

## Economic Efficiency of Tomato Production in Fayoum governorate, Egypt

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### ABSTRACT

The study aimed to identify the economic effects of pollution by increasing the use of chemical fertilizers for tomato crop in Fayoum governorate and the effect of the relationship between the amount of chemical fertilizer and the value of plant production of tomato crop as well as the quantity of chemical fertilizers and the export value of Egyptian tomatoes. And to analyze the current status of tomato crop in Fayoum governorate and to find ways to reduce the size of the loss in the crop and not export it. It was also found that although the summer season occupies the first place in the relative importance of the cultivated area by 46.7%, but its total production falls to about 44.1% of the total production of tomatoes in Fayoum governorate, while the winter season came in second place in the relative importance of the cultivated area (39.8%). Its total production reached about 44.4% of the total production of the three lugs, The Nile season was ranked third in relative importance (13.3%) and relative importance of its total production was about 13.11% of the total production of the three lugs Chemical fertilizers are one of the main production elements in Egyptian agriculture. Nitrogen fertilizers are the first nutrient that determines the productivity of the crops because of the lack of Egyptian soil in general for this element. The phosphorus is in second place. This is related to the consumption of chemical fertilizers of about 102335 thousand tons and is consumed from nitrogen fertilizers towards 87370 tons while producing about 5519 thousand tons while consuming about 13838 thousand tons of phosphate fertilizers and produces about while the consumption of potassium fertilizers about 1127 thousand tons and all imported from abroad. A study of the relationship between the amount of phosphate fertilizers as a function in the quantity of plant production showed that by increasing the amount of phosphate fertilizers in one unit, the increase in the value of the plant production was about 0.662 million and the study of the relationship between the amount of phosphate fertilizers and sulfur as a function in the value of the plant production is increased by one unit leading to increasing the value Plant production was about LE0.572 million. A study of the relationship between the amount of phosphate fertilizers, sulfur and potassium fertilizers as a function in the value of plant production showed that by increasing the amount of fertilizers together in one unit leading to an increase in the value of plant production about 0.899 million pounds .It was also found that the amount of phosphate fertilizers, sulfur and potash fertilizers is not Has a significant impact on the value of plant production followed by the amount of phosphate fertilizers and sulfur and then comes in the back of the amount of phosphate fertilizers in the impact on the quantity and value of plant production may be due to excessive use of this fertilizer, despite the seriousness of human health It is recommended that the study should not be excessive in the use of chemical fertilizers, phosphates, potash and pesticides, as the excessive use of chemical fertilizers leads to the disruption of biological or natural balance of soil. Which increases the acidity and damage of its natural and chemical properties as an environment suitable for agriculture, as well as serious damage to public health, and the excessive use of pesticides also leads to the emergence of different symptoms of the disease on the plant and fruits and in contrast increase the cultivated area used for fertilizers to increase agricultural exports of crop tomatoes.

**Keywords:** Tomato, economic Efficiency, Fayoum governorate, chemical fertilizers.

### Introduction

The tomato crop is considered one of the most important crops of the vegetables. It is one of the most important sources of national agricultural income, which occupies an important position in export to attract foreign exchange to the Egyptian economy. The tomato production reached LE 8.19

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billion, representing about 46.2% of the vegetable production value of 17.73 billion. The total amount of tomato exports reached about 2947 thousand tons representing about 5.3% of the quantity of exports of Egyptian vegetables which amounted to about 555.52 thousand tons worth about 87.79 million pounds representing about 4.7% of the value of exports of vegetables, which amounted to 1869.55 million pounds for the same period and the cultivated area about 490.26 thousand feddans and productivity reached production of about 15.7 tons / feddan 0.7492 thousand tons Respectively three lugs during the period (2010-2017) and despite the importance of the crop, but the local production to meet the requirements of national consumption. Where cultivated land and production has been decreasing in recent years. The cultivated area in Fayoum has decreased from 25.2 thousand feddan to about 20.86 thousand feddan for the Nile hill and the average production has decreased from about 15.69 tons to about 13.11 tons in 2016 - 2017, while the area decreased from about 19.48 thousand feddan to about 15.07 thousand feddan for the winter peak. The average production increased from about 15.26 tons to about 17.71 tons for the same year while the area of the summer rose from about 22.3 thousand feddan to About 23.45 thousand feddan and the average production increased from about 14.35 tons to about 15.4 tons for the same year. Chemical fertilizers are considered to be the main production elements in Egyptian agriculture and have been used to increase production through the important elements of nitrogen, phosphates and potassium. Nitrogen fertilizers is the first nutrient that determines the productivity of crops because Egyptian soil is not generally present in this element. Phosphorus is in second place, The chemical fertilizer is about 102335 thousand tons consumed from nitrogen fertilizers about 87370 thousand tons, while producing about 5519 thousand While consuming about 13388 thousand tons of phosphate fertilizers and produces about 1592 thousand tons, while consuming from the Potassium fertilizer about 1127 thousand tons and all imported from abroad, The increase in the use of pesticides increases production costs to the extent that the crop cannot be produced and marketed in a profitable manner. The increased concentration of pesticides in the soil also makes it impossible to grow crops exported because they contain outstanding residues of pesticides beyond the permissible limits. Agricultural development is subject to some modern concepts in the environment, the most important of which is clean agriculture. The Ministry of Agriculture has been concerned with clean agriculture in the areas of research and agricultural production for production boom events in order to achieve self-sufficiency and to try to export it to specifications acceptable to the global market free of chemicals, making it safe for the health of the individual and reducing pollution problem.

