

ECONOMIC LIBERALIZATION POLICY EFFECTS ON TOMATO CROP AGRO-ECONOMIC TRENDS IN EGYPT (1980 – 1999)

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ABSTRACT

The study attempted to investigate the effects of the economic liberalization policies on the agro-economic trends of Tomato crop most important economic variables, efficiency, criteria and indicators. The study used tomato crop production and revenues as dependent variables and cultivated area, productivity and farm prices as independent variables. The studied period was divided into three periods, base period (1980 – 1986) and two comparable periods (1987-1992) and (1993 – 1999). Statistical methods were used to achieve the study goals. The study showed that the production increased by the double, as a result of the increase in productivity. The increase in revenues was due to price and productivity increase, but their relative importance were decreased. The economic liberalization policy showed positive effects on production, productivity, prices, consumption and exports. It had negative effect on cost per unit and stable effect on consumption / production and export / production ratio. The study assured the producer's better off status VS. The consumer worse off status because of the burden of the price will be cut from his surplus. Therefor additional adjusting policies are needed to adjust consumption exports and waste management.

INTRODUCTION

Tomato crop is considered one of the most important vegetable crops in the Egyptian agriculture and economy as well, It is used as food, fodder and as industrial input in Tomato sauce, paste and other Tomato product industries. Therefore, any changes in its price or production may affect the agricultural sector and the entire economy.

As the agricultural sector is tending towards the application of the economic liberalization policies, this may cause positive and negative effects on Tomato crop production, consumption, and industrial utilization and trade.

Tomato crop national & global status

Tomato crop national status

Tomato production achieved around 33%, 46%, 50.3% and 46% of the total vegetable production in Egypt in the years 1980, 1987, 1992 and 1999 respectively.

Its utilization as food product formed 54%, 46.5%, 51% and 44% of the aggregate vegetable food product for the mentioned years respectively. As a result of the increasing Tomato production since 1980, the Tomato imports decreased from 33 thousand (metric ton) in 1980 to reach 13 thousand metric ton in 1999 which indicates total decrease of 61% from the base year 1980 This fact illustrates more self – dependency in the domestic supply of Tomatoes. Tomato exports have increased from (five thousand

metric ton) in the year 1980 to reach (14 thousand metric ton) in the year 1999 with total increase 9 thousand metric ton (280%) this fact reflects the increase of the economy's rate of self – sufficiency of the product.

As fodder (waste), it is considered important sub-product, its waste was 33%, 46%, 50.5% and 46.4% of the total vegetable waste for the years 1980,1987,1992 and 1999 respectively. Therefore, Tomato crop is considered almost 50% of vegetable domestic supply and domestic utilization (food &waste).

Tomato crop global status

The Egyptian production was 54%, 10.6%, 17.7% and 6.6% of the African developing countries, developed countries and the entire world respectively. The Egyptian Tomato waste achieved 55%, 10.8%, 6.7% and 7.9% of the mentioned region's total waste respectively.

As food 52%, 11.3%, 17% and 7% of the above region's total Tomato use as food. So, Tomato national and global status showed impressive status because of its high production percentage as food and fodder therefore, any changes in price level might affect its national and global economics.

1) The study problem

The economic liberalization policies in the Egyptian agriculture sector aimed to achieve high developmental rates in agricultural crop production in order to achieve self-dependency in the domestic supply and self-sufficiency of the agricultural products as a way to achieve economic and political liberalization, particularly, under the new global economic order Tomato crop as an important food, fodder and industrial input clearly reflects the effects of such policies, although the economic liberalization policies had many positive effects but it caused some not cable negative effects on all crops and Tomatoes as well as, a result of the high increase of the production costs represented in the increase of technological production inputs, labor wages and land rent. This caused high increase in the price of the final product, which may causes, different negative economic effects:

- a) A decrease of consumer's demand (direct effect) taking in consideration, that Tomato product is considered as a vegetable sub-product in the Egyptian cooking systems, therefore, it will affect the consumer's demand of other vegetables (spiral effect). Finally the equilibrium status will be affected in the in the internal market.
- b) A decrease in the competitive status of the Egyptian tomatoes in the external markets especially, if it is accompanied by the exchange rate status of the Egyptian pound.

