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An Economic Study of the Use of Chemical Fertilizers and Pesticides in Egyptian Agriculture

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ABSTRACT

Chemical fertilizer is one of the main production requirements in Egyptian agriculture, and used to increase production through the important elements namely nitrogen, phosphate and potassium. Nitrogen is first nutrition element, which determines the productivity of crops due to lack of Egyptian lands in general for that item and phosphorus comes in the second place. Research aimed at identifying the production, consumption and prices of chemical and bio-fertilizers and the relation between the amount of chemical fertilizers and plant production value as well as the amount of chemical fertilizers and the value of Egyptian organic exports. The research relied on following the inductive approach in the economic analysis of the descriptive aspect and following the deductive approach of quantitative aspect. The used data were obtained by various entities. It is clear the decrease in the production of nitrogenous fertilizers while consumption of these fertilizers increases in spite of this clear trend in increasing prices. As for phosphate fertilizers, production increases and at the same time consumption increases, but the rate of increase in consumption is much larger than the rate of increase in production, due to our lack of production of potash fertilizers, it is clear the increase in consumption and prices during the study period (2000-2011). As for the value of all pesticides, they tend to increase, whether insecticides, fungicides or herbicides that may be due to the increase in prices for not being able to find out which types of pesticides, are consumed more. Thus, it is clear that in spite of the trend towards clean agriculture in Egypt by using biological fertilization, the equations general time trend shows the decreasing used amount of solid ricebacterian and Phosphorusian and increase in the use of liquid quantity of them, and the increase in the value of solid ricebacterian and Phosphorusian is not asserted while the value of liquid ricebacterian and Phosphorusian increased and the amount of other bio- fertilizers increase as well as the value during the study period (2000-2011). It is shown that the amount of pesticides is the most influential on plant production value, followed by the amount of potassium fertilizers, the amount of phosphate fertilizers and finally the amount of nitrogenous fertilizers in the impact on plant production value due to excessive use of these fertilizers in spite of the danger on human health, while the amount of potassium fertilizers is the most influential on the value of organic exports, followed by phosphate and nitrogenous fertilizers and pesticides. The study recommends not to exaggerate in the use of chemical, nitrogen, potassium and phosphate fertilizers and pesticides as the excessive use of chemical fertilizers leads to the disruption of the vital or natural balance of soil. Thereby changes their acidic and damage their 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 on plants and fruits and increased cultivated area used for bio- fertilizers to increase organic agricultural and food exports.

Key words: Chemical fertilizer, economic analysis, Pesticides, Egyptian Agriculture.

Introduction

Chemical fertilizer is one of the main production requirements in Egyptian agriculture, and used to increase production through the important elements namely nitrogen, phosphate and potassium. Nitrogen is first nutrition element, which determines the productivity of crops due to lack of Egyptian lands in general for that item and phosphorus comes in the second place. This is linked to the consumption of chemical fertilizers, amounting to about 102,335 million tons as consumed nitrogenous fertilizers amounted to about 87,370 million tons, while the produced amount of it is 5,519 million tons while the consumed amount of phosphate is about 13,838 million tons , the produced amount reached about 1,592 million tons and the consumed potassium is 1,127 million tons, and they are all imported from abroad in the average period (2009-2011). The increased use of pesticides leads to increase in production costs to the extent that the crop cannot be produced and marketed in a way that makes profits as well as the increase in the concentration of pesticides in the soil of leads to preventing from cultivating crops that are exported from abroad because they contain residues of pesticides that exceed the allowed limit. Some modern concepts in the environment enter into agricultural development, most importantly clean agriculture. The Ministry of Agriculture has in its various bodies shown interest into clean agriculture in the fields of, research and agricultural production to make a boom in production to achieve self-sufficiency and

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to attempt to export with quality accepted by the global market, free from chemicals, making it safe for the health of the individual and reducing pollution problem.

Research Problem:

Decline in local production of chemical fertilizers led to increase of imports, and thus crises in the local market of chemical fertilizers in recent years, and high prices in the black market that affect the producers and the agricultural production. As the Egyptian agricultural exports face difficulties due to the increase in the percentage residues of chemicals, the farmer tended to use high price bio-fertilizers that led to high productivity costs on the Egyptian farmer.

Research Objective:

Research aimed at identifying the production, consumption and prices of chemical and bio-fertilizers and the relation between the amount of chemical fertilizers and production value as well as the amount of chemical fertilizers and the value of Egyptian organic exports.