#### **Economic Importance of Tomato Crop:**

Tomatoes are considered of export crops are available where the place of the climatic conditions, which were able to be cultivated in interval throughout the year to allow export. However, the exports of tomatoes slim, where the amount of which exports amounted to about 23.69 thousand tons, representing about 0.34% of the amount world exports of Fresh tomatoes, which amounted to about 6991.2 thousand tons, representing about 0.3% of domestic production as tomato export value amounted to about 11.23 million dollars, and the price per ton of Egyptian exports of fresh tomatoes around \$ 739.9 /ton represents the value of Egyptian exports and the price per ton about 0.14%, 66.4% from its global counterpart, which amounted to about 7799.6 million Lar, 1114.1 dollars/ton respectively.

#### **Search problem:**

Despite the importance of tomato economic and food crops, it faces the problem of fluctuations in productivity of the feddan from year to year, as well as from one season to another. Despite Egypt enjoyed the relative advantage in many crops, but in many cases these crops lose the comparative advantage due to the weakness of the competitive advantages of the Egyptian agricultural crops in the world market which led to the fluctuation in the quantities and values and rates of Egyptian agricultural export growth and thus continue The chronic deficit in the Egyptian trade balance.

It is also considered Tomato crop of Export crops and as a source of foreign exchange it is one of the most agricultural products that have been damaged due to their nature. The problem of research includes a decrease in cultivated area and production of tomato crop. This is due to the failure to meet the requirements of Egyptian agricultural exports which are facing difficulties due to the increase in the percentage of residues from chemicals which has caused the problem of loss of this crop of

economic problems that cause significant losses of agricultural production and the outputs of its farms to use bio - fertilizers high price and thus which Ka fiber production on Egyptian farms.

#### **Study Goals:**

The research aims to identify the economic effects of increasing the use of fertilizers for tomato crop in Fayoum governorate And analysis of the relationship between the amount of chemical fertilizers and the value of plant production as well as the amount of chemical fertilizers and the value of exports of Egyptian tomatoes . And analysis of the current status of tomato crop in Fayoum Governorate. And to find ways to reduce the volume of loss in the crop and not export.

#### **Research Methodology and Data Sources:**

The research relied on following the inductive method in the economic analysis from the descriptive point of view and following the deductive method in quantitative terms. Many analytical tools and mathematical and statistical methods were used to achieve the desired objectives of the research such as the general time trend and the simple regression of the relations between the variables.

It was obtained used data from the Ministry of Agriculture and land reclamation, economic affairs sector, the Central Administration of Agricultural Economics, the General Authority for the Fund for Agricultural Budget, the Egyptian Center for Fertilizer Development, the Central Agency for Public Mobilization and Statistics, the Food and Agriculture Organization (FAO), the Ministry of Economy and Foreign Trade, Ministry of Industry, some fertilizer companies. The questionnaire forms were designed to collect research data from a field sample in Fayoum Governorate A sample of 100 is selected in the geometric mean for the cultivated area and the number of holders in Fayoum .

#### **Characterization of the study sample:**

The research sample was taken according to the method of the stratified random sample of the tomato farms in the season Nilotic in Fayoum governorate by the center of Tamiya and Watsa from the governorate. The basis and justification for the selection of the sample is the cultivated area and the number of holders in the centers of Tamiya and Watsa Fayoum Governorate, where reached 34.1%, 24.3% of the total number of transplanted reins holders of the governorate and is estimated at about 4502 Feddan, 3211 Feddan agricultural season 2016-2017 The villages of Al-Rawdah and Al-Mataili were selected with an estimated area of 419, about 460 Feddans of Tamiya center. And the villages of Manshiyet Al-Amir and Abdul Majeed facility with an area estimated at about 254, about 242 Feddans of the center of Atsa.

#### **Research findings**

##### **First: The current situation of tomato crop in Fayoum governorate:**

Table (1) Evolution of the cultivated area with tomato yield during the period (2010 -2017). It was found that the tomato crop is grown in three varieties (Summer- Winter - Nili) The cultivated areas and the productivity of the area varied And the total production in these lugs.

##### **1 - Total production of tomatoes:**

The production of tomatoes in Fayoum depends on both the total cultivated area and the productivity of the feddan. This is due to the total number of loaves, indicating that the planted area ranged from a minimum of 43.2 Thousand feddans in 2010, The maximum unit is about 59.6 Thousand feddans in general 2017, With an annual average of about 49,4 Thousand feddan, and the total area has taken a general trend, which is increasing statistically significant, with an annual increase of about 7.3 Thousand feddan at an annual growth rate of about 1.4 % of the average area cultivated during the study period.

