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The Economics Study of Certified Organic Agriculture of some vegetables crops role on achieving food security, A Case Study in Behera, Egypt

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Abstract: The Egyptian agricultural and food policies focuses on achieving food security and improving its dimensions in terms of food availability, access to food, stability of food supplies and utilization of food, food quality and safety, the agricultural trade is an essential component in achieving food security, as has been approved Policies that make the Egyptian agricultural exports more competitive and the most important of which is to raise the levels of quality and safety of traded food commodities, hence The Government of Egypt realized that the necessary to promote organic farming, The Egyptian domestic market being quite large, there is ample opportunity for marketing organic produces in the country. Greater opportunities are also available for exporting certified organic products to countries like European Union; the research applies the SWOT methodology to analyze the policy and institutional options for better organic farming in Egypt's agricultural sector. The main purpose of this paper is to investigate the role of factors that influence government and farmers' adopting organic farming. This study was conducted 2019/2020, under conditions of both organic and conventional farming at Behera Governorate, to foster organic vegetable production in the preservation area of Behera Governorate and in Egypt, The research finding that: 1- Comparison among potato and tomato crops of both organic and conventional farming, carried out. It is found that cost of production of organic agriculture tomato and potato per Feddan were LE3072.35 and LE. 1920.34 which is more than conventional farming about, 31.79% and LE. 25.39% respectively. Despite higher cost of organic agriculture, it was more profitable than conventional agriculture due to higher market price and premiums, consumers usually agree to pay 20-25% premium for organic food (Engindeniz, 2002), caused higher relative profitability, The results revealed that about 47.2%% of total sampling farmers viewed their food security at an average level. 2-Farmer facing challenges such as, High production cost, low quantity of production, no adequate market, certification problems, lack in role of agricultural cooperatives…etc. without government support, the promotion and adoption of organic farming is a challenging task because majority of the farmers fall under the small and marginal categories. Recommendation: There was need of clear policy and program of Government to adopt the organic agriculture sustainable, and spread awareness about organic farming through proper policies, such as invest in research and development related to organic farming for understanding the economic and sustainable viability, and increase export of organic goods to the international markets, Egyptian government should make efficient law against the pesticide and chemical fertilizer users, Establish the organic fertilizer production factories, provide the seeds and loan facilities, Egyptian government and private sectors prepare the strategic plan of organic production, responsible to promote the organic agriculture, train the farmers for mobilize the technical manpower.
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Keywords: Sustainable development, food security; organic agriculture, conventional agriculture, agricultural and food policies, SWOT, Behera Governorate, Egypt

1. Introduction:

Health issues and environmental concerns have drawn the attention to organic agriculture aiming to protect the environmental balance and to produce without damaging the environment, Farming plant first started organic, using the natural inputs, and with the need to produce more food, due to high increasing of population growth percentage led to the use of pesticides and chemical fertilizers in Agriculture for increasing production, environmental degradation, and which results in a health risk, caused by the consumption of contaminated products especially for workers in agricultural activity, there for quality and safety of food became a necessary condition for increasing and sustaining agricultural production and exports. Egyptian government prompted and seeks to

adopt sustainable agricultural systems (MALR 2009), that preserve human health and the environment, such as organic farming, to ensure and sustain the food security" nutrition needs' of current generations, without jeopardizing the needs of future generations, in addition to achieve a surplus for export from organic agricultural production. Therefore, there is need for studying an economics of organic production in Egypt.

Research Problem:

The biggest challenge facing policymakers in Egypt is to develop government policies that, providing sufficient food, without polluting the environment, and negatively affected on agricultural exports Egyptian for not meeting international standards, especially in countries that focus lies on food quality and safety, such as the European Union. the Egyptian organic agriculture sector has not reached the size that it can compete with conventional agriculture, African and international organic agricultural trade, the organic cultivated area, about 579 thousand Feddan, ((CAPMAS)) representing 5.9%,2.8% of the total agricultural land area in Africa and Egypt respectively, 2016, (FiBL.2018), and the value of organic agricultural exports about 593.3 million $ in 2016, representing 22% of the value of conventional agricultural exports 2696.8 million dollars, 2016, which confirms that Egypt has benefited only with a marginally amount of foreign markets import Agricultural products.

There for this research seeks to examine if organic agriculture can or cannot play a significant role in sustainable food security and increase the Egyptian agricultural exports or not?

What potential does organic agriculture have for solving the problems of feeding Egyptian people and increasing Egyptian agricultural exports?

Objective of the research:

This study was designed to evaluate the role of organic farming in improving food security, and reduction poverty from the perspective of farmers in the Behera Governorate in Egypt, to inform farmers on the consequences of choosing organic farming (farm profitability), and inform policy makers on the advantages of spending more on organic research (system profitability), to achieve Sustainable agricultural development through the following goals:

-Identify the technology of organic agriculture and the development of organic agriculture orientation in Egypt and focus on Behera governorate, to support conventional farmers converting to organic and other more sustainable systems.

- Studying the role of the sustainable agricultural development strategy 2030 in food security and organic agriculture.

Assessment of Farm Profitability by Compare an economics compared the economic performance of organic and conventional farming of producing potato and tomato crops. -Studying Factors affecting production of organic potato and tomato crops.

- Clarifying the most important weaknesses, strengths, threats and opportunities facing organic farming technology in Egypt, and the proposed solutions to solve them.

Research Methodology and Data Sources:

The research was based on the use of descriptive and quantitative statistical analysis methods, to identify the production Cost, yield, price data, some indicators and criteria among potato and tomato crops of both organic and conventional farming, were analyzed to determine the profitability. The research was based on primary data source, collected from sampled were the organic and conventional farmers; used to calculate cost and returns of production, primary data were such as experts…etc. from government authorities. The study was conducted among the total (140) respondents, the research designed questionnaires to collect the production indicators and, opinion of respondents, conducted the face to face interview. In order to define and delimit the subject, several data sources being consulted published and unpublished data from the relevant authorities such as Central Laboratory for Organic Agriculture, International Federation of Organic Agriculture movements IFOM, the Economic Affairs Sector (Agricultural Statistics Bulletin), Egyptian Center of Organic Agriculture ICOA, the Central Agency for Public Mobilization and, reference books and specialty scientific papers.