2) The study objectives

This study is an attempt to identify the economic effects of implementing the economic liberalization policies on the main tomato crop economic variables as one of the most important Egyptian vegetable crops. It also, tries to highlight the most effective variables, on aggregate production and revenues. Finally, it argues that the resulted change from implementing

such policies may affect the tomato crop consumption national and global markets.

3) Methodology and Data sources

In order to fulfill the study objectives the studied period (1980-1999) was divided into three main periods of seven years: the basic period (1980-1986) represents pre-implementation of the economic liberalization policies in the agriculture sector. The second period is considered the first comparable period (1987-1992) which clarify the gradual implementation of the economic liberalization policies. The third period is considered the second comparable period (1993-1999) which indicates the consequent period of implementing the economic liberalization policies, production requirements, price liberalization and the application of the new rent relationship between the owners and tenants in the agricultural lands.

The study depends on electronic data and written published and unpublished data collected from different sources such as the ministry of Agriculture and land reclamation, the ministry of planning and FAO.

Different statistical methods were used such as Data Descriptive analysis, index number were used to quantify the study variables. Separating the different variables effects were applied. Some economic efficiency measurements were considered such as the net returns per feddan, unit cost and the rate of returns / costs. Finally an economic analysis was conducted. The following equations were used to illustrate the economic analysis of phase one (the effects of the changes of cultivated area and productivity on production)

1) The separated effect of factor (A) on the phenomenon :

$$JA = (A_i M_0 - A_0 M_0)$$

2) The separated effect of factor (M) on the phenomenon :

$$SM = (A_0 M_i - A_0 M_0)$$

3) The aggregate separated effects of phenomenon change :

$$JR = JA + JM$$

4) The joint effect of factor (A) and (M) : $JR = (A_i M_i - A_0 M_0)$

5) The sequential aggregate effect of the phenomenon change :

$$SR = SA + SM + JR$$

Where:

- A_0 The cultivated area in the base period (thousand feddan)
- M_0 The average production per feddan / Ton in the base period
- A_i The crop cultivated area in the compared period (thousand feddan)
- M_i The average production of the crop per feddan / ton in the compared period

As for phase II the following equations were used:

1) The separated effect of factor (A): $SA = (A_i P_0 - A_0 P_0)$

2) The separated effect of factor (P) on the phenomenon :

$$SP = (A_i P_i - A_0 P_0)$$

3) The aggregate separated effects of phenomenon change :

$$SR = SA + SP$$

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4) The joint effect of factor (A) and (P) :

$$J R = (A_1 P_1 - A_0 P_1) - (A_1 P_0) - (S P)$$

5) The sequential aggregate effect of the phenomenon change:

$$S R = S A + S P + J R$$

Where:

- A_0 The crop productivity in the base period (Tons)
- P_0 The farm price in the base period (L.E)
- A_1 The crop productivity in the compared period (Tons)
- P_1 The farm price in the compared period (L . E)

Some economic efficiency measures were used such as net feddan returns, unit cost, net returns / cost ratio and unit cost / price ratio.

4- Literature review

The literature review of the economic liberalization policy effects on agricultural crops in Egypt showed that such policy had positive effects on the agro-economic indicators, it had also, some negative effects. The following are some of these studies:

- The study of Taha & Amer, 2002² entitled " Developmental return for the economic policies and Mass. Communication activities related to the production and industrialization of the Egyptian flax analytical cooperative field study " highlighted the negative effect of economic liberalization policy on flax and assured the need of other adjusting policies such as privatization, reallocation and aid.
- The study of Abdel Aziz & El Sharif 2001³ entitled " Effect of economic liberalization policy on important economic variables for potatoes and orange crop " proved that farmer's revenue and cultivated area, production and consumption were increased according to the application of such policies.
- The study of Aoad and others, 2001⁴ entitled " Evaluation of the effect of economic liberalization policy on the economic and productive aspects of Bean crop " proved that Egypt enjoyed comparative advantage in producing Bean crop before and after complete liberalization policy. Cultivated area, yield of feddan, production and farm price, total costs and revenues per feddan increased by 23 %, 11 %, 63 %, 320 %, 548 % and 320 % respectively
- The study of El Gaar, 2000⁵ entitled " Analytical study of the economic liberalization policy on the rice crop " revealed that feddan yield, production, net returns and cost of production were increased according to the implementation of such policy
- The study of Aneaber, 2000⁵ entitled " The effect of economic liberalization policy on wheat food gap " showed that such policy caused increase of the cropping areas 197 % and productivity by 44%
- The study of Hemaya, 1997⁷ entitled " The structure of GDP under Economic Development strategies in Egypt (1960-1994) showed that the relative importance of the agricultural sector in GDP has declined from 16.1 % to 13.9 % for the years 1987, 1994 respectively, under the implementation of liberalization policies