With regard to productivity it ranged from a minimum of about 13.2 Tons / feddan in 2010 and Maximum reached 17.2 tons / feddan year in 2017 with an average annual rate of about 15.7 Ton / fed. The average tomato production of tomatoes has taken an overall trend which is statistically

significant and the annual increase is about 0.21 Ton / Fed at an annual growth rate of about 1,11 % of the average productivity of the redemption .

As for the total production of the tomato crop has ranged between a minimum of about 5 , 42 , 04 Thousand tons in 2010 The maximum unit was about 1027.5 Thousand tons a year in 2017 With an annual average of about 749 Thousand tons In general, total output has taken an increasing general trend and has not been statistically significant . As shown in Table (1) the development of tomato production according to the three seasons:

### **1. Production of tomatoes in the summer season:**

The average area planted with summer tomato was about 22.3 Thousand feddans represents about 46.7 % of the total area for the three dynasties, and by estimating the general time trend of the cultivated area, a general trend of increasing statistical significance was recorded with an annual increase of about 2, 8 Thousand feddans and an increase rate of about 1.2 % of the average area cultivated during the study period.

In terms of productivity, it ranged from a minimum of about 14.3 Ton / feddan year 2010, United The highest d 15.2 tons / feddan year in 2017 With an annual average of about 14.7 tons / feddan, and the average tomato production of tomato has taken years increasingly significant trend statistically, the amount of the annual increase of about 0.2 and 14 were Ton / fed at an annual growth rate of about 1.2 % of the average productivity of the feddan.

As for the total production of tomato crop, it ranged between a minimum of about 220.4 Thousand tons in 2010 The maximum was about 378.6 Thousand tons a year in 2017 With an annual average of about 210, 5 A roll tons and in general the total output has taken years a growing trend and did not prove the moral statistically.

### **2. Production of tomatoes in the winter season: -**

The average area planted with winter tomatoes was about 19.48 Thousand feddans represents about 39.8 % of the total area of the three triples. In estimating the general time trend of the cultivated area, a general trend was recorded with an annual increase of about 3.5 Thousand feddans and an increase rate of about 2.11 % of the average cultivated area during the study period.

In terms of productivity P has ranged from a minimum of about 15.8 tons / feddan in 2010, United The highest d 17.7 tons / feddan year in 2017 With an annual average of about 16.5 tons / feddan, and the average tomato production of tomato has taken years increasingly significant trend statistically, and reached the annual R Introduction to increase about 0, 1 5 Ton / fed at an annual growth rate of about 0,855 % of the average productivity of the feddan.

As for the total production of tomato crop has ranged between a minimum of about 293.45 Thousand tons in 2010 Maximum reached about 3 51.5 Thousand tons a year in 2017 with an annual average of about 242.63 In general, total production has taken an increasing general trend and has not been statistically significant.

### **3. Production of tomatoes in the Nili season: -**

The average area planted with Nile tilapia was about 25.2 thousand feddan, representing about 13.3% of the total area of the three cultivars. In estimating the general time trend of the cultivated area, the overall trend was significantly decreasing by an annual decline of about 1.15 thousand feddan, 2.1% of the average cultivated area during the study period.

In terms of productivity, it ranged between 15.69 tons / feddan in 2010 and an average of 13.11 tons/ fed in 2017 with an annual average of 12.81 tons / fed. The average tomato production of tomatoes was a statistically significant trend, and the annual increase was about 0.126 tons / fed at an annual growth rate of about 0.19% of the average productivity of the feddan.

The total production of tomato crop ranged between a minimum of 15.5 thousand tons in 2010 and a maximum of about 16.7 thousand tons in 2017 with an annual average of about 16.1 thousand tons. In general, the total production took a decreasing trend and did not Morality is statistically significant.

From the above, it is clear that although the summer season occupies the first place in the relative importance of the cultivated area by 46.7%, its total production falls to about 44.1% of the total tomato production in Fayoum Governorate. The relative importance of the cultivated area was

(39.8%), but its total production amounted to 44.4% of the total production of the three lattices, the third was the relative importance of the third (13.3%) and the relative importance of its total production 13.11% of the total production of the three lugs.

**Table 1:** The parameters of the general time trend equations for the evolution of both area and productivity and the total production of tomatoes the three seasons during the period (2010-2017).