The Study Sample:

A questionnaire specifically designed for potato and tomato crops of both organic and conventional farming was used to obtain the required information from a selected sample.

Simple random sampling procedure was followed. **In the first stage** in Behera Governorate was purposively selected, since in view of successful implementation of organic agriculture in village in the Governorate, its relative importance in the organic planted area, which represents about 26% of the total organic grown area in Egypt in 2016, and about 62% of the organic potato area, about 47% of the organic tomato area according to office records Organic inspection.

In the next stage a cluster of two villages were selected deliberately, because more number of farmers practicing organic farming was observed in these villages, in these selected villages the organic agriculture was successfully implemented, sample was taken for the farmers of potato and tomato crops of both organic and conventional farming grown in the

villages of Al-Nubaria, and Abu Al-Matamir, **In the final stage,** number of (70) farmers practicing organic farming grown potato and tomato crops and number of (70) farmers practicing conventional farming grown potato and tomato crops, were selected randomly, during the agricultural season (2019/2020).

Results and Discussion:

Organic farming is defined as a form of agriculture, which does not use chemical inputs in its production process, and enhance the biological and ecological processes to promote soil fertility and good health of animals and plants (Gafsi, Le, & Mouchet, 2010, p. 4). It involves complete view and it depends on ecological processes, biodiversity as well as cycles adapted to local circumstances rather than the use of external inputs with hostile effects. Its goal is to promote fair associations and a good quality of life for all related components. While Food security refers to the situation "when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life" (FAO, 2010). Food must be produced under safety conditions for people and free from noxious substances such as pollutants from industrial and agricultural processes, including residues of pesticides, hormones and veterinary drugs.

Relationship between the concept of food security and organic agriculture:

Organic farming has the potential to provide benefits in such as environmental protection, protection of non-renewable resources and improved food quality, and helps in achieving food security (Unctad-unep,2008), as organic agriculture ensures a sustainable food production system as it gradually leads to increased soil fertility and consequently productivity, while conventional agriculture leads to a loss of soil fertility (FAO, 1996), in addition to that organic farming The consumer's desire to obtain safe food is achieved, reduce environmental degradation, prevent restrictions on agricultural trade, correct distortions in global agricultural markets, and reduce price volatility, as the concept of food security is linked to the availability of food safety (FAO, 1996), As the concept of food security is linked to the availability of food safety, which is defined by the World Health Organization as all the necessary conditions and standards during the processes of production, manufacture, storage, distribution and preparation of food necessary to ensure that the food is safe, reliable, healthy and appropriate for human consumption.

The differences between conventional and organic farming:

Most of the vegetable crops are eaten fresh hence chemical residuals may lead to health hazards, It is clear from Table (1) that organic agriculture has positive effects on the content of vegetables and crops, one of the most important nutrients compared to conventional products, where the proportions of beneficial substances increased and the proportions of harmful substances, due to the fact that the organic food production industry is subject to laws organized and managed by international institutions such as the Food and Agriculture Organization "WHO", the World Health Organization, etc., and one of the most.

Table (1) the effect of organic farming on plant content of some important components

Substances that have increased (all useful)		Substances that have decreased (all harmful)	
Substances	**%**	Substances	**%**
Dry matter	**+23%**	sodium	**-12%**
Protein	**+18%**	nitrates	**-93%**
Vitamin C	**+28%**	free acids	**-42%**
Total sugars	**+19%**		
The amino acid methionine	**+13%**		
Iron	**+77%**		
Potassium	**+18%**		
Calcium	**+10%**		
Phosphorus	**+13%**		

Zakaria Abdul Rahman Al-Haddad - Investment in the field of organic agriculture and its economics - the Arab Conference on Organic Agriculture for Environmental hygiene and strengthening the economy - Tunisia - September 27-28, 2003. important global requirements for the production of organic food is that the agricultural lands are free of processed fertilizers, and dependence on Natural compost To nourish the plant and maintain the fertility and quality, Not to use pesticides and herbicides, or desalination or reuse of wastewater, to prevent the use of hormones or antibiotics or genetic engineering in the production of organic food, according to Ministerial Resolution No. 1411 During the year2008, so that organic food producers can obtain an organic

product certificate that allows them to market their products.

- Organic agriculture is often perceived as more sustainable than conventional farming; organic farming is less polluting than conventional farming when measured per unit of land but not when measured per unit of output
- Organic agriculture is sustainable in the long term.

Current situation of organic agriculture sector in Egypt:

Currently Organic farming, accounts 1%of global agricultural land, and more than 100 countries publicly support organic standards (Seufert et al. 2017). In Africa, there are more than 1.7 million ha of certified organic agricultural land, **figure (1).**

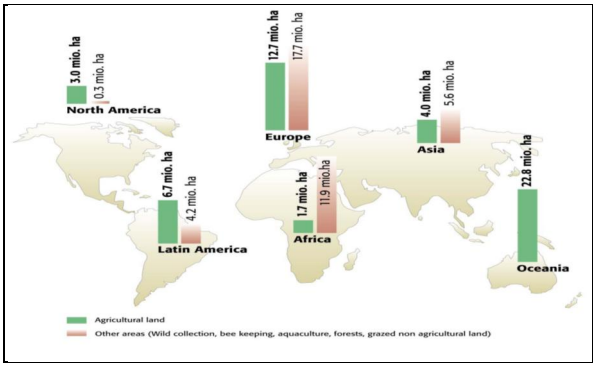


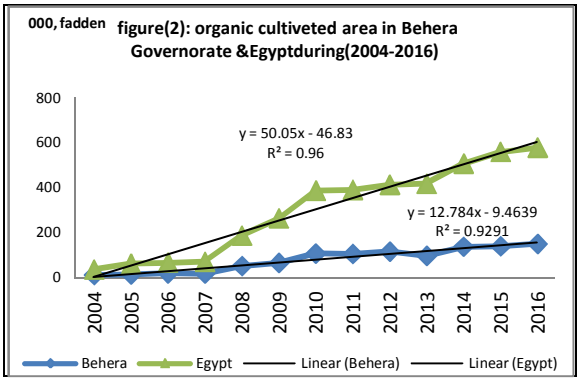
Figure (1): Organic agricultural land and other areas 2015

Source: FiBL Survey 2017, based on data from governments, the private sector and Certifiers, 2017.