5) The study findings

(1) Effect of the Economic liberalization policies on Tomato production and the accompanied changes and determinants

Index numbers were used to measure the economic changes in the aggregate production as a result of implementing the economic liberalization policies. Cultivated area and average productivity per feddan represented the economic variables (determinants).

Table (1) shows the analysis and results:

a) Aggregate production changes

a-1: First comparable stage (1980 – 1986 & 1987 – 1992)

This comparable stage between the basic period (1980 – 1986) and the first comparable period (1987 – 1992) showed an increase in the production of winter summer and Nili tomato with 47 %, 57 % and 18 % respectively, as for the aggregate tomato production, it registered 42 % increase this result clarify that the highest production in crease occurred in the summer tomato. and Nili tomato was the least increase.

a-2: The second comparable stage (1980-1986) and (1987-1999)

The comparable stage between the basic period (1980-1986) and the second comparable period (1993-1999) represented an increase in the production of winter, summer and Nili tomato with 115 %, 113 %, 1 % respectively. The aggregate tomato production showed average percentage of 81 % increase. This result means that the height increase was in the winter crop followed by the summer crop and the Nili crop was the least increase

a-3: The third comparable stage (1987-1992 and (1993-1999)

Comparing the first comparable period (1987-1992) with the second comparable period (1993-1999), we find the following:

- 1- The winter tomato crop registered the highest increase in the second comparable period 115 % (complete liberalization) where, it registered only 47 % increase in the first comparable period (gradual liberalization)
- 2- The summer tomato crop was 113 % in the second comparable period, whereas, Its increase in the first comparable period was 57 %.
- 3- The Nili tomato crop was poorly increased by 1 % in the second comparable period, where, its increase was 18 % in the first comparable period.
- 4- Aggregate tomato crop was increase by 42 % in the first comparable period but in the second comparable period, it increased by 81 %

The resulted analysis illustrated that the economic liberalization policy caused real increase in the aggregate tomato production in its final implementation period more than in the gradual implementation and the pre-implementation period, The Nili tomato showed different attitude where it showed 18 % increase in the partial implementation period and was decrease to 1 % in the final implementation of the economic liberalization policy.

b) Changes in the economic variables and its effects on aggregate production

b-1) The first comparable stage (1980-1986) and (1987-1992)

Regarding the separate effects of the changes in winter tomato the cultivated area caused 29.5 % of the tomato production, whereas, 62.1% refers to the changes in productivity per feddan which reflects the superiority of the technological development effect more than the increase in the cultivated area. The joint effect of cultivated area and productivity was 18.4 %, as for summer tomato, the effect of the change in cultivated area was responsible for 37.3 % of the change in production, 52.2 % of the change in production occurred as a result of the change in productivity per feddan and 10.5 % goes for the joint changes of both variables.

As for Nili tomato, the results in table (1) showed that 11.9 % of the changes in production occurred according to the increase in the cultivated area, 86.4 % of the changes in production was due to the changes of productivity per feddan. Finally, 1.7 % of the change in production was a result of the joint effect between productivity and increase area. Finally the aggregate tomato figures showed 30.8 %, 60.9 %, and 8.3% increase in cultivated area, productivity per feddan and joint effects respectively.

b-2: The second comparable stage (1980-1986) and (1993-1999)

As for winter tomato, 9.4 %, 81.7 % and 8.8% of the changes in production were due to the increase in the cultivated area, productivity per feddan and the joint effect.