Items	Variables	A	B	R 2	T	Average	Rate of change%
<b>Total</b>	Area thousand feddans	43 , 26	7,32	0.46	3.3 **	49.46	1.49
	Production ton / fed	13. 20	0.205	0.63	4.74 **	15.71	1.1 1
	Production thousand tons	642.53	133.18	0.19	1.78	749	1.77
<b>Summer season</b>	Area thousand feddans	198.61	2 .84	0.32	2.47 *	229.35	1. 21
	Production ton / fed	12.41	0.2 14	0.82	7.78 **	14.33	1.21
	Production thousand tons	2 2 0.8	112.5	0.62	4.59 **	21 0.4	2.41
<b>Winter season</b>	Area thousand feddans	19 .4 1	4.93	0.59	3.51**	12.48	2.11
	Production ton / fed	15.81	0.151	0.45	3.31 **	16.51	0.855
	Production thousand tons	293.4	11.12	0.59	4.35 **	242.63	2.81
<b>Nili season</b>	Area thousand feddans	25 .17	-1.45	0.34	- 2 .18 **	25. 33	2.1
	Production ton / fed	13.11	0.1 26	0.27	2.78 *	12.81	0.1 9
	Production thousand tons	15.64	- 8.36	0.44	-0.76	16.6	0.58

1. Source: - Compiled and calculated from the data of agricultural statistics in the Directorate of Agriculture Fayoum Governorate 2010 -2017
2.  $Y_i$  = Estimated value of each tomato area , And total production of tomato per year I
3.  $X_i$  = Time variable, I) 1, 2 ..... 14
4. A, B = Refers to the constant limit and the regression coefficient of the equation respectively.
5. (\*\*) indicate the significance of the regression or model at a significant level (0.01)
6. (\*) Indicates morale at a significant level (0.05)( - 2)
7. R = Modified Selection Factor.

**Second: The economic effects of increasing the chemical fertilization on the production and productivity of tomato crop for sample farmers in Fayoum governorate:**

In order to study this relationship, the statistical hypothesis was formulated: "There is no significant relationship between the amount of fertilization and the productivity of the tomato yield for the sample of the study in Fayoum Governorate.

**1- Phosphate Fertilizer:**

Table (2) shows correlation coefficients to test the relationship between phosphate fertilizer and the productivity of the tomato crop for the study sample in Fayoum governorate and the value of the coefficient of simple correlation was estimated at about -442. It was found that the relationship of reverse correlation is greater than its tertiary counterpart at a significant level 0.05, and the value of the statistical significance of Pearson P-value was 0.01, which is less than the level of 5% This makes us reject the first statistical hypothesis that there is no significant relationship between phosphate fertilizer and the productivity of the tomato crop.

## **2- Sulfur fertilization:**

As shown in table no (2) a significant relationship between fertilization sulfur and between productivity feddan crop tomato sample study in Fayoum governorate and the value of the simple correlation coefficient, which amounted to about 0.349 account which is larger than its counterpart Tabulated at the level of moral .05, and the value of the statistical significance of the coefficient of Pearson P-value Has reached about 0, 02 Which is below the level of 5%. This leads us to reject the second statistical hypothesis that there is no significant relationship between sulfur fertilization and the productivity of the tomato crop.

## **3- Nitrate fertilization:**

The correlation between nitrate fertilization and the feddan yield of tomato yield was examined for the study sample in Fayoum governorate. The simple correlation coefficient was calculated at 0.116, which is less than the tabular correlation at 0.05 level. P-value has reached about 0, 32, which is greater than the level of morale of 5%. This makes us accept the third statistical hypothesis that there is no significant relationship between nitrate fertilization and the productivity of the tomato crop as shown in Table (2).

## **4. Potassium fertilization:**

As shown in table no (2) a significant relationship between potassium fertilization and between productivity feddan crop tomato sample study in the province of Fayoum was the value of i Alaratba coefficient of simple calculation, which amounted to about 0.304 It is larger than its counterpart Tabulated at the level of moral .05, and the value of the statistical significance of the coefficient of Pearson P-value Has reached about 0.009, which is less than the level of 5%. This leads us to reject the fourth statistical hypothesis that there is no significant relationship between potassium fertilization and the productivity of the tomato crop.

## **5- Urea fertilization:**

As shown in table no (2) The relationship between the fertilization of urea and the productivity of the tomato yield of the tomato crop of the sample of the study in Fayoum Governorate and the value of the simple correlation coefficient, which was 0.227 - less than the tabular correlation at a significant level 0.05 , and the value of the Pearson coefficient P-value Has reached about 0.052 which is greater than the level of moral 5%, and this makes us accept the fifth statistical hypothesis that there is no significant relationship between the fertilization of urea and the productivity of the redemption of the tomato crop.

## **6 - Biofertilizers**

The correlation between the use of fertilizers and the productivity of the tomato yield for the sample of the study in Fayoum Governorate is shown in Table (2). The simple correlation coefficient, which is bout 0.361, is greater than its table value at 0.05 level. P-value has reached about 0.002, which is less than the level of 5%, and this makes us reject the fifth statistical hypothesis that there is no significant relationship between the use of fertilizers and the productivity of the redemption of the tomato crop.

## **7 – Farmyard manure:**

The correlation between the Farmyard manure and the feddan yield of the tomato crop was examined. The simple correlation coefficient value was calculated at 0.106. The correlation coefficient was found to be less than the titular correlation at 0.05 level. The statistical significance of Pearson P-value has reached about 0.368, which is greater than the level of 5%. This makes us accept the fifth statistical hypothesis that there is no significant relationship between the use of municipal fertilizers and the productivity of the tomato crop.