Research Method & Data Sources:

The research relied on following the inductive approach in the economic analysis of the descriptive aspect and the following deductive approach of quantitative aspect.

Many of the analytical tools and mathematical and statistical methods have been used to achieve the desired objectives of the research, such as the general time trend and simple regression of relations between variables.

The used data were obtained by various entities, namely the Ministry of Agriculture and land reclamation, Economic Affairs Sector, Central Administration of Agricultural Economy, the General Authority of Agricultural Budget Fund, Egyptian Center of 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 and some fertilizer companies.

Discussing Results:

First: Producing Chemical Fertilizers & Pesticides in Egypt:

Studying the development of Egyptian nitrogenous fertilizer production during the period (2000-2011) shows that it amounted to about 8,123 million tons, in 2000, while at the end of the period it amounted to about 5,166 million tons at a deficiency rate of 36.4%. The equation of the general time trend describes the decreasing annual nitrogenous fertilizer production that amounted to about 302.8 thousand tons, representing about 4.29% of the average of about 7,042.7 million tons. The Urea fertilizer 46.5% is considered one of the most important nitrogenous fertilizers and the equation of general time trend shows the decreasing annual rate of 95.7 thousand tons, representing about 1.97% of the average production that amounted to about 4845.6 thousand tons, while the production of ammonia fertilizer decreased to 33.5% annually at a rate of about 123.14 thousand tons representing about 5.3% of the average production of ammonia fertilizer 33.5% estimated at 2318.1 thousand tons for the study period as shown by equation (3).

As for the consumption of nitrogenous fertilizers, it has been estimated at the beginning of the study period by about 6,740 million tons and continued to increase to reach, at the end of the study period, about 8,9623 million tons. The rate of increase in the consumption of nitrogenous fertilizers represents about 1229.7% from the beginning of the period, with an annual increase rate estimated at about 9,203.2 million tons representing about 26.5% of the consumed average by estimated at 3,4790 million tons equation (4). As for the selling price of Urea 46.5%, which is one of the most important used species of nitrogenous fertilizers in Egypt, it was estimated at the beginning of the study period, by about 680 pounds / ton and continued to increase to reach at the end of the period about 1500 pounds / ton representing increase rate of about 20.5% from the beginning of the period , and the equation of general time trend describes the annual increase in the selling price at a rate of about 78.04 pounds / ton representing about 8.15% of the average selling price and that is estimated at about 956.6 pounds / ton equation (5). While the selling price of ammonium nitrate fertilizer 33.5% is estimated at the beginning of the period at about 520 pounds / ton and at the end of the period at about 1400 pounds / ton. The equation of general time trend describes the annual increase in selling price of ammonia 33.5% at a rate of about 91.6 pounds / ton representing about 10.9% of the average selling price amounting to about 833.3 pounds for the study period, as shown by equation (6). By studying the production of phosphate fertilizers in Egypt, it turned out to be estimated at about 1144 thousand tons in 2000, and tended to increase until it reached about 1457 thousand tons at the end of the period in 2011 and the increase represents 21.5% from the beginning of the