The summer tomato 50.6 %, 31.4 % and 18 % of the change in as a result of the increase in cultivated area, productivity per feddan and the joint effect respectively. The Nili tomato showed negative effects of cultivated area, midum positive effect of productivity per feddan and slight change due to both effects. Finally, the aggregate tomato crop showed 20 %, 8.8 % and 11.2 % increase of the cultivated area increase productivity per feddan and the joint effects of both variables.

b-3: The third comparable stage (1987-1992) and (1992-1999)

Comparing the first comparable period (1987-1992) with the second comparable period (1992-1999) it is clear the relative importance of the cultivated area and productivity have changed. For each kind of tomato as well as the aggregate tomato variables. The cultivated area relative importance was decreased in winter and Nili tomato and was increased in summer tomato which means that summer tomato crop was utilized from the economic liberalization policies. Aggregate tomato cultivated area effect was decreased from 30.8 % under the gradual implementation of the policies to reach 20 % under the full implementation of such policies. As for the productivity relative importance effect on production, it is clear that it had positive effect under the full implementation compared to the gradual implementation.

Table (1) : The relative changes & analysis results of the cultivated area (thousand feddan) and the average productivity per feddan (tons) on the Aggregate change of the tomato production (1980-1999)

The Crop	Index	Average of the study period			Index numbers			The 1 st absolute effects			Relative importance of the effects			The 2 nd absolute effects			Relative Importance
		Base pd (80-86)	1 st compar. pd (87-92)	2 nd compar. pd (93-99)	2/1*100	3/1*100	3/2*100	Separate effect	Joint effect	Sequential effect	Separate effect	Joint effect	Sequential effect	Separate effect	Joint effect	Sequential effect	
Winter tomato	Area(a) productivity (m) production(p)	141.7	161.4	157.1	114	111	111	157		187	28.5	123		123		9.5	
	Area(b) productivity (m) production(p)	7.97	10.3	14.45	129	194	331	331		331	62.1	1060		1060		81.7	
	Area(c) productivity (m) production(p)	1129	1663	2427	147	215	488	488	(45)	533	(18.4)	1183	(115)	1298	(115)	(8.8)	
Summer tomato	Area(a) productivity (m) production(p)	105.4	127.8	166.8	121	157	219	219		219	37.3	593		593		50.6	
	Area(b) productivity (m) production(p)	9.85	12.7	13.3	129	135	305	305	(63)	305	52.2	368		368		31.4	
	Area(c) productivity (m) production(p)	1038	1624	2309	157	213	524	524		587	(10.5)	981	(210)	1171	(210)	(19)	
Milk tomato	Area(a) productivity (m) production(p)	90.4	92.4	69	102	77	19	19		19	11.9	-206		-206		-2060	
	Area(b) productivity (m) production(p)	86.9	108.1	12.9	116	132	140	140	(3)	162	(1.7)	75		75		(4770)	
	Area(c) productivity (m) production(p)	337.5	381.4	382.2	113	116	396	396		396	30.8	493		493		20	
Aggregate tomato crop	Area(a) productivity (m) production(p)	9.05	11.3	14.11	126	156	781	781	(105)	781	60.9	1708		1708		68.8	
	Area(b) productivity (m) production(p)	3056	4338	5535	142	181	1177	1177		1281	(8.3)	2199	(280)	2479	(280)	(11.2)	

Source: Added & calculated from the raw data of different yearbooks of the ministry of Agriculture and Land Reclamation (1980-1999)

Table (2): The Relative Changes & Analysis Results of Productivity (ton) & Farm price (L.E) on the Change of the Total Revenues of the Tomato Crop (1980-1999)