And can be seen from Table (2) study the relationships the previous correlation and may show that the Productivity per harvest tomatoes feddan were of significant relation at the moral level of 0.01 for each of the fertilization of phosphate, sulfur, potassium, and fertilizers while it was with no significant relationship to the rest of the independent studied variables such as: Nitrates, urea and municipal fertilizer.

The following results show that there is a significant correlation between the productivity of the tomato yield and all the independent variables. Taking into consideration the effect of these variables, the following statistical hypothesis was established: "The independent variables with the morbidity of the tomato yield did not contribute to the interpretation of total variation for productivity, and to test the validity of this hypothesis and to estimate the contribution of each of the same moral relationship to productivity of the tomato yield independent variables attributed to crop tomato sample study in the province of Fayoum , it was used model analysis Correlative multiple regression, and calculates the pain Matrix correlation of these variables , as shown from the Table (3) That only 3 of the four studied variables related to the yield of tomato yield can be retained for use in the correlative and incremental regression model Stepwise Multiple Regression , These variables are: Phosphate Fertilizer, Sulfur and Fertilizer.

**Table 2:** Shows the correlation coefficient between the independent variables and the dependent variable

	Independent variables	coefficient values with the dependent variable
1	Phosphate fertilization	** 0.442-
2	Sulfur	** 0.349
3	Nitrate	- 0.116
4	Potassium	** 0.304
5	Urea	0.227 -
6	biofertilizers	** 0.361
7	Organic manure	0.106 -

\* Morality at the level of 0.05, \*\* at the level of 0.01

Source: Compiled and calculated from the study data in the sample of the study in Fayoum Governorate 2017.

And shows of the Table (3) correlation analysis and multiple regression relationship fertilization productivity turned out that the rate of contribution changes in the interpretation of the overall variance of productivity of the tomato yield was significant at 0:01 and the contribution rate of combined together in predictive ability to interpret about 58.4 % while the ratio of other factors, and the percentage of the contribution of phosphate fertilizer Toward 42.2 %, and the contribution of sulfur fertilization by about 9%.2%, and the share of fertilizer fertilization about 5 %.

**Table 3:** Shows the correlation and multiple regression analysis of the relationship of fertilization to productivity

Statement	Variables	Multiple correlation coefficient	% Cumulative of explained variance of the dependent variable	% For the explanatory difference of the dependent variable	Regression coefficient
1	Phosphate fertilization	0.442	46.2	4.2.2	0.45
2	Sulfur	0.534	53.3	9.2	16.003
3	biofertilizers	0.548	55.4	5	0.89

Source: Compiled and calculated from the study data in the study sample in Fayoum Governorate for 2017.

The value of the fixed part of the equation (value A ) = 0.206 , (\*\*) indicate the significance of the regression or model at a significant level (0.01)

The results showed that the most significant variables contributing to the interpretation of the total variability of the yield of tomato yield in the sample of Fayoum governorate were the amount of phosphate and sulfur fertilizers, which contributed 51.4% in the interpretation of the total variation of the total production of the tomato converter.

### Third: The relationship between the quantity of chemical fertilizers and the value of plant production:

Table (4) shown the relationship between the amount of fertilizer phosphate as a function of the amount of plant production show that increasing the amount of fertilizer phosphate and one unit leads to increase plant production value of about 0.662 million pounds, as was the coefficient of

determination 0195 shows the value of (F) Morality model was about 17.46. The correlation between the amount of phosphate fertilizers and sulfur as a function in the value of tomato production showed that increasing it by one unit leads to an increase in the value of plant production by LE 0.572 million and the coefficient of 0.285. The correlation between the amount of phosphates, sulfur and potash fertilizers as a function in the value of plant production showed that by increasing the amount of fertilizers with one unit, the value of plant production increased by about LE 0.899 million and the coefficient of (0.341).

It is clear from the above that the amount of phosphate fertilizers, sulfur and potash fertilizers are the most influential on the quantity and value of plant production, followed by the amount of phosphate fertilizers and sulfur and then comes in the back of the amount of phosphate fertilizers in the impact on the quantity. Plant production has been due to the excessive use of this fertilizer despite the seriousness of human health. While it was found that the amount of Potassium fertilizer is the most influential on the value of organic exports followed by phosphate fertilizer and then fertilizers and pesticides. It is recommended that the study should not be excessive in the use of chemical fertilizers, phosphates, potash and pesticides, as the excessive use of chemical fertilizers leads to the disruption of biological or natural balance of soil. Which alter the damage more acidic nature of their properties and chemical valid as an environment of agriculture, as well as serious damage to public health, as the extravagance in a Use Pesticide leads Also to me Appearance of Syndrome Satisfactory Different On Plant and fruit , while increasing the cultivated area used for bio-fertilizers to increase agricultural exports .