The evolution of the organic cultivated area in Egypt during the period (2004-2016) Organic farming in Egypt began in 1976 with the SEKEM farm, and this area was dedicated to the production of some medicinal plants, and the number of organic farms reached about 31 farms with a total area 2560 Feddan in 1990/1991 The organic area increased to 37 thousand Feddan in 2004, and to 57937 thousand Feddan, year 2016. Increase about 542 thousand Feddan, representing about 1465% compared to 2004, the time trend equation for the development of the organic cultivated area in Egypt During the period (2004-2016) Figure (2), annual growth rate about 16.5 % during the period (2004-2016).

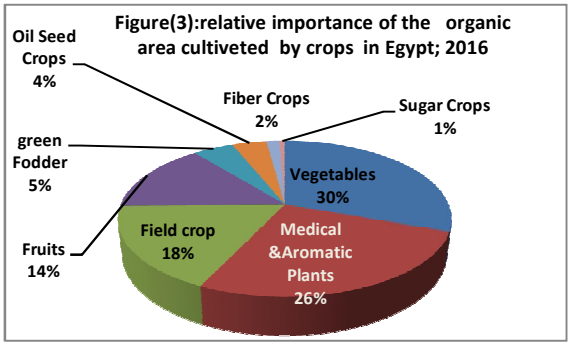
Development of the organic cultivated area in Behera Governorate during (2004-2016):

Behera governorate is considered the first between the Egyptian governorates with regard to the organic agricultural land, The area planted organic increased in Behera Governorate, from 12.16 thousand Feddan in 2004, to 150.66 thousand Feddan in 2016, respectively, increase about 138.51 thousand Feddan compared to year 2004, estimated the time trend equation of the organic cultivated area in Behera Governorate during the period (2004 – 2016), (Figure (2) shows that annual growth rate about 16 % during the period (2004-2016).



The relative importance of the organic cultivated area in Egypt during 2016:

There are many agricultural products grown organic such as vegetables and fruits, herbs and medicinal and therapeutic spices, "cotton" fiber crops, sugar crops, and oilseed crops as can be seen from Figure (3) It occupies the first place vegetables by 30% of the total cultivated area organic, to about 579 thousand feddan in 2016, and includes potatoes, peppers, tomatoes, cucumbers, carrots, lettuce,... etc.



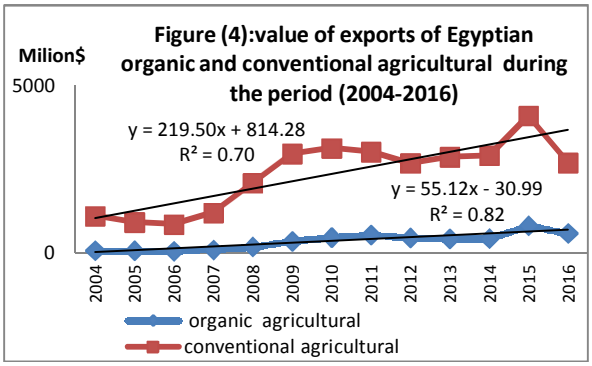
The second place is occupied by medicinal and aromatic plants at about 26.5% of the total organic cultivated area, it includes anise, caraway, mint, basil, musk, chamomile, etc. The field crops ranked third with about 17.7% of the total organic grown area, the most important of which is cereal crops. Fruit crops ranked fourth with about 14.5% of the total area organic grown, it includes strawberry, peach, apples, watermelon, pineapple, avocado, etc.

The world demand for Egyptian organic products:

Value of exports of organic agricultural crops in Egypt during the period (2004-2016):

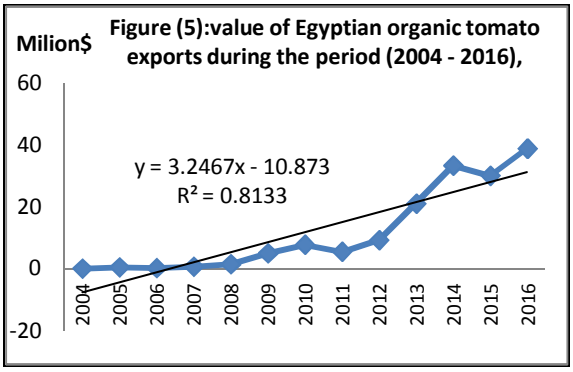
The value of organic agricultural exports range between a minimum value about 64.1 million $, 2006

and a maximum value about 593.3 million $, 2016, with an average about 354.8 million $ during (2004 - 2016). Estimated general time trend equation Figure (4), showed that annual growth rate about 15.5 % during the period (2004-2016).



Value of agricultural exports for the organic tomato crop:

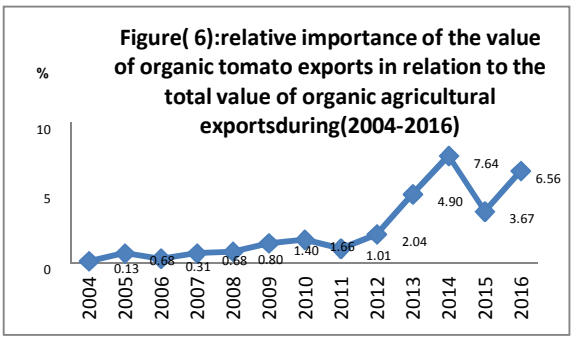
The value of organic tomato exports ranged between a minimum value about 0.1 million $ in 2004 and a maximum value about 38.9 million $ in 2016, increase of about 38.8 million $ compared to year 2004). Figure (5), Estimated general trend equation showed that annual growth rate about 27.4 % during the period (2004-2016).