period, and the equation of general time trend describes the significant annual increase statistically at a rate of about 33.5 thousand tons representing about 2.25% of the average production of about 1487.4 thousand tons. While the consumption of phosphate fertilizers at the beginning of the study period amounted to 1030 thousand tons, the consumption continued to increase until it reached at the end of the period 1,3824 million tons and the increase represents about 27.4% from the beginning of the period, and the significant annual increase statistically is estimated at about 1,497.5 million tons representing about 1242% of the average that is estimated at about 5,458.8 million tons equation (8). As for the selling price of phosphate fertilizers in Egypt, it was estimated, at the beginning of the study period, at about 800 pounds / ton and continued to increase to reach at the end of the period about 1517.9 pounds / ton and the rate of increase represents about 89.74% from the beginning of the period and the equation of general time trend shows the significant annual increase statistically at a rate of about 69 pounds / ton representing about 6. % of the average production of about 1138.1 pounds / ton as shown by equation (9). Egypt imports potassium fertilizers and the consumed amount of potassium fertilizers at the beginning of the study period amounted to about 56 thousand tons and continued to increase until it reached the end of the period 1,124 million tons and the increase represents about 1907% from the beginning of the period, and the equation of time trend describes the significant annual increase statistically at a rate estimated at about 117.3 thousand tons representing about 40.89% of the average consumed amount that is estimated at about 287 thousand tons. As for the selling price of potassium fertilizers in Egypt, it was estimated at the beginning of the study period by about 3800 pounds / ton and continued to increase to reach at the end of the period about 4846.6 pounds / ton and the increase rate represents about 27.5% from the beginning of the period and the equation of general time trend shows the significant annual increase statistically at a rate of about 92.85 pounds / ton representing about 2.14% of the average production of about 4335.7 pounds / ton as shown by equation (11). As for the value of pesticides, the equation of general time trend describes the significant annual increase statistically, amounting to about 2.374 pounds / ton representing about 7.6% of the average value of pesticides, amounting to about 30 820 pounds / ton and the coefficient of determination amounted to about 0.65, and the counted value (F) amounted to 18.75. While the equation of the general time trend shows that the value of fungicides increase annually at a rate of about 2.030 pounds / ton representing about 10.4% of the average value of fungicides, amounting to about 19.6 thousand pounds / ton and the coefficient of determination amounted to about 0.54 and the counted value (F) amounted to 11.6, while the equation of the general time trend describes that the value of herbicides increase annually at a rate of about 2.83 thousand pounds / ton representing about 15.7% of the average value of herbicides, amounting to about 17.9 thousand pounds / ton and the coefficient of determination amounted to about 0.33 and the counted value (F) amounted to 5.03.

It is clear from the mentioned, the decrease in the production of nitrogenous fertilizers while consumption of fertilizers is increasing in spite of the clear trend of increasing prices. As for phosphate fertilizer, production increases and at the same time consumption increases, but the rate of increase in consumption is much larger than the rate of increase in production, due to our lack of production of potash fertilizers which resulted in the increase in consumption and prices during the study period (2000-2011). As for the value of all pesticides, they tend to increase, whether insecticides, fungicides or herbicides that may be due to the increase in prices for not being able to find out which types of pesticides, are consumed more.

Table 1: the equations of general time trend for the production and consumption of chemical fertilizers and pesticides used in Egyptian agriculture during the period (2000-2010)

No.	Indicators	Equation	Average	Change Rate	R2
1	Nitrogenous fertilizer production (million tons)	Y^H= 9011.1-302.8 XH (9.94)	7,042.7	-4.29	0.91
2	46.5% of urea production (million tons)	Y ^H = 5467.3-95.7 XH (6) **	4,845.6	-1.97	0.78
3	33.5% ammonia production (million tons)	Y ^ H = 3118.6-123.14 XH (13) **	2,318.1	-5.3	0.94
4	Nitrogenous fertilizer consumption (million tons)	Y ^ H = 25031.1 + 9203.2 XH (4.4) **	3,4790	1.54	0.66
5	Selling price of urea 46.5% (Pounds / ton)	Y ^ H = 449.4 + 78.04 XH (4.5) **	956.6	8.15	0.67
6	Selling price of ammonia 33.5% (Pounds / ton)	Y ^ H = 237.8+ 91.6 X H (5.4) **	833.3	10.9	0.75
7	The production of phosphate fertilizers (million tons)	Y ^ H = 1269.4 + 33.54 XH (2.3) *	1,487.4	2.25	0.35
8	Consumption of phosphate fertilizers (million tons)	Y ^ H = 4275 + 1497.5 X H (4.67)**	5,458.8	27.4	069
9	Selling price of phosphate fertilizers(Pounds / ton)	Y^H= 689.3+69XH (9.2)**	1138.1	20.4	0.89
10	Consumption of potassium fertilizers (million tons)	Y^H= 321.3 + 117.3XH (4.6)**	287	40.8	0.68
11	Selling price of potassium fertilizers (Pounds / ton)	Y^H= 3732 + 92.8XH (14.6)**	4335.7	2.14	0.95

12	Value of Insecticides (million pounds)	Y^H= 15.4+ 2.374 XH (4.3)**	3.1	76	0.65
13	Value of fungicides (million pounds)	Y^H= 6.4+ 2.03XH (3.4)**	19.6	10.3	054
14	Value of Herbicides (million pounds)	Y^H= 3.96+ 2.83XH (2.24)*	17.97	15.6	0.33

Where Y ^ refers to the estimated value of the dependent variable,
XH refers to the time element as an independent variable, where H (1.2, 3, 4 ..... 11). ** Significant at the 1% level * significant at the 5% level

Source: 1 - The Ministry of Agriculture and Land Reclamation, Economic Affairs Sector, Central Administration of Agricultural Economics, Food Balance of the Republic of Egypt, Various Issues.