**Table 4:** Equations of the general time trend of the chemical fertilizers used in the cultivation of tomato crop sample study Fayoum Governorate for 2017

Number	Indicators	The equation	Average	Rate of change	R <sup>2</sup>	f	t
1	Quantity of phosphate fertilizers (tons)	$Y^e = 16.978 - 0.662 \times e$ (09, 3) **	68.6	0.442	0.195	17.46	-3.09
2	Phosphate + Sulfur	$Y^e = 0.127 - 0.572 \times e + 15.5$ (3.18) **	45.6	0.534	0.285	14.15	3.18
3	Phosphate+ sulfur + biofertilizer	$Y^e = -3.22 - 0.451 \times e + 16.03$ + (0.899 x e) (2.4) **	18.1	0.548	0.341	12.09	2.4

**Source:** Collected and calculated from the data of the study sample field study Fayoum Governorate for 2017.

Where  $Y^e$  indicates the estimated value of the dependent variable and total tomato production,

$X^e$  It refers to the element of time as an independent variable where e (1, 2, 3, 4 ..... 11)

.A, B = Refers to the constant limit and the regression coefficient of the equation respectively.

(\*\*) indicates the significance of the regression or model at a significant level (0.01)

(\*) Indicates a significant (0.05)

(2)

R<sup>2</sup> = Modified Selection Factor, (F) = Calculated f value , (t) = Calculated t value.

Fourth: - Relations and efficiency of production and economic estimated tomato crop Fayoum:

**A: The basic accounting for the tomato crop in Fayoum:**

- Total revenue per feddan of tomatoes = quantity produced per feddan \* Price of the farmer
- Total costs = variable costs + fixed costs
- The net revenue of the pound in pounds = total revenue in pounds - the total costs per feddan pounds
- Net monthly yield = net yield of the pound / period of stay of the crop by land. 100
- Net return on the pound = net revenue of the pound / the total cost of the pound per pound. 100
- Net pounds of water unit yield / water unit = net yield in pounds per feddan / water requirements m<sup>3</sup> / feddan
- Cost Return = Total Revenue / Total Costs
- Economic efficiency = production value / unit price of production
- The profitability of the invested pound = net return / total costs

- Marketing Efficiency Factor =  $100 - [\text{Marketing Costs} / (\text{Production Costs} + \text{Marketing Costs})]$ . 100
- The efficiency of the irrigation: - Reflect the profitability of the pound obtained from the unit of water used.

**B - The basic accounting of irrigation water:**

- Economic efficiency of non - profit production: - reflect the pound spent in the production process for the pound has befallen h Plug it in profit with the efficiency of farm management.
- Partial economic efficiency: - Reflect the profitability of the pound obtained after the cost of the water component used.
- Overall economic efficiency: - The pound reflected in the production process after the total costs.
- Water productivity: - (average water productivity) and expresses the use of one additional unit of water supplier to maximize the production within the farm.

**A: Economics of tomato production in Fayoum: -**

**1- Farm price:**

Table (5) shows that the average farm price per ton of tomatoes in Fayoum governorate ranged between 1475, 1500 and 1250 LE / fed for winter, summer and Nile tomatoes respectively in 2017.

**2 - Total revenue:**

Table (5) shows that the total income of tomatoes in Fayoum governorate ranged between 22863, 20250 and 18250 LE / fed for the winter, summer and Nile tomatoes respectively in 2017.

**3. Total costs:**

Table 5 shows that the total cost of tomatoes in Fayoum governorate ranged between 11890, 10760 and 10725 pounds per feddan for winter, summer and nil, respectively in 2017.

**4 - Net profit of the feddan:**

Table (5) shows that the net yield of tomatoes in Fayoum governorate ranged between 10973, 9490 and 7525 LE / fed for the winter, summer and Nile tomatoes respectively in 2017.

**5 - Return on costs:**

Return on Costs = Total Revenue / Total Cost

Table 5 shows that the yield on tomato costs in Fayoum governorate ranged between 1.89, 1.88 and 1.70 LE / fed for production profitability, ie , the pound spent in the production process reflects an increase in the net profit of the winter tomato And the Nile and the Nile respectively in 2017.

**Table 5:** Shows the net yield per feddan of tomatoes sample (Fayoum Governorate in 2017).

Crop	Unit	Average production per feddan	Average farm price	Value of the crop	Production costs	Rent	Total gross costs	Net revenue per feddan
		Main	Main					
Winter tomato	Ton	15.5	1475	22863	9890	2000	11890	10973
Summer tomato	Ton	13.5	1500	20250	8260	2500	10760	9490
Nili tomato	Ton	14.6	1250	18250	8725	2000	10725	7525

**Source:** - Compiled and calculated from the sample data of the study in Fayoum Governorate in 2017.

Total Gross Costs = Variable Costs + Fixed Costs

Net revenue in Jordanian pounds = total revenue in pounds - total costs per feddan pounds

**Table 6:** Shows the average production costs per feddan of tomatoes sample Fayoum Governorate in 2017.

Crop	Workers' wages	The price of the seed	My compost	Chemical fertilizers	Pesticides	Total production requirements	Total costs
Winter tomato	4360	3000	600	930	1000	5530	9890
Summer tomato	3120	3000	200	940	1000	5140	8260
Nili tomato	3415	3000	-	810	1500	5310	8752

**Source:** - Compiled and calculated from the sample data of the study in Fayoum Governorate in 2017.

Production costs = include workers' wages, seeds, municipal fertilizers, chemicals and pesticides.