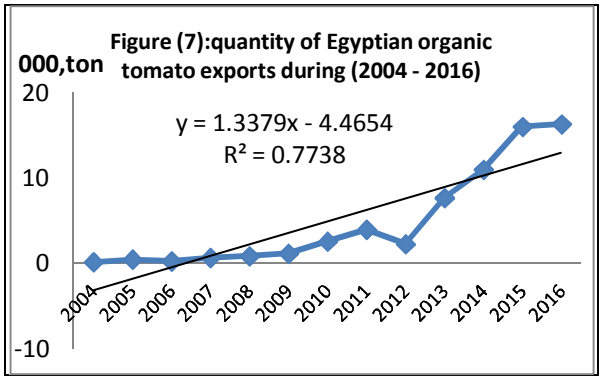


The relative importance of the value of organic tomato exports to the total value of organic agricultural exports was about 0.13% in 2004, which increased to 6.56%, 2016, Figure (6).

Quantity of exports:

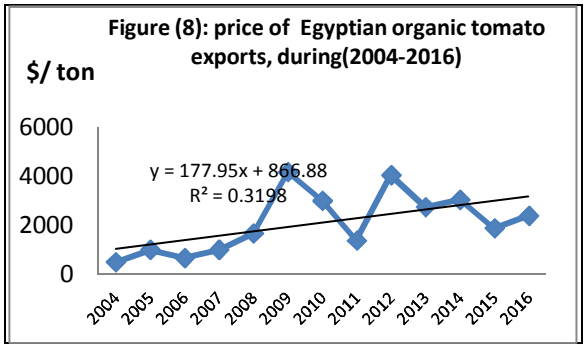
The quantity of exports of organic tomatoes increased from 0.2 thousand tons in 2004 to 16.3 thousand tons in 2016, an increase about 16.1 thousand tons compared to, year 2004. It is significance of the annual increase in the quantity of exports of organic tomatoes, Figure (7), showed that annual growth rate about 23.7 % during the period (2004-2016).





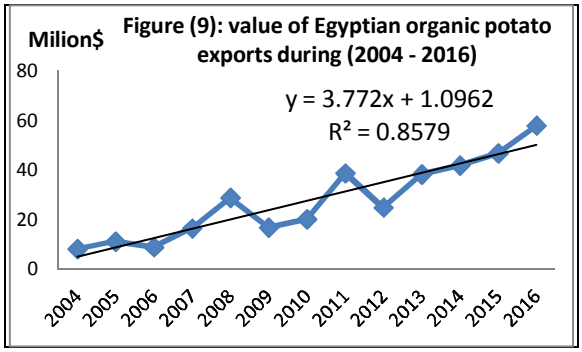
Evolution of the export price:

The price of organic tomato exports ranged between a minimum $ 500 per ton, 2004, and a maximum 4,166 $ per ton in 2009, an increase of about $ 3,666.7 per ton. the annual increase of the price of organic tomato exports is significance Figure (8), showed that annual growth rate about 15.5 % during the period (2004-2016).

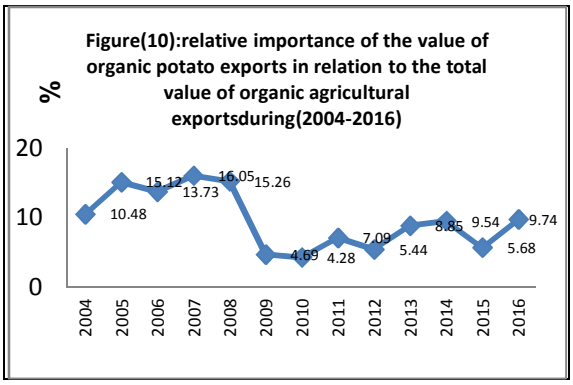


The value of agricultural exports of the organic potato crop:

The value of organic potato exports ranged between a minimum about 8.1 million $, 2004 and a maximum about 57.8 million $, 2016, an increase about 49.7 million $ compared to year 2004, Estimated general trend equation Figure (9), showed that annual growth rate about 13.7 % during the period (2004-2016).



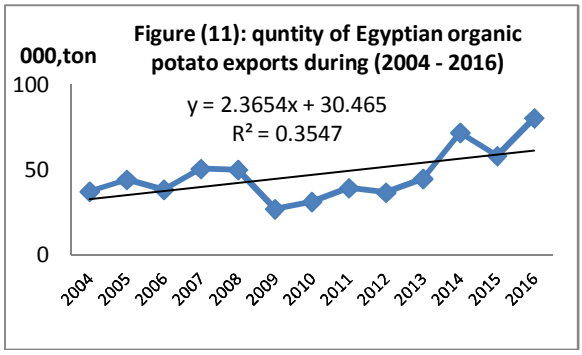
The relative importance of the value of organic potato exports to the total value of organic agricultural exports about 10.48%, 2004, decreased to 9.74% in 2016 Figure (10)



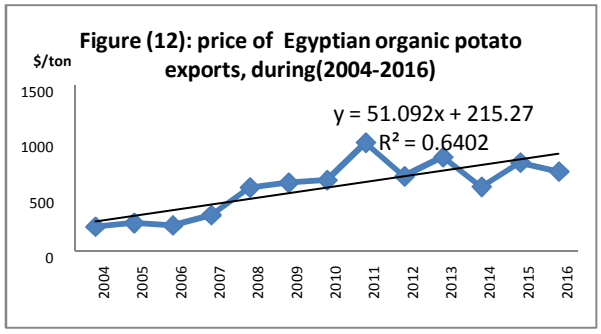
Quantity of Egyptian organic potato exports:

The quantity of Egyptian organic potato export increased from 37.4 thousand tons, 2004 to 80.50 thousand tons, 2016, an increase about 43.1 thousand tons compared to year 2004. Figure (11)

showed that annual growth rate about 5 % during the period (2004-2016).



The average price of Egyptian organic potato exports: The average price of organic potato exports ranged between a minimum price $ 216.58 per ton, and a maximum price $ 979.70 per ton in 2011, an increase of about $ 763.12 / ton, Figure (12), showed that annual growth rate about 8.9 % during the period (2004-2016).



An economic assessment of the role of the Sustainable Agricultural Development Strategy 2030 in achieving food security and organic agriculture:

Table (2) shows the interest of the sustainable agricultural development strategy 2030, by investing in technologies that reduce food waste and loss, adopting alternative technologies for chemical production requirements, and adopting sustainable production systems such as organic agriculture through "the advantages of transition to a green economy and sustainable development", and clarifying the effects The positive economic, social and environmental result of the shift from conventional to organic farming, and several measures have been taken to enhance the sustainability of organic agriculture as follows:

- Replacing 20% of the total cultivated land in Egypt with a conventional method to organic farming technology, providing about 700 thousand tons of chemical fertilizers, and provides one billion pounds annually. social and environmental result of the shift from conventional to organic farming, and several measures have been taken to enhance the sustainability of organic agriculture as follows:

- The use of modern irrigation methods and the limitation of cultivation of crops for the use of water such as rice or sugar cane, since the use of drip irrigation provides about 40% of the water use compared to flood irrigation, equivalent to 23 billion cubic meters / water.