2 - The Ministry of Agriculture and Land Reclamation, Economic Affairs Sector, Central Administration of Agricultural Economics, Agricultural Statistics Bulletin, Various Issues.

3- Food and Agriculture Organization (FAO), Trade Year Book, Various Issues, 2000 – 2010.

Second: Production of Bio-Fertilizers in Egypt:

The use of bio-fertilizers contributes in reducing dependence on chemical fertilizers by increasing the number of beneficial microbes in the cultivated soil where biological fertilization depends generally on changing the microbial content in the area around the roots, through pollination of seed or soil for organisms that are able to make beneficial changes in the plant and bio-fertilizers include nitrogenous stabilizers, phosphors solvents that are not facilitating as well as potassium facilitating bacteria, and through the use of bio-fertilizers the environment can be protected from pollution caused by the use of chemicals.

Studying the most important solid and liquid bio-fertilizers in the Egyptian agriculture which are ricebacterian and Phosphorusian. It is clear that the used quantity of ricebacterian is estimated as a minimum at about a thousand bags in 2007, while the estimated maximum is about 15.4 thousand bags in 2004, and the average is about 5.4 thousand bags during the period (2000-2011). The equation (1) table no (2) the general time trend describes the significant annual shortage statistically estimated at about 0,701 thousand bags representing about 4.3% of the average during the study period. As for the value, its minimum is estimated at about 5 thousand pounds in 2007, its maximum is estimated at about 30.8 thousand pounds in 2004, and the average is about 16.3 thousand pounds during the study period. The statistical significance of the decrease in value is not asserted as it is about its counted that affirms that the decrease in value is due to the lack of quantity and not the price. As for the amount of Phosphorusian, its minimum is estimated at about 5.42 thousand bags, while its maximum is estimated at about 203.5 thousand bags and the average is about 88.9 thousand bag, and the equation of general time trend no (3) describes the insignificance and the average of was about 241.1 thousand pounds during the study period by annual decrease statistically estimated at about 4.48 thousand bags representing about 18.7 % of the average during the study period. As for the minimum value, it is estimated at about 109.2 thousand pounds in 2009 and its maximum about 407 thousand pounds in 2004

As for the liquid bio-fertilizer, it is clear that the maximum used quantity from the liquid riaeactenla is estimated at about 0.1 thousand liters in 2003, while the maximum amount is estimated at about 9.7 thousand liters in 2010, and the average is about 3.2 thousand liters during the period (2000-2011), and the equation of the general time trend no(5) describes the significant annual increase statistically in the amount used, estimated at about 0.692 thousand liters accounted for about 21.6% of the average during the study period. As for the value, its minimum is estimated at about 0.3 thousand pounds in 2003, its maximum is estimated at about 30.8 thousand pounds in 2010, and the average is about 21.3 thousand pounds during the study period, and the equation of general time trend no (6) describes the significant annual increase statistically in the value estimated at about 6.049 thousand pounds, which represents about 28.4% of the average during the study period. As for the amount of Phosphorusian, its minimum is estimated at about 0.5 thousand liters in 2001, while the its maximum is estimated at about 21.9 thousand liters and the average is about 5.5 thousand liters, and the equation of general time trend no (7) describes the significant annual increase statistically in the amount of Phosphorusian fertilizer estimated at about 1.72 thousand liters accounted for about 31.4% of the average during the study period. As for the value, its minimum is estimated at about 1000 pounds in 2001, its maximum is about 153.3 thousand pounds in 2010, and the average is about 38.9 thousand pounds during the study period, and the equation of the general time trend no (8) describes the significant annual increase statistically in the value of Phosphorusian fertilizer estimated at about 13.8 thousand pounds, which represents about 35.4% of the average during the study period (2000-2011). As for the other liquid bio-fertilizers, it is clear that the minimum of used quantity is estimated at about 79.7 thousand liters in 2001, while the estimated maximum amount was about 297.7 thousand liters in 2009, and the average was about 185.6 thousand liters during the period (2000-2011), and the equation of the general time trend no (9) describes the significant annual increase statistically in the used amount, estimated at about 24.4 thousand liters accounted for about 13.2% of the average during the study period. As for the value, its minimum is estimated at about 106.7 thousand pounds in 2002, its maximum is estimated at about 3674.9 thousand pounds in 2011 and the average was about 1448.2 thousand pounds during the study period, and the equation of the general time trend no (10) describes the significant annual increase statistically in value, estimated at about 367.2 thousand pounds, accounting for about 25.4 % of the