**6 - The profitability of the pound investor:**

Capitalized Investor = Net Return / Total Costs

Table (7) shows that the profitability of the pound invested from tomatoes in Fayoum governorate ranged between 92.28, 88.19 and 70.16 per ton spent for winter, summer and Nile tomatoes respectively in 2017.

**7 - Net Water Unit Revenue LE / Water Unit:**

Net return water unit LE / and h d of water = net yield in pounds per yield/ water requirements m<sup>3</sup> / feddan

Table (7) shows that the net yield of the water unit / ton of tomato in Fayoum Governorate ranged from 3.92, 3.38, 2.68 per tonne to the winter, summer and Nile tomatoes respectively in 2017. The pound spent in the production process of irrigation for winter tomatoes is obtained from it at about 3.9 pounds after the total costs followed by the profitability of the pound spent in the irrigation process for the summer tomato obtained from it 3.3, followed by the profitability of the Nile, about 2.6 pounds per ton.

**Table 7:** Shows the productivity and economic efficiency of tomato crop sample study in Fayoum Governorate in 2017.

Crop	Net monthly yield in pounds	Net return on the pound	Economic efficiency	Return on costs	Net revenue of the water unit
Winter tomato	2743.25	92.28	15.5	1.89	3.92
Summer tomato	2372.5	88.19	13.5	1.88	3.38
Nili tomato	1881.25	70.16	14.6	1.70	2.68

**Source:** - Compiled and calculated from the sample data of the study in Fayoum Governorate in 2017.

The water needs of the crop of tomato m<sup>3</sup> faddan = 2160 m<sup>3</sup> - 2800 m<sup>3</sup> - period stayed the crop land = 3-4 months

**8 - Economic efficiency of tomatoes in Fayoum Governorate:**

Economic efficiency = output value / unit price of output

A: Economic efficiency of non - profit production: - reflect the pound spent in the production process for the pound has befallen h Plug it in profit with the efficiency of farm management.

Table 7 shows that the economic efficiency of tomatoes in Fayoum governorate ranged between 15.5, 13.5 and 14.6 per pound spent in the production process for the profit-earning pound for winter, summer and nickel tomatoes respectively in 2017. In other words , the pound spent in the production process for the pound obtained in the profit for the winter tomato obtained from it about 15.5 pounds after the total costs followed by the profitability of the pound spent in the production process for the pound earned in the profit of the summer tomato obtained about 13.5 pounds The yield of the Nile tomato is about 14.6 per pound.

**Fifth: - Problems of growing tomatoes in Fayoum Governorate : -**

**First: - Problems suffered by the farmer: -**

To study these problems have been designed questionnaire for farmers tomato at the county level and was selected consisting of a sample 100 farms distributed centers of the province by 35 farmers from each center were randomly selected and were the results of the questionnaire , as can be seen from the Table (8) The problem is primarily to increase chemical fertilizer and pesticides by 62%, and for the problem of good and continuous guides not to follow - up about 32 % for many of the risks to the crop, in addition to the tomatoes to the vagaries of weather contribute to fluctuations in production and recurrence of disease sensitivity , which weakens the production rates reflected to you exports of tomatoes and the result of that there are some technical problems in desertification monastery .

And was the problem of increasing the Rated fertilization to death or seedling root rot in the late stages and represents 30 % of the problems.

The increase in fertilization affects crop and irrigation water, especially nitrate fertilization, affecting plant and human and raising the rate of infection with carcinogens. Increased fertilization also affects farm animals and poultry consumed for these plants.

**Table 8:** Problems of tomato cultivation in Fayoum Governorate from the point of view of the researcher

	Statement	Number of farmers	Percentage of sample
1.	Guides are not continuous follow-up	32	32%
2.	Lack of quantities received by exporters during the transport phase	9	0.09%
3.	Lack of experience of some farmers working on producing a quantitative yield without qualitative to achieve high profitability	18	18%
4.	Increase fertilization and death in early stages, mild in late stages and recurrence of diseases	30	30%
5.	Increase chemical fertilizers and pesticides	62	62%
6.	The presence of some insect injuries	15	15%

**Source:** Collected and calculated from the questionnaire form for the study of Fayoum Governorate for the season 2017.