- Apply sustainable farming systems that use solar energy to power machinery.

- A decrease in the costs of agricultural production requirements about (20% - 35%) compared to conventional agriculture through the use of waste in the production of organic fertilizers.

- Recycle agricultural waste and use it as a source of energy. The use of rice straw is about

500,000 tons annually, in productive fertilizers that reduce carbon dioxide emissions by about 32,500 tons per year (or cubic meters).

- The production of organic fertilizer from about 20 million tons of agricultural waste as an alternative to the use of chemical fertilizers, which leads to environmental protection.

Table (2): The goals of the sustainable agricultural development strategy 2030 related to organic agriculture

Description	**Unit**	Actual 2017	Target		
			2019/2020	2024/2025	2029/2030
Agricultural land area	thousand Feddan	**9526**	**10517**	**11510**	**12948**
Crop area	thousand Feddan	**16536**	**18260**	**19981**	**22479**
The increase in the agricultural area	thousand Feddan	**495**	**993**	**993**	**1438**
	%	**100**	**110**	**121**	**136**
The area of organic land	thousand Feddan	**251.46**	**356.5**	**539.8**	**836.42**
The ratio of the area of organic land to the total agricultural land	**%**	**2.64**	**3.39**	**4.69**	**6.46**
Agricultural waste as a result of fertilizers and other uses	thousand metric ton	**3800**	**5700**	**8360**	**11400**
	%	**10**	**15**	**22**	**30**

Source: Collected and calculated from the Sustainable Agricultural Development Strategy, 2030. Gamal Siam & Tahani, 2019)

The performance indicators and economic Efficiency indicator for conventional and organic potatoes and tomatoes in, sampling 2019/2020:

First: the organic potato crop: results are reviewed in Tables (3) and (4):

- The average Feddan productivity of the organic potato crop decreased by 15.02% compared to conventional organic cultivation. Average crop yields are lower in organic than in conventional agriculture. Consequently, change from conventional to organic would require more land to produce the same quantity of crops. Increase land requirements about 19%.

- The higher price per ton of organic potatoes is about 46.9% compared to conventional organic farming. Many poor families spend over 50% of their income on food, which mean potatoes Purchased spending on organic food would Increase money requirements.

- The net Feddan yield of the organic potato crop increased by 58.17% compared to conventional organic cultivation.

Table (3): The economic yields indicators of organic tomatoes and potatoes in comparison to conventional yields in 2019/2020

description	tomatoes			potatoes		
	Conventional farming	Organic farming	%(+)/(-) Organic farming	Conventional farming	Organic farming	%(+)/(-) Organic farming
Average production ton /Feddan	17.2	14.72	-16.85	13.71	11.9	-15.21
Average variable costs L E / Feddan	34045	40225	15.36	17644	17852	1.17
Total revenue L E / Feddan	51858	82579.2	37.20	33630.63	54978	38.83
Net yield L E / Feddan E	17813	42354.2	57.94	15986.63	37126	56.94
Average total costs L E / Feddan	36045	45225	2030	19644	22852	14.04
(Total return / total costs) * 100	1.44	1.83	21.21	1.71	2.41	28.84
(Net Feddan yield / Average variable costs) *100	52.32	105.29	50.31	90.61	207.97	56.43
human labor, Labor/day	75	100	25.00	40	49	18.37
Average consumption of organic fertilizers in cubic meters/Feddan	18	24	25.00	42	47	10.64
Average cost of production L E / ton	2095.64	3072.35	31.79	1432.82	1920.34	25.39
Average farm price per ton in pounds	3015	5610	46.26	2453	4620	46.90

Source: Collected and calculated from the questionnaire data for the year 2019/2020.

Second: Organic tomato crop:

The most important productive and economic indicators for conventional and organic tomatoes in 2019/2020 are shown in Table (3): The average Feddan productivity of the organic tomato crop decreased by 16.85% compared to conventional organic cultivation.

- The higher price per ton of organic tomatoes is about 46.26% compared to conventional organic cultivation.
- The net Feddan yield of the organic tomato crop increased by 57.94% compared to the conventional organic cultivation.

The productions function for organic grown potatoes and tomatoes in the sample study in Behera Governorate, the agricultural, in year2019/2020:

The Cup-Douglas function is the most used function for estimating production functions because it is the most appropriate form of agricultural production conditions, as it gives the best linear unbiased estimate of the estimated parameters, where The relationship between the average quantity of production, ton per Feddan "dependent variable" and a number of production inputs represents "independent variables" and thus becomes the equation, The model to be estimated is written as follows:

$$y= a\pm b_1 \ln x_1 \pm b_2 \ln x_2 \pm b_3 \ln x_3 b_4 \ln x_{4+} \pm b_5 \ln x_5 \pm b_6 \ln x_6 \pm b_7 \ln x_7 \pm b_8 \ln x_8 + \varepsilon$$

With: x_1 the area planted with the organic crop (Feddan): x_2 the number of irrigation times: x_3 the number of manual control times: x_4 the quantity of Bio-pesticides" Organic manure" in liter, x_5: the quantity of compost, Organic manure "m3": x_6 the number of Hired & un hired labor used man / Day, x_7: quantity used for seed or seedlings, and ε: Random error.