The Crop	Index	Average of the study period			Index numbers			The 1 st absolute effects			Relative importance of the effects			The 2 nd absolute effects			Relative Importance of effect
		Base pd (80-86)	(1) 1 st compar. pd (87-92)	(2) 2 nd compar. pd (93-99)	2/1*100	3/1*100	3/2*100	Separate effect	Joint effect	Sequential effect	Separate effect	Joint effect	Sequential effect	Separate effect	Joint effect	Sequential effect	
Winter tomato	productivity(a farm price(p) total revenue(m)	7.97	10.3	15.45	129	267	498	319		319	9.2	1025		1025		23.6	
	productivity(b farm price(p) total revenue(m)	137	308	392	225	257	498	1371		1371	40	1713		1713		39.4	
	productivity(c farm price(p) total revenue(m)	1091.9	3182.7	5438	291	498	1690	1690	(1772)	3462	(50.8)	2738	(1608)	4346	(1608)	(37)	
Summer tomato	productivity(a farm price(p) total revenue(m)	9.79	12.74	13.34	130	138	532	248		248	11	299		299		5	
	productivity(b farm price(p) total revenue(m)	84	188	447	238	532	1690	1690		1690	74	3554		3554		61.3	
	productivity(c farm price(p) total revenue(m)	822.4	2523.8	6983	307	725	1938	1938	(336)	2274	(15)	3849	(1288)	3853	(1288)	(33.7)	
Milk tomato	productivity(a farm price(p) total revenue(m)	9.75	11.36	12.94	117	133	188	188		188	6.3	370		370		7.4	
	productivity(b farm price(p) total revenue(m)	116	363	471	313	406	2408	2408		2408	80.2	3461		3461		70	
	productivity(c farm price(p) total revenue(m)	1131	4130.9	6095	385	539	2597	2597	(403)	3000	(13.5)	3831	(1133)	4964	(1133)	(22.6)	
Aggregate tomato crop	productivity(a farm price(p) total revenue(m)	8.66	11.37	14.18	131	164	294	294		294	12.6	618		618		12.3	
	productivity(b farm price(p) total revenue(m)	112	290	423	258	378	1541	1541		1541	66.2	2593		2593		53.6	
	productivity(c farm price(p) total revenue(m)	970	3297.3	5988	340	618	1835	1835	(492)	2327	(21.2)	3311	(1717)	5028	(1717)	(34.1)	

Source: Added and calculated from the raw data of different yearbooks of the ministry of Agriculture and Land Reclamation (1980-1999)

* The calculated effect between base and the second comparable period

* The calculated effect between base and the first comparable period

2) The Effects of the economic liberalization policies on tomato total revenues and the accompanied changes and determinants

Index numbers were used to measure the economic liberalization policies. Productivity per feddan and farm price represented the economic variables (determinants), table (2) shows the analysis and results:

a) Total revenues changes

a-1) The first comparable stage (1980-1986) & (1987-1992):

This comparable stage resents comparative status between revenue change before the economic liberalization policies and gradual implementation on winter, summer and Nili tomato revenues increased by 191 %, 207 % and 265 % of the basic year. Total tomato revenues registered 240 % increase.

a-2) the second comparable stage (1980-1986) & (1993-1999)

Comparing the full effect of full implementation of economic liberalization policies on total revenues (1993-1999) with pre- implementation period (1980-1986), the table shows the following results: 398 %, 625 % and 439 % increase in the revenues of winter, summer and Nili tomato crop, the total revenues have changed by 518 % of the basic revenues.

a-3) The third comparable stage (1987-1992) & (1993-1999)

Comparing gradual implementation period and full implementation period, it is found that the revenues were almost doubled which reflect the positive effects of full implementation of the economic liberalization policies in all kind of tomato revenues.

b) Changes in the economic variables and its effect on total revenues

b-1) The first comparable stage (1980-1986) & (1987-1999)

Productivity separate effect caused 9.2 %, 11 % and 6.3 % in winter, summer and Nili tomato revenues, the total productivity effect on the total tomato revenues was 12.6 %.

The farm price separate effect caused 40 %, 74 %, and 80.2 % of winter, summer and Nili revenues respectively. Its effect on total tomato revenues registered 66.2 %.

The joint effect was 50.8 %, 15 % and 13.5 % for winter, summer and Nili tomato respectively. The effect on the total tomato revenues was 21.2 %.

b-2) The second comparable stage (1980-1986) & (1993-1999)

Productivity separate effect caused 23.6 %, 5 % and 7.4 % in winter, summer and Nili tomato revenues, the total productivity effect on the total tomato revenues was 12.3 %.

The farm prices separate effect formed 39.4 %, 61.3 % and 70 % of winter, summer and Nili tomato revenues. Its total effect on tomato crop was 53.6 %.

As for joint effect was 37 %, 33.7 and 22.6 % for winter, summer and Nili tomato respectively. The effect on the total tomato revenues was 34.1 %.

b-3) The third comparable stage (1987-1993) & (1993-1999)

Productivity and farm prices relative importance were slightly decreased from the first stage to the second stage, Although productivity effects of winter tomato registered noticeable increase. The previous results show that the full implementation of the economic liberalization policy was not in favor of the mentioned effects compared with the gradual implementation of such policy.