average during the study period. As for the amount of liquid bio- fertilizer, its minimum is estimated at about 80.9 thousand liters in 2001, while its maximum is estimated at about 328.4 thousand liters and the average is about 194.2 thousand liters, and the equation of the general time trend no (11) describes the significant annual increase statistically in the amount of bio-fertilizer, estimated at about 26.8 thousand liters accounted for about 13.8% of the average during the study period. As for the value, its minimum is estimated at about 121.1 thousand pounds in 2001, its maximum is estimated at about 3854.9 thousand pounds in 2011 and the average was about 1510.1 thousand pounds during the study period, and the equation of the general time trend no (12) describes the significant annual increase statistically in the value of Phosphorusian fertilizer estimated at about 385.9 thousand pounds, which represents about 25.6% of the average during the study period (2000-2011).

Thus, it is clear that in spite of the trend towards clean agriculture in Egypt by using biological fertilization, the equations general time trend shows the decreasing used amount of solid ricebacterian and Phosphorusian and increase in the use of liquid quantity of them, and the increase in the value of and solid ricebacterian and Phosphorusian is not asserted, while the value of liquid ricebacterian and Phosphorusian increased and the amount of other bio- fertilizers increase as well as the value during the study period (2000-2011).

Table 2: the equations of general time trend for the production and consumption of solid and liquid bio-fertilizers, used in Egyptian agriculture during the period (2000-2011)

No.	Indicators	Equation	Average	Change Rate	R2
1	amount of solid ricebacterian (Thousand bags)	Y^H= 9.58- 0.701 XH (2.04)	**5.4**	**12.9**	**0.32**
2	Value of solid ricebacterian (thousand pounds)	Y^H= 16.5- 0.015XH (0.002)	**16.4**	**0.09**	**0.0005**
3	amount of solid Phosphorusian (Thousand bags)	Y^H= 189.13-16.7XH (5.6)**	**88.9**	**18.7**	**0.77**
4	Value of solid Phosphorusian (thousand pounds)	Y^H= 267.9-4.48XH (0.42)	**241.7**	**1.85**	**0.02**
5	amount of liquid ricebacterian (thousand liters)	Y^H= 0.966+0.692XH (3.68)**	3.2	21.6	**0.60**
6	Value of liquid ricebacterian (million pounds)	Y^H= 14.9 + 6.049XH (4.88)**	**6,884**	**1.7**	**0.73**
7	amount of liquid Phosphorusian (thousand liters)	Y^H= 4.9+1.72XH (3.9)**	5.5	31.4	**0.63**
8	Value Phosphorusian means (thousand pounds)	Y^H= 43.8+13.79XH (4.4)**	**39**	**35.4**	**0.69**
9	amount of other liquid fertilizers (thousand liters)	Y^H= 39.1+24.4XH (10.4)**	**185.6**	**13.2**	**0.92**
10	value of other liquid fertilize (million pounds)	Y^H= 754.9+367.2XH (11.8)**	**1,448**	**25.4**	**0.94**
11	amount of bio-fertilizer (thousand liters)	Y^H= 33.24+26.8XH (10.2)**	**194.2**	**13.8**	**0.92**
12	value of bio-fertilizers (million pounds)	Y^H= 805.9+385.9XH (11.7)**	**1,510**	**25.6**	**0.94**

Where Y ^ refers to the estimated value of the dependent variable, XH refers to the time element as an independent variable, where H (1.2, 3, 4 ..... 11). **Significant at the 1% level * significant at the 5% level Source: 1 - The Ministry of Agriculture and land Reclamation, Economic Affairs Sector, Central Administration of Agricultural Economics, food balance of the Republic of Egypt, Various Issues.
2 - The Ministry of Agriculture and land Reclamation, Economic Affairs Sector, Central Administration of Agricultural Economics, Agricultural Statistics Bulletin, Various Issues.
3- Food and Agriculture Organization (FAO), Trade Year Book, Various Issues, 2000 – 2010.

