and economic indicators revealed a decrease in the productivity per feddan of the organic farming pattern by about 2 tons/feddan compared to the traditional farming pattern of the potato crop. The organic cultivation of the potato crop also resulted in an increase in the farm price, total revenue, and net yield per feddan, in addition to an increase in the cost and return of a ton produced from organic potatoes. The study showed an increase in the cost-return ratio of the organically grown potato crop by about 1.08, with a rate of change of about 74%. Likewise, the profit of the invested pound for the organically grown potato crop increased by about 0.08, with a rate of change of about 235%. The break-even point to cover the total costs of the organically grown potato crop decreased by about 5.16 tons, with a decreasing rate of change of about 50.18%. The study also showed a decrease in the acre productivity of the organic farming pattern by about 1 ton / feddan compared to the traditional cultivation pattern of the grape crop, and an increase in the farm price, total revenue, and net yield per feddan, in addition to an increase in the cost and return of a ton produced from organic grapes, and an increase in the cost-return ratio. For organically grown grape crops by about 0.04, with a rate of change of about 1.47%, an increase in profit for the investor's pound for organically grown grapes by about 0.04, with a rate of change of about 2.34%, and a decrease in the amount of break-even to cover the total costs. The organically grown grape crop amounted to about 0.45 tons, with a decreasing rate of change of about 8.02%. The study also clarified the most important problems facing the expansion of organic agriculture in particular, the study that affects the quantities produced and prices, which causes severe fluctuations in the supply of that agriculture, which affects farmers' decisions in their production.

Based on The Results Reached, The Research Recommends the Following:

1. The need to pay attention to increasing the areas of organic farming in Egypt, given the steady global increase in the areas of organic farming, in order to meet the new global needs and requirements for healthy and safe food free from agricultural chemical residues.
2. Work to coordinate efforts between producers and exporters by exchanging information, publishing programs, holding seminars and training courses in the field of growing crops that are in high demand in foreign markets.
3. The need to work to increase exports of organic agricultural products, whether manufactured, semi-processed or raw, as the export prices of organic products are

several times the export prices of non-organic agricultural products, which contributes to an increase in foreign exchange.

4. Increasing interest in scientific research in deepening specialized studies and providing a database on the negative effects of the use of agricultural chemicals and their impact on human and animal health and the deterioration of soil productivity, while producing the necessary alternatives to produce clean agriculture, and introducing both the producer and the consumer to the benefits of organic farming.

References

- [1]. Abdel-Tawab Abdelaziz Al-Yamani (1996), Lectures on Evaluation of Agricultural Projects, Faculty of Agriculture, Tanta University.
- [2]. Ahmed Abdel-Wahhab Abdel-Gawad (1999), The Summit of Transition to Organic Agriculture in the Arab World, Conference on Safe Agricultural Production Strategy in the Arab World - Cairo 27: 29 October.
- [3]. Ahmed Ismail Mostafa Ghazaleh (2006), An Economic Study of Some Biotechnology Products in Agriculture, PhD thesis, Department of Agricultural Economics, Alexandria University.
- [4]. Ahmed Mohamed El-Araby (1996), Organic Agriculture and Continuous Development, Symposium on Agriculture and Environmental Challenges, Sixth Conference on Agricultural Development Research - Faculty of Agriculture - Ain Shams University.
- [5]. Amal Mohamed Al-Maghazi Mohamed (2002), An Economic Study of Organic Agriculture Technology in the Arab Republic of Egypt PhD thesis, Department of Agricultural Economics, Faculty of Agriculture, Cairo University.
- [6]. Anaam Abdel-Fattah Mohamed & Heba Yassin Abdel-Fattah (1979), An Economic Evaluation of Organic Agriculture for Some Vegetable Crops (Case Study), Egyptian Journal of Agricultural Economics, Volume (12), Issue (3), September.
- [7]. Ashraf Abdullah Al-Fityani (1995), Evaluation of Some Agricultural Projects in the Governorates of Kafr El-Sheikh and El-Beheira Msc thesis, Department of Agricultural Economics, Faculty of Agriculture in Kafr El-Sheikh, Tanta University.
- [8]. Gaber A. B. Shehata, (2014), General Statistics, Dar Al-Wafaa for Donia Printing and Publishing, first edition, Alexandria.
- [9]. Magdi Al-Shorbagy (1994), Econometrics Theory and Practice, Department of Foreign Trade, Faculty of Commerce and Business Administration, Helwan University.
- [10]. Mohamed Abdel-Hamid El-Damiry (2015), An Economic Evaluation of the Use of Non-Traditional Fertilizers in New Lands, Ph.D. Thesis, Department of Agricultural Economics - Faculty of Agriculture, Moshtohor, Benha University.
- [11]. Saad Zaki Nassar (1979), Financial, Economic and Social Evaluation of Projects, Contemporary Egypt Magazine, Issue No. (37), Cairo, October.
- [12]. Shaima Masoud, Bdeir Eleiwa (2011), The Economics of Organic and Inorganic Agriculture, Msc Thesis, Department of Agricultural Economics - Faculty of Agriculture - Kafr El-Sheikh University.