3) The effects of the economic liberalization policies on some tomato

Some economic efficiency criteria

3-a) Cost per unit criterion

Winter tomato average cost per unit had increased from 57 L.E in the base period to reach 110 L.E in the first comparable period and 147 L.E. in the second comparable period. As for summer tomato average cost per unit had increased from 46 L.E. to 83.8 L.E. and 166.6 for the first and second period respectively. Nili tomato average cost per unit had increased from 47 L.E. to 112 and 173 for the same periods respectively. Finally, tomato crop average cost per unit was 54 L.E. in the pre- implementation period to reach 100.7 L.E. and 158 L.E. for the following periods respectively. The earlier results emphasize the fact that cost per unit in all kinds of tomatoes had been doubled per each comparable period and almost tripled for the entire studied period. The relative decrease of the variance coefficient value between the studied period and the relative increase of it in the aggregate studied period reflects stability of cost per unit.

3-b) Net feddan return criterion

Regarding net feddan return criterion, table (3) shows steady increase in winter tomato return per feddan from 676.6 L.E. To reach 2075 L.E. and 3215 L.E. per the comparable periods respectively. Summer tomato return per feddan showed increase from 378.4 L.E. in the base period to 1432 L.E. and 3945 L.E. for the next comparable periods. Nili tomato return per feddan increased from 751.3 L.E. in the pre- implementation period to reach 2793.5 L.E. and 3953 L.E. for gradual and full implementation periods. The aggregate tomato net return per feddan increased from 546.4 L.E. to 2136 L.E. and 3782 L.E. for the three periods respectively. The preceding results indicate high increase in the net feddan returns in each studied period, Nili tomato registered the highest increase in net feddan return. The relative increase of the variance coefficient of the entire studied area reflects relative stability of tomato net return per feddan

3-c) Return / cost ratio

Regarding the tomato crop return / cost ratio, it is clear that it had slightly increased during the gradual implementation of the economic liberalization policy, then, it was slightly decreased during the full implementation period nevertheless, the return / cost ratio for aggregate tomato crop has been increased over the total tested period (1980-1999) from 1.16 % in the base period to reach 1.66 in the end of the final period.

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This result reflects the positive effect of implementing the economic liberalization policies on the tomato producers revenue and naturally, according to the basic economic rules, the producers supply will increase to get profit from the revenue increase, it is expected to continue increasing supplied tomato crop as expected increasing revenues as the (&&&) known economic rule which indicates that the producer follows the economic rationality rule.

3-d) Cost / price ratio

Considering tomato crop cost / price ratio, it is shown from the analysis that it had slightly decreased which assure more increase of the producer's revenues. The aggregate tomato cost / price ratio was decreased 29 % at the end of the full implementation period compared to the base period. The total tested period recorded 16.3 % decrease in cost / price ratio. The highest decrease from the mentioned ratio came from the summer tomato crop with 34 % decrease. Both winter and Nili tomato didn't give positive results, for their cost / price ratio recorded almost the same value for the compared final and base period, whereas, the mid period recorded actual decrease. Their ratio in the total tested period gave 5.3 % and 7 % decrease respectively.

4) The effect of the economic liberalization policies on tomato crop main economic indicators

With respect to the cultivated area, it is clear from table (4) that its average had increased from 336 (thousand feddan) before implementing the economic liberalization policy to reach 381 and 392 thousand feddans for the next periods respectively. According to such results, the average increase between the starting period and the final period had reached 16.6%, the average increase of the total tested period was 10 % It is worth mentioning that the statistical significance for the tomato cultivated area increase period at 5 % level was not proved for the tested periods.

As for the productivity indicator, it achieved 69 % increase between the final and starting period and 32 % increase for the total tested periods.

Regarding average of aggregate production, it reached 87 % increase between the first and final period, whereas, its increase reached 44 % for the total tested period.

Concerning consumption, its average increased 118 % between the base period (1980-1986) and the final period (1993-1999), while it reached 53 % for the total tested period (1980-1999).

Exports had increased 70 % for both comparable first and final period and total tested period. The statistical significance was proved for productivity aggregate production and consumption, whereas, it was not proved for exports.

The exports/ production and consumption / production ratios didn't have actual changes for the total and comparable tested periods.