Third: the relation between the amount of chemical fertilizers and pesticides, the value of Plant Production:

Studying the relation between the amount of nitrogenous fertilizers as a function of plant production value shows that an increase of the amount of nitrogenous fertilizers by one unit leads to increase in plant production value by 0.091 million pounds, as the coefficient of determination was 0.61 and the value of (F) on indicates the significance of the model, reaching 15.6 equation no (1) table no (3). By studying the relation between the amount of phosphate fertilizers as a function of plant production value equation no (2) shows that the increase of one unit leads to increase in plant production value by 0.531 million pounds as the coefficient of determination was 0.70 and the value of (F) shows the significance of model, reaching 23.8. By studying the relation between the amount of potassium fertilizers as a function of plant production value equation no (3) shows that increasing the amount of potassium fertilizers by one unit leads to increase in plant production value by 6.467 million pounds as the coefficient of determination was 0.68 and the value of (F) shows the significance of the model, reaching 21.4. By studying the relation between the amount of pesticides as a function of plant production value equation no (4), it shows that increasing the amount of pesticides by one unit leads to increase in plant production value by 108.7 million pounds as the coefficient of determination was 0.70 and the value of (F) indicates the significance of the model , reaching 23.8.

Fourth: the relation between the amount of organic fertilizers and pesticides and value of organic exports:

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Studying the relation between the amount of nitrogenous fertilizer as a function of the value of organic exports shows that the increase of the amount of nitrogenous fertilizers by one unit leads to increase in the value of organic exports by 0.0065 million pounds, as the coefficient of determination was 0.61 indicates and the value of (F) shows the significance of the model , reaching 15.6 equation no (5) table no (3), and studying the relation between the amount of phosphate fertilizers as a function of the value of organic exports shows that the increase of the amount of phosphate fertilizers by one unit leads to increase in the value of organic exports by 0.037 million pounds as the coefficient of determination was 0.67 and the value of (F) indicates the significance of the model, reaching 20.5 equation no (6). By studying the relation between the amount of potassium fertilizers as a function of the value of organic exports shows that the increase in the amount of nitrogenous fertilizer by one unit leads to increase in the value of organic exports by 0.8 million pounds as the coefficient of determination was 0.99 and the value of (F) indicates the significance of the model, reaching 1257.9 equation no (7). By studying the relation between the amount of pesticides as a function of the value of organic exports shows that the increase in the amount of pesticides by one unit leads to increase in the value of organic exports by 0.005 million pounds as the coefficient of determination was 0.99 and the value of (F) indicates significance of the model, reaching 2034.8 equation no (8).

Table 3: the relation between the consumed amount of organic fertilizers and pesticides plant production value and the value of exports during the period (2000-2011)

No.	Indicators	Equation	R2	F
1	The consumed quantity of nitrogenous fertilizers and plant production value	Y^H= 9740.2+0.091XH (3.9)**	0.61	15.6
2	The consumed quantity of phosphate fertilizers and plant production value	Y^H= 9551.9+0.531XH (4.87)**	0.70	23.8
3	The consumed quantity of potassium fertilizers and plant production value	Y^H= 9520.9+6.467XH (4.62)**	0.68	21.4
4	The consumed quantity of pesticides and plant production value	Y^H=9609+108.7XH (4.87)**	0.70	23.8
5	The consumed quantity of nitrogenous fertilizers and the value of organic exports	Y^H= 272.4+ 0.0065XH (3.95)**	0.61	15.6
6	The consumed quantity of phosphate fertilizers and the value of organic exports	Y^H= 263.7+0.037XH (4.5)**	0.67	20.5
7	The consumed quantity of potassium fertilizers and the value of organic exports	Y^H= 13.5+0.80XH (35.6)**	0.99	1257.9
8	The consumed quantity of pesticides and the value of organic exports	Y^H= 0.467+0.005XH (45.1)**	0.99	2034.8

Where Y ^ refers to the estimated value of the dependent variable, XH refers to the time element as an independent variable, where H (1.2, 3, 4 ..... 11). **Significant at the 1% level * significant at the 5% level

Source: 1 - The Ministry of Agriculture and land Reclamation, Economic Affairs Sector, Central Administration of Agricultural Economics, food balance of the Republic of Egypt, Various Issues.

2 - The Ministry of Agriculture and land Reclamation, Economic Affairs Sector, Central Administration of Agricultural Economics, Agricultural Statistics Bulletin, Various Issues.

3- Food and Agriculture Organization (FAO), Trade Year Book, Various Issues, 2000 – 2010.