Organic potato and tomato crops:

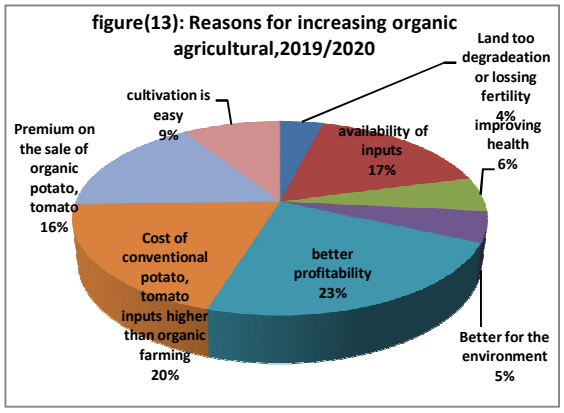
The value of (F) shows the statistical significance of the model, at the level of significance of 0.01, and the independent variables included in the model are responsible and explain about 89%, 91% of the change in the production of organic potatoes and organic tomatoes, respectively, About 11% and 9% of these changes are due to factors that were not included in the model for the crops of organic potatoes and organic tomatoes, respectively. The total elasticity has reached less than the correct one for each of the two crops, which means the dominance of the relationship with decreasing productive capacity, whereby production increases by less than the percentage of the increase of the productive elements involved in the production process, meaning that production takes place in the second productive stage.

Table (4): the production function for organic grown potatoes and tomatoes in the sample study in Behera Governorate, the agricultural, in year2019/2020

crop	function
Organic potatoes	$\ln Y = -1.30 + 0.01 \ln X_1 + 0.01 \ln X_2 + 0.25 \ln X_3 + 0.44 \ln X_4 + 0.29 \ln X_5 + 0.73 \ln X_6 + 0.05 \ln X_7$ (2.03)* (1.44) (2.80)* (3.01)* (2.50)* (4.07)* (3.28)* $R^2 = 0.89$ F=25**
Organic tomatoes	$\ln Y = -1.03 + 0.17 \ln X_1 + 0.20 \ln X_2 + 0.27 \ln X_3 + 0.13 \ln X_4 + 0.39 \ln X_5 + 0.57 \ln X_6 + 0.15 \ln X_7$ (4.4)** (1.08) ** (2.95)* (3.16)* (7.01)* (5.84)** (2.55)** $R^2 = 0.91$ F=41.6**

Source: Collected and calculated from questionnaire data for the year 2019/2020*, **Significant at0.01, and 0.05 level.

Where there are independent factors that affect the quantity of production of the organic tomato crop, and all of the performance indicators were statistically, except X_2. The situation did not differ with regard to the potato crop.



Reasons for increasing organic agricultural:

There are many reasons for potato, tomato farmers to change their production systems to organic farming. Such as financial and environmental, figure (13).

The most important motivations amongst organic farmer in Behera sampling, 2019/2020, for organic farming crops, instead of conventional farming is the better profitability, and Cost of organic farming potato, tomato inputs lower than conventional farming.

Relationships between organic area and economic growth in Egypt:

The economic growth can be represented by gross domestic product (GDP), the purpose of the equation, or the relationship between organic area (OA) and economic growth (GDP), as follow:

ln (GDP)=10.76 + 0.59 ln (oA)

This estimate focuses on the relationship between, economic growth on organic area in logarithm, The result showed the significance of the coefficients, indicating that the organic area has a significant effect on economic growth 59%. The significance of the model is indicated by the coefficient of determination R^2=0.88 which indicates a good fit of the model, the organic area accounts for 88% of economic growth.

Challenges and constraints facing organic grown potatoes and tomatoes in the study sample, year 2019/2020:

Despite the benefits of organic products, the rate of adoption of organic farming practices is

Challenge for the farmers in Egyptian and need to be discussed, challenge, as follow:

- The interviewed organic farmers in Behera Governorate were 40 years old on average and have Average number of family members about three members.
- Organic farmers in Behera have higher levels of education on average than conventional farmers which influence the acceptance and implementation of new ideas and farming practices such as organic agriculture.
- The results revealed that about 47.2% of total sampling farmers viewed their food security at an average level.
- Lack on Extension agents and farm advisers are increasingly knowledgeable about organic farming.
- One of the hardest challenges for farmers converting to organic is learning how to market products, finding markets and negotiating prices.
- The most important production and marketing problems facing potato and tomato growers organic grown in the study area of the agricultural season in 2019/2020: There are many economic and social factors affecting farmers 'adoption of the organic farming method, such as age, educational level, tenure area, agricultural expertise, and extension services. By asking the respondents about the source of their information on organic agriculture and its application methods, it was from neighboring farmers as confirmed by about 74% of the sample The study is because the extension services provided by the agricultural extension agents were not sufficiently to convince them to adopt the organic farming technique As shown in Table (5), which shows the weak relationship between extension and farmers, this can be attributed to the low percentage of those holding university degrees in the study sample on the one hand, and the need for training courses for agricultural extension workers in the field of organic agriculture.
- About 65% of the surveyed farmers indicated that organic crops suffer from a lack of funding sources, especially in the field of research, extension, training, and loans to farmers.
- About 100% of the farmers surveyed pointed to the high costs of producing organic crops, "the soil must be treated before starting organic farming," and the high costs of issuing certificates, especially in the case of annual renewal.
- It was also found that about 61% of farmers from the study sample confirmed the length of time for conventional farms to be converted to organic farms as a result of intransigence on organic farming.
- About 76% confirmed the lack of organic fertilizers in the local markets at all times.
- About 64% of farmers indicated from the study sample, the lack of expert and trained labor.
- About 86% of farmers indicated from the study sample, it is difficult to control pests and diseases in organic farming. As a result of the use of biological control, its result is slower and less effective compared to the use of chemical pesticides that reduce the infection of plants with fungal diseases and weeds.
- We conclude from the above that some farmers can have great capabilities in applying some methods and foundations of applying organic agriculture in the field of vegetable cultivation and others do not have that ability which constitutes an obstacle in the application of this technology, and this can be due to the weakness and low government support "loans, advances And other "for organic crops, and this was confirmed by about 100% of the study sample.