Table (3): The economic efficiency indicators for the tomato producers during the studied periods

The Crop	The indicator	The base period (1980 - 1986)		1 st comparable period (1987-1992)		2 nd comparable period (1993-1999)		F		Total Tested period (1980-1999)	
		Average	V.C	Average	V.C	Average	V.C	Average	V.C	Average	V.C
Winter tomato crop	cost per unit (ton/L.E.)	57	19.5	110	26	147	14	31.6	105	41.5	
Summer tomato crop	cost per unite (ton/L.E.)	46	26	83.8	20	166.6	20.6	47.2	99.8	57.2	
Nilii tomato crop	cost per unit (ton/L.E.)	47	21	112	26	173	11.9	62.7	110.7	52	
Aggregate tomato crop	cost per unit (ton/L.E.)	54	28	100.7	22	158	15.3	43.7	104	47	

v.c = variation coefficient

Source: Added and collected from the raw data of the Agriculture year books, Ministry of Agriculture and Land Reclamation, different issue (1980-1999)

Table (4): The effect of the economic liberalization policies on tomato crop main economic indicators

The Crop	The indicators	The base period (1980 - 1986)		1 st comparable period (1987-1992)		2 nd comparable period (1993-1999)		F		Total tested period (1980-1999)	
		Average	V.C	Average	V.C	Average	V.C	Average	V.C	Average	V.C
Aggregate tomato crop	Cultivated area (thousand feddan)	336	7.7	381	9	392	10	5.3	369	11	
	Productivity per feddan (ton)	8.6	20	11.4	11.5	14.2	3.2	31.9	11.4	23.3	
	Aggregate production (ton)	2849	28	4309	10	5529	10.5	28.3	4260	30	
	Consumption (ton)	2058	25.5	3003	11	4342	14	36	3141	35	
	Exports (ton)	10.2	60	23.1	42	15.5	50	4.3	15.9	58	
	Exports / production %	0.3		0.5		0.3			0.4		
	Consumption / production %	70		70		78.5			74		

Source: Added and collected from the raw data of the agriculture yearbooks, Ministry of Agriculture and Land Reclamation, different issues (1980-1999)

* Unproven statistical significance

DISCUSSION AND CONCLUSION

The study attempted to investigate the effect of the economic liberalization policies on the trends of tomato crop most important economic variables, efficiency, criteria and indicators. Three kinds of tomato crop were studied winter, summer and Nili crops. The study used tomato crop production and revenues as dependent variable and cultivated area, productivity and prices as independent variables.

Regarding tomato production, the study assumed to be affected by the change in cultivated area and productivity. The analysis showed real increase in the aggregate tomato production during the full implementation of the economic liberalization policies compared with the base period (pre-implementation). Three effects were taken into consideration, the separate effect of each independent variable, its joint effect and finally, its sequential effect in order to collect the relative importance of each effect. The productivity separate effect on production showed superiority over cultivated area separate effect of the compared periods. Production was doubled due to the relative increase in productivity (per feddan) separate effect, it was increased from 60.9 % to reach 68.8 % for the first and second comparable periods respectively, whereas, the cultivated area separate effect was decreased from 30.8 % to 20 % for the first and second comparable periods. The joint effect was increased for the mentioned comparable periods from 8.3 % to 11.2 %. It is important to mention that although, the cultivated area increased but its relative importance effect on production was decreased and the statistical study showed,

Insignificant effect of cultivated area in the tested periods but the productivity effect showed statistical significance.

As for total revenues, it was assumed to be affected by the change in productivity and prices. The revenues had almost increased by the double which reflect the positive effects of full implementation of the economic liberalization policies in all kinds of tomato revenues. Both productivity and farm prices separate effect relative importance were decreased in all kinds of tomato crop and the aggregate tomato crop except winter tomato productivity which increased from 9.20 % to 23.6 % and price effect showed superiority over productivity. The statistical study showed significant effect of productivity and price over the tested period. Finally, the study proved that farm price was the most effective variable on revenues and productivity showed superior effect on production, although it had the least effect on revenues.

In respect of the effect of the economic liberalization policies on some economic criteria, the study showed that the cost per unit in all kinds of tomatoes had been doubled for each comparable period and almost tripled for the entire studied period. The net feddan return results showed high increase in each studied period, in the other hand, Nili tomato registered the highest increase.