**Second, The problems faced by the exporter facing the process of export development of tomato crop, the most important:**

The exporter of Fayoum governorate is suffering from the accumulation of the commodity inventory and in turn lead to an increase in the costs of storage that accumulate day by day. In Egypt, however, the import has opened wide and this is in the interest of a class of traders, And threatens the local industry to collapse and farmers to bankrupt, in addition to what Egypt is losing the difficult currency is in dire need, especially as we passed this economic turn serious and can summarize the problems of the source are as follows:

1. The frequent procedures and fees within the Egyptian ports due to the absence of coordination among the bodies involved in the export process leading to delayed arrival of export transactions, which expose the source to a large loss
2. Some exporters make casual deals by exporting non-conforming items that affect the reputation of the Egyptian product.
3. Adoption of the export process to individual efforts and decisions, which may be random in some cases due to lack of clear policies and information to exporters.
4. The existence of many competing countries such as Spain, Israel, Tunisia for Egypt's exports of tomatoes, especially in quality and price, as a result of high costs of production requirements, in addition to the absence of an Egyptian company for the work of external transport with refrigerated cars, in addition to the high value of transport by aircraft, High costs and competitiveness.
5. The imposition of environmental standards and quality standards imposed on vegetable exporters from developing countries, and there are special standards for the rate of concentration of pesticides in exported products.

**Third: Traders and exporters problems:**

The sample of the study and the questionnaire for the traders and exporters A total of 75 individuals were collected from the sample of traders and the number of 25 exporters has obtained the following results:-

Higher costs of transport The most important problems faced by traders by 73.3% as shown in Table (9) and about 84% of local traders pointed to the decrease in local prices compared to international prices. The increase in fees for Egyptian ports is an obstacle for exporters by 73.3%, in addition to the accumulation of containers in ports by 45.3%, which constitutes an increase in export costs and some exporters are subject to delayed fines. Recommendations studying:

The source is a common denominator between the production and marketing sides, which are divided between the two problems, the production areas are represented in the farms and marketing destinations represented by traders and exporters. The following are proposals for solutions for both sides.

**Table 9:** Traders' problems with tomato in the study sample

Statement	Number of traders	Percentage of total
High transport costs	55	73.3
Lower domestic prices compared to world prices The lower the export price of tomatoes increased the amount of exports of tomatoes	63	84
Increasing fees in Egyptian ports	55	73.3
Accumulation of containers in ports	34	45.3

Source: collected and calculated from the field study data for Fayoum Governorate for the season 2017.

**First: Proposals for solutions to the problems of production:**

- 1- The provisions of control accurate and follow - up guides personnel M grower and government alike, to question themselves farmers number of field visits during the planting season and how to solve problems first, Powell makes it easy by planting large tracts crop specific area to maintain exchanges with other regions through the application of the agricultural cycle and commitment Fertilizer fertilization of the crop.
- 2- The farmer must be required to cut the crop specified by the exporter in order to prevent the increase in the percentage of fertilizers, pesticides or microbial load.
- 3- Support the farms by the Agricultural Credit Bank to encourage the increase in production.

**Second: - proposals to face marketing problems: -**

- 1- Assigning Chambers of Commerce to support farms and their products.
- 2- Control of the work system in Egyptian ports in cooperation with the Ministry of Commerce helps to avoid the accumulation of containers in ports and the speed of shipping.
- 3- full liberalization of the prices of production inputs and the abolition of support in exchange for full liberalization of final product prices in accordance with market mechanisms and the expansion of the development of new varieties and strains suitable high productivity and bear the high temperatures in Upper Egypt and desert land .
- 4- The need to reduce the quantities of high consumption of tomatoes at the local level by reducing individual consumption rates, which are among the highest at the global level.
- 5- The possibility of increasing the quantities of tomato produced at the local level through the vertical expansion of the increase in the productivity of feddan of tomato crop, where the average productivity of feddans of 17 - 20 tons / fed compared to the productive capacity at the research level, which is (22 - 30) tons / feddan This difference gave a strong indication of reducing the gap and raising the self-sufficiency rate of tomatoes.
- 6- The possibility of increasing the amount of tomatoes produced at the local level by expanding in increasing the cultivated area of the crop of tomato to the presence of multiple comparative advantage of the crop as successful in all new and old desert and alkaline soil so low water for its needs and carry salinity mm a confirming high economic productivity efficiency of the crop of tomato.
- 7- Encourage farmers to expand the cultivation of tomato and reduce production costs and thus increase the net yield by A. - Provision of production inputs b - production support t - develop varieties of high productivity New Territories. C. Providing agricultural machinery to farmers at the lowest cost. H. Provision of agricultural extension to raise production.

**D. Providing a database for the production and marketing of tomatoes to be used by farmers to increase production in the new lands.**

**Third: - The most important solutions proposed for tomato exporters: -**

- 1- Exemption of export operations from all fees, stamps and administrative expenses imposed by various government agencies.
- 2- The European Union's demand during the three-year negotiations to increase the quantities exported, which enjoy full exemptions from customs duties, as well as quotas allowed for export by customs reduction. With the aim of prolonging the periods in order to increase the exports

of tomatoes, especially with the introduction of the production of new areas, and work to early agriculture and cultivate early varieties of maturity consistent with the wishes of European consumers and meet international standards.

- 3- Increase the size and efficiency of the air, land and sea transport fleet and expand the use of refrigerated container shipping, while supporting refrigerated cargo operations.
- 4- Not to impose customs protection.
- 5- Support tomato farmers through the distinctive prices without the economic return of the source.

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