Table (5): Challenges and constraints facing organic grown potatoes and tomatoes in the study sample, 2019/2020

Challenges and constraints	No	%
production		
- Yields of organic farming are lower than for conventional potato, tomato	70	100
- Weak investment in organic agriculture due to low financial capabilities, especially for small producers.	65	65
- The high costs of producing organic crops, and the increase in organic certification costs.	70	100
- Pests and diseases are difficult to control in organic farming.	60	86
- Lack of expert and trained manpower.	45	64
- The long period of time for the conversion of conventional farms to organic farms as a result of the intransigence of organic farming inspection.	43	61
- Preparing organic fertilizers takes effort and time.	59	84
- Organic fertilizers are not available on local markets at all times, difficult to find manure.	53	76
marketing		
-Lack of coordination between organizations in the organic sector which, such as Failure of the agricultural cooperative societies and the extension agents to play their assigned role in the field of organic agriculture.	52	74
- Reduced government support for organic crops.	70	100
- Low domestic demand for organic products, due to an increase in their prices.	70	100
- Failure to provide information on the domestic and external demand for organic products for guidance when expanding.	61	87
- High storage and transportation costs.	50	71
- High freight costs, customs fees, and sampling costs.	44	63
- High marketing margins due to the presence of a large number of brokers.	52	74
- Inability to Meet the Export Demand.	45	64
- lack of market information and Knowledge, Lack of technical assistance.	65	93
financial		
-Lack of Access to Finance.	50	71
- Reduced government support for organic crops.	49	70
- The cost of certification.	70	100
- Higher investment required for organic farming.	70	100
- No financial support provided in Egypt as in Germany.	53	76
- Inability to obtain a premium price.	43	61

Source: Collected and calculated from the questionnaire data for the year 2019/2020.

Marketing problems:

About 100% of the farmers in the study sample confirmed the increase in the prices of organic products compared to consumer income, due to the high costs of producing organic products.

- About 100% of the farmers agreed in the study sample to decrease the local demand for organic products, this may be due to a decrease in awareness of the health and nutritional importance of organic products, and that local consumers tend to buy more conventional agricultural products compared to organic agricultural products because of their low prices, availability and supply in Areas close to them, while organic products are concentrated in a limited number of supermarkets and hypermarkets.
- About 87% of the farmers in the study sample stressed the lack of information on the domestic and external demand for organic products for guidance when expanding.
- About 71% of the farmers in the study sample emphasized the high costs of storage and transportation.
- About 63% of the farmers in the study sample indicated an increase in freight costs, customs fees, and costs of taking sample analysis.
- About 70% of the farmers in the study sample emphasized the high marketing margins due to the presence of a large number of brokers.

The most important proposed solutions to overcome the most important problems facing

organic potatoes and tomatoes farmers in the study area in the agricultural season 2019/2020:

Table (6) shows the solutions proposed by farmers of organic potatoes and tomatoes in the study area to try to overcome the problems represented in facilitating the procedures of converting conventional farms to Organic farms, providing seedlings at the right time and at reasonable prices, providing appropriate organic fertilizers free of soil diseases at the right time and at reasonable prices, providing biocides at an appropriate price, activating the role of the extension agency and agricultural cooperative societies in raising awareness Farmers in the field of organic agriculture, in addition to In addition to providing marketing outlets at home and abroad and facilitating export procedures at a rate of about 100% according to the opinions of farmers in the study sample. While the necessity of conducting training programs for workers to work on organic farms at reasonable prices, and displaying organic products at appropriate prices, especially for low-income groups, came second with a rate of about 96%, according to the opinions of farmers in the study sample.

SWOT Analysis:

The research applies the SWOT methodology; it is based on several studies, national and international reports, and farmer and experts interviews, To analyze the policy and institutional options for better practice of organic farming in Egypt's agricultural sector. The most important **Strengths** are agriculture sector already has strategies to reduce imparts, and increasing exports by without chemicals to ensure health, adopting modern technique's in agriculture, also a willingness to increase food security in Egypt, Table (7).

Table (6): The most important proposed solutions to the problems facing farmers of organic potatoes and tomatoes in the study area of the agricultural season 2019/2020.

Proposed solutions	Responsible Authority	no	%
Facilitating the procedures for converting conventional farms to organic farms.	(M ALR)	70	100
Providing seedlings in a timely manner and at reasonable prices.	(M ALR)	60	86
Providing appropriate organic fertilizers free of soil diseases in a timely manner and at reasonable prices. Establish the organic fertilizer production factory.	(MALR), and private sector	55	79
Providing bio-pesticides at an appropriate time and prices	((MALR), and private sector	64	91
Activating the role of the extension agency and agricultural cooperative societies in educating farmers in the field of organic agriculture	(M ALR)	67	96
Work training programs for employment to work on organic farms at reasonable prices.	(M ALR)	45	64
Offering organic products at reasonable prices, especially for low-income groups.	(M ALR), and Ministry of Foreign Trade	56	80
Establishing a cooperative society for organic farmers, working to provide production requirements as well as marketing organic products through their own outlets	(M ALR)	46	66
providing extension fields in the governorates to encourage organic agriculture	(M ALR)	57	81
Providing marketing outlets in the internal and external markets for organic agricultural products.	(MALR), and Ministry of Foreign Trade ة	70	100
Activating the role of Egyptian embassies and commercial chambers at home or abroad to work on marketing organic agricultural products, and coordination between the various parties.	Ministry of Foreign Trade, and Ministry of International Cooperation.	65	93
Facilitating export procedures and reducing customs duties, to increase the competitiveness of organic products	Ministry of Foreign Trade	70	100

Source: Collected and calculated from the data of the research sample for the agricultural season 2019/2020.