The study focused on two economic ratios: return / cost and cost / price. The first, measured the relationship between returns and the unit of cost and the results showed positive increase which means positive effects of

the economic liberalization policies on tomato producers revenue and this fact will lead to increase the supplied tomato crop in order to gain profit, according to the economic rationality rule. The later, measures the relation ship between unit of cost and its prices, the results assured slight decrease in it and that means more increase of the producers' revenues.

By studying the economic liberalization policies effects on tomato crop main economic indicators, it was found that the average cultivated area was increased by 16.6 % between starting and final period with average increase of the total tested period 10 %. The productivity indicator increased 69 % between final and starting period and 32 % for the total tested period. The average of aggregate production reached 87 % and 44 % for compared and total period respectively. Consumption trend showed increase 118 % and 53 % for the compared and total period. This result contradicts the demand rules of micro-economic analysis, where increase in commodity price should be accompanied by a decrease in consumer demand.

So this status arouse from the following:

- 1) The tomato crop is of Nell elasticity because it is considered necessary commodity.
- 2) It is used as supplementary product with other vegetable in household use
- 3) It is a kind of commodity of limited alternatives.
- 4) It is of multi-usage characteristic, it is used as fresh vegetable, food ingredient and industrial input.
- 5) The increase of consumption more than production refers to the population increase during the tested period.

Finally exports had increased 70 % for both comparable and total tested periods: exports / production and consumption / production were not affected by the economic liberalization policies.

As general conclusion, it is clear that the tomato producer will gain more revenues as a result of the increase in productivity and prices, in addition to, the decrease in cost per unit. Given that the production increased mainly because of productivity increase.

The proceeded analysis assure that the producers will be better off under the implementation of the economic liberalization policies in the short and midum-run but the burden of the price increase will relay on the consumer because of the economic nature of the tomato crop and the population increase. In the long-run if the increase of tomato consumption continues to exceed the increase of tomato production, then, the price will continue to increase in spiral manner and the producers will continue to gain more profits and consumer, will be in worth off status.

Adjusting policies are needed to adjust tomato consumption patterns, exports and waste management.

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آثار سياسات التحرر الاقتصادى على اتجاهات المؤشرات الاقتصادية لمحصول الطماطم فى مصر (١٩٨٠ - ١٩٩٩) عقيلة طة مركز القومى للبحوث

حاولت الدراسة إلقاء الضوء على آثار سياسات التحرر الاقتصادى على اتجاهات أهم المؤشرات والمتغيرات والكفاءة الاقتصادية والمعايير الاقتصادية الزراعية لمحصول الطماطم وقد اعتمدت الدراسة على متغيرين تابعين: هما الإنتاج والإيراد كما استخدمت الدراسة ثلاثة متغيرات مستقلة هي المساحة المزروعة والإنتاجية الفدانية والأسعار المزرعية وقد قسمت الفترة المبحوثة إلى ثلاث فترات هي فترة الأسس (١٩٨٠ - ١٩٨٦) وفترة مقارنة (١٩٨٧ - ١٩٩٢) و (١٩٩٣ - ١٩٩٩) وقد استخدمت الدراسة طرق إحصائية تحليلية ونماذج اقتصادية قياسية لتحقيق أهداف الدراسة . وقد أوضحت الدراسة أن الإنتاج من الطماطم تضاعف كنتيجة لزيادة الإنتاجية ، أما الزيادة فى الإيرادات فترجع بالدرجة الأولى إلى الزيادة فى الأسعار المزرعية ثم الإنتاجية مع انخفاض ملحوظ فى الأهمية النسبية لدور كل منهما وقد أثبتت الدراسة إيجابية الآثار الاقتصادية لسياسات التحرر على الإنتاج والإنتاجية والأسعار والاستهلاك والصادرات ، كما أن آثارها على تكلفة الوحدة كان سلبيا ، ولم يتبين لهذه السياسات آثار على معدل الاستهلاك / الإنتاج أو الصادرات / الإنتاج وقد أكدت الدراسة على تحسين أوضاع منتجى الطماطم فى المدى القصير والبعيد ، وكان الوضع مختلفا بالنسبة للمستهلك حيث أنه سيتحمل عبء الزيادة فى الأسعار نظرا لاستقطاعها من فائضه . لذلك تنشأ الحاجة إلى سياسات إصلاح هيكلية تعالج الاختلالات فى الاستهلاك والصادرات وإدارة مخلفات الطماطم .