It is shown from the foregoing that the amount of pesticides is the most influential on plant production value, followed by the amount of potassium fertilizers, the amount of phosphate fertilizers and finally the amount of nitrogenous fertilizers in the impact on plant production value due to excessive use of these fertilizers in spite of the danger on human health , while the amount of potassium fertilizers is the most influential on the value of organic exports, followed by phosphate fertilizers and nitrogenous fertilizers and pesticides. The study recommends not to exaggerate in the use of chemical, nitrogen, potassium and phosphate fertilizers and pesticides as the excessive use of chemical fertilizers leads to the disruption of the vital or natural balance of soil. Thereby changes their acidic and damage their 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 on plants and fruits and increased cultivated area used for bio- fertilizers to increase organic agricultural and food exports.

Summary:

Chemical fertilizer is one of the main production elements in Egyptian agriculture, and used to increase production through the important elements namely nitrogen, phosphate and potassium. Nitrogen is first nutrition element, which determines the productivity of crops due to lack of Egyptian lands in general for that item and phosphorus comes in the second place. This is linked to the consumption of chemical fertilizers, amounting to about 102 335 thousand tons as consumed nitrogenous fertilizers amounted to about 87370 thousand tons, while the produced amount of it is 5519 thousand tons while the consumed amount of phosphate is about 13838 thousand tons and the produced amount reached about 1592 thousand tons and the consumed potassium is 1127 thousand tons, and they are all imported from abroad in the average period (2009-2011).

Research aimed at identifying the production, consumption and prices of chemical and bio-fertilizers and the relation between the amount of chemical fertilizers and plant production value as well as the amount of chemical fertilizers and the value of Egyptian organic exports.

The research relied on following the inductive approach in the economic analysis of the descriptive aspect and following the deductive approach of quantitative aspect. The used data were obtained by various entities. It is clear the decrease in the production of nitrogenous fertilizers while consumption of these fertilizers increases in spite of this clear trend in increasing prices. As for phosphate fertilizers, production increases and at the same time consumption increases, but the rate of increase in consumption is much larger than the rate of increase in production, due to our lack of production of potash fertilizers, it is clear the increase in consumption and prices during the study period (2000-2011). As for the value of all pesticides, they tend to increase, whether insecticides, fungicides or herbicides that may be due to the increase in prices for not being able to find out which types of pesticides, are consumed more. Thus, it is clear that in spite of the trend towards clean agriculture in Egypt by using biological fertilization, the equations general time trend shows the decreasing used amount of solid ricebacterian and Phosphorusian and increase in the use of liquid quantity of them, and the increase in the value of solid ricebacterian and Phosphorusian is not asserted while the value of liquid ricebacterian and Phosphorusian increased and the amount of other bio- fertilizers increase as well as the value during the study period (2000-2011). It is shown that the amount of pesticides is the most influential on plant production value, followed by the amount of potassium fertilizers, the amount of phosphate fertilizers and finally the amount of nitrogenous fertilizers in the impact on plant production value due to excessive use of these fertilizers in spite of the danger on human health , while the amount of potassium fertilizers is the most influential on the value of organic exports, followed by phosphate and nitrogenous fertilizers and pesticides. The study recommends not to exaggerate in the use of chemical, nitrogen, potassium and phosphate fertilizers and pesticides as the excessive use of chemical fertilizers leads to the disruption of the vital or natural balance of soil. Thereby changes their acidic and damage their 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 on plants and fruits and increased cultivated area used for bio- fertilizers to increase organic agricultural and food exports.

References

Food and Agriculture Organization (FAO), 2000-2010. Trade Year Book, Various Issues.

Food and Agriculture Organization (FAO), Ministry of Economy and Foreign Trade, Ministry of Industry and some fertilizer companies.

Hamdiya Mahmoud Moussa (Dr.) and Others, 2010. An economic study of the most important factors affecting the local prices of chemical fertilizers, Egyptian Journal of Agricultural Economics, Volume XX, Issue II.

Heba Yassin Abd El Fattah (Dr), Anaam Mohamed Abd El Fattah (Dr.) 2007. An economic study for the development of chemical fertilizers in Egypt, Egyptian Journal of Agricultural Economics, Volume XVII, the third issue.

Ministry of Agriculture and Land Reclamation, Economic Affairs Sector, Central Administration of Agricultural Economics, food balance of the Republic of Egypt.

Ministry of Agriculture and Land Reclamation, Economic Affairs Sector, Central Administration of Agricultural Economics, Agricultural Statistics Bulletin.