Table (7): Summary of the SWOT Analysis of organic agriculture in Egypt

Strength	**Weaknesses**
- Clear vision, objectives and strategy for agricultural sustainable development 2030. - Availability of organic production inputs. - International laws control organic farming. - The increasing demand for organic products in foreign markets. - The positive effects of organic farming practices on health and the environment. - Positive economic and social impacts on producers, exporters and consumers. -Preserving the fertility of agricultural soils. -Maintenance and promotion of natural and agricultural diversity. -Reducing the health and negative effects associated with pollution with chemicals. -Providing the main inputs to organic farming and reducing dependence on imports. -Experience with trade. - the price premium of organic agriculture products.	-High costs of certification, particularly for small farmers. -Lack of specialized and skilled workers of organic Agriculture. - High initial investments and high production costs for organic farming. -Lack of awareness and dissemination information of the health, economic and social impacts of organic farming. - The absence of marketing information, which causes difficulty in exports. - Productivity of organic agriculture decrease compared to conventional cultivation during the transformation period. - losing export opportunities, due to Insufficient market information about exporting and importing countries. -Limited financial resources and funding sources . High interest rate on lending. - Limited capacity to assist the small farmer. - Lack on the role of Agriculture Cooperatives. and Egyptian agriculture Bank towards small holder.
Opportunities	**Threats**
- Increasing demand for safe, high-quality food, provide a great opportunity for Egyptian organic products in more than 160 countries. - Organic farmers growing several crops key crops to reduces economic risks. - Low prices of domestic organic products compared to world prices. - Political stability in most countries . - free trade between different countries will increase the movement of organic products between these countries and Partnerships between countries stimulate organic agriculture. - Development & Modernization of communication and transportation increase availability of organic products between countries. - Investment in the organic agriculture, by developing linkage with international markets. - easy loan support to farmers. - Government applied Strong monitoring and supervision and award or punishment. - Government, non-government organizations, Cooperative and investors involve in training for farmer of organic agriculture. - Rising awareness of farmers and consumers about organic agriculture. - Availability of trained manpower. - Improvement of crops using combination from conventional and organic methods.	- Fragmentation of tenure. - Domestic organic agricultural products face competition from some countries that support their producers or sell at a low price compared to the domestic price., -Changes in the government policy. - lack of information on the markets and their accessibility. - Lack of coordination between institutions working in the organic agriculture. -Lack of interest in organic agriculture, especially in the field of agricultural education, Limited extension services and research and development activities. - The spread of some misinformation, such as considering agriculture as organic by simply refraining from using chemicals, and considering the Feddan productivity of organic crops low compared to conventional crops. - population increase, scarcity of water supply. - The low efficiency of agricultural organizations and institutions in fulfilling their role, some of the objectives of agricultural policies are in conflict with organic agriculture. -Poor research and extension services . The deficiency of human skills. -Limited national funding and investments . -Inadequate infrastructure and supporting facilities. - Reluctance of farmers to alter conventional techniques

Source: based on several studies, national and international reports, and farmer and experts interviews**.**

- **Recommendations: In light of the research results, the following can be recommended:**

- Government needs to spread awareness among farmers about nature damage by chemical usage and should promote organic farming by making proper policies.

- Cooperatives or alliances with other organic farmers to strengthen their negotiating power (see "Marketing Strategies.

- Research on organic farming practices has lagged significantly behind conventional research due to a lack of institutional interest in organic farming, the complex nature of organic farming systems, and the fact that most agricultural researchers are trained to focus on disciplinary rather than integrated systems research.

- Organic farming requires preventative rather than prescriptive strategies and a considerable amount of planning ahead.

- Organic contract farming could be responsible for higher profits - -system.

- Developing a strategy to promote organic agriculture in Egypt, supported by the latest methods of biotechnology, natural fertilizers, biological pest control programs and good control of farms, in addition to allocating pilot areas in organic crops as guiding areas to encourage farmers to adopt organic agriculture.

- - Establishing a cooperative society for organic farmers, working to provide production requirements "organic fertilizers and pesticides" from a natural source, at encouraging prices for farmers, as well as marketing organic products through their own outlets "Central Administration for Agricultural Cooperation"

- Spreading consumer awareness of the importance of a healthy organic product as an alternative to the conventional product that may harm the health of the consumer, through audio and visual means of communication.

- Indicative export policies must be developed for the most important markets for organic agricultural products in general, and for tomato and organic potatoes in particular, to identify the most important determinants of demand within these markets, and thus to develop a visualization or map of the target markets according to the export goods.

Summary:

The Egyptian government focuses on improving food safety, through specifications and standards, and preventing the transmission of diseases to ensure safe food and a healthy life for citizens, which requires effective cooperation between all relevant authorities from farms to consumers, Egyptian agricultural exports are exposed to increasing requirements in terms of food safety standards, Export priorities were also determined by relying on the promotion of environmentally and economically sustainable forms of agricultural activity, specifically the production of agricultural crops with high added value, including organic agricultural products, but a few Egyptian farmers adopted Technology where the number of organic farms in Egypt (970) farm in 2016, (CAPMAS). The organic cultivated area about 579 thousand feddan in 2016, representing about 5.9%, 6.4% of the total area of organic agricultural land in Africa and the total area of cultivated land in Egypt in 2016, (FiBL.2018), respectively, which shows that the organic agriculture sector has not reached the size that it can Competition of conventional agriculture, or global organic agricultural trade, as the value of organic agricultural exports about 593.3 million $, representing about 22% of the value of conventional agricultural exports, about 2696.8 million $ in 2016, which confirms that Egypt only benefited with a modest share of open foreign markets to import The products Organic sponsor, targeted research mainly discussed the possibility of expansion of organic agriculture in Egypt.

The most important research results:

- Among the most important factors affecting the production of potatoes and organic tomatoes are the quantity of seeds, the quantity of organic fertilizer, and the number of workers, as the total production flexibility is less than the correct one, which means that production takes place in the second stage, which is the economic stage.

- The productivity of organic farms decreases by about 20% compared to conventional agriculture, but organic farming uses less pesticides and fertilizers by about 50%, 97% compared to conventional farms, respectively.

- Organic agricultural products are distinguished by their high quality and prices compared to conventional agriculture.

- High average variable and total costs and net Feddan yield for organic farming compared to conventional ones.

- There is a deficiency in the indicative role associated with raising awareness of the methods and methods of organic farming and marketing its products.

- The Egyptian organic product suffers from weak marketing policies internally and externally, due to the lack of a marketing strategy for organic products, as the demand is limited to the category of

those who are financially capable and those with high incomes.

- Regarding the future status of organic agriculture in Egypt, it is also encouraging and promising. On the one hand, consumers are interested in healthy food and have a great purchasing power. On the other hand, investors are interested in expanding organic business, and the government is also concerned with sustainable support to the organic agricultural sector. To overcome the challenges facing the organic agriculture sector in Egypt, the organic agricultural sector and related parties must be strengthened through sound government interventions, in addition to stimulating and supporting conventional farms to become organic farms, and the directorates of agriculture and agricultural cooperatives in Egypt will have a role In expanding the development of organic agriculture, developing clear incentives and support measures is essential to strengthening the structure of the agricultural sector to create a successful organic agricultural sector.

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