The Effect of price policies for the potato and tomato crops using analysis matrix agricultural policies

Prof. El SayedHasanGado[1]and Dr. Mohamed Ahmed El Farran[2]

[1]Professor of Agricultural Economics - Faculty of Agriculture - Benha University.
[2]Assistant Professor of Agricultural Economics - Higher Institute of Agricultural Cooperation.
Email: mohelfaran@yahoo.com

Abstract: In the recent years, the Egyptian agricultural policy has led to some structural changes that aimed to maximizing economic returns under the technical potential and economic determinants of the domestic and global economies. The results of measuring the analysis of the matrix of agricultural policies for the study crops showed that the nominal protection coefficient of production requirements reached about 0.94 and 0.93for Potatoes and tomatoes during the period 2000-2021, which indicates that there is no support for production requirements. It was also found that the nominal protection factor for the outputs of Potatoes and tomatoes crops respectively during the study period amounted to about0.88 and 0.47 which indicates the absence of a fair production policy by the state imposing direct and indirect taxes on the product and providing support to the consumer. To The results showed that a comparative advantage for the studied crops during the studied period, which means that the comparative advantage factor is less than one. It was also found that by comparing the financial and economic evaluation of each of the machinery wages, the price of seeds, the price of chemical fertilizers, the price of pesticides, we find that the financial evaluation is less than the economic evaluation of these items, which indicates that they are supported by the state. It was also found that by comparing the financial and economic evaluation of the land rent, animal wages, the price of municipal fertilizer, and the general expenses, they are found to be equal, which indicates that the state does not interfere in the prices of these items.The results also showed that the value of the effective protection coefficient for potato and tomato crops was about 0.85, 0.46 during the study period, which means that potato and tomato crops did not enjoy government protection during that period.

Introduction

Vegetable crops are among the most important food sources in Egypt due to their high nutritional value, Where the Egyptian citizen consumes it in large quantities in its fresh, processed or semi-processed form, In addition to being used as a raw material in many food industries, Therefore, each of the potato and tomato crops were dealt with, as they are among the most important vegetable crops in Egypt, In order to find out the features of the agricultural price policy for these two crops, the Matrix Analysis Policy (PAM) was calculated, This is done by calculating the nominal and effective protection coefficients, and then identifying the policy followed by the state, whether it is a protectionist policy or imposing direct or indirect taxes on the producers of these crops, As well as calculating the domestic resource cost coefficient to find out the comparative advantage of producing these two crops. The tomato crop is one of the important food vegetables in the Arab Republic of Egypt, The potato and tomato crop is also one of the most important vegetable crops in Egypt, whether for domestic consumption or for export, especially in light of the large deficit in the Egyptian trade balancein light of the successive global financial and economic fluctuations that affected the majority of the countries of the world, which requires attention to study these two crops in order to promote them and maintain their competitiveness and support them to increase exports from them and preserve them, And it is well known that potato and tomato crops are becoming increasingly important for export under the partnership agreement with European countries.

Research problem:

The research problem is limited to the different effects of the economic reform policy on the two crops (potatoes and tomatoes) at the level of the state, the producer and the consumer, especially after the state's tendency to liberalize production decisions.

The aim of the research:

This research aims to study the impact of agricultural policy on the production of the most important vegetable crops (potatoes and tomatoes) by estimating measurements or coefficients to identify the essence of the policy followed by the state for the selected crops, whether it is a protectionist policy or a direct or indirect taxation policy in order to develop the production and export of these two crops, And assisting export policy makers in the possibility of increasing the volume of agricultural exports. This was before and after the economic liberalization policy that Egypt followed from 2000 to 2021.

Methodology and Data Sources

The research used the detective and quantitative analysis of the economic phenomena and variables of the subject of the study, to study the development of economic indicators for the most important crops, By using the Matrix Policy Analysis (PAM) matrix, estimating the nominal and actual protection coefficients, the cost of domestic resources for these agricultural crops, measuring the cost of domestic resources, and the financial and economic profitability of the farmers.

The research dealt with the study of the items of production costs for the two crops (potatoes and tomatoes), which includes the cost of production requirements(Seeds, natural fertilizers, chemical fertilizers, and pesticides), and studying the cost of domestic resources which includes(Labor wages, machinery wages, animal wages, public expenses, in addition to agricultural land rent).The research also relied on the data published by the Ministry of Agriculture and Land Reclamation and the data of the Central Agency for Public Mobilization and Statistics.

The theoretical framework for the research

The policy analysis matrix is considered one of the important tools used in analyzing agricultural policies, especially the price policy.

The agricultural policy analysis matrix is used on three levels:

1. At the level of the agricultural commodity to study its comparative advantage compared to another agricultural commodity produced domesticly, and this is what is called the vertical commodity system
2. At the farm level, to study the impact of agricultural policies or technical changes on the internal and external trade of inputs and outputs.
3. At the level of the comprehensive national economy to identify the policies used or the technical changes in the national economy and the extent of their ability to handle the problems of the agricultural sector.

The focus of this study will be on the first level of these levels.In order for the policy analysis matrix to be used, it is necessary to evaluate the inputs and outputs financially on the one hand, and an economic evaluation on the other hand. The economic evaluation is usually done using transformation factors issued by the World Bank after the policy of economic liberalization.

Therefore, the use of the agricultural policy analysis matrix calls for the study of the following basic components:

(1) Crop productivity
(2) Total ransom revenue
(3) The cost of production inputs
(4) The cost of domestic resources
(5) Total production costs
(6) Net return

1-Crop productivity:

Whether this productivity is for the primary or secondary product, and it reflects the various vertical expansion programs, whether related to production technology, a set of research recommendations, or price policies,It also indicates the ability of agricultural policies to cause a positive change in the average production per area unit and thus increase the total production of a crop.

2-Total ransom revenue:

It reflects the yields of the crop from the production process,these returns are evaluated at market prices (financial valuation),Then the economic prices (shadow prices), which reflect the value of the commodity in the global markets,It is estimated through the export or import prices prepared for it, the cost of transportation and other marketing margins, Placing the domestic and shadow prices in one matrix indicates two policies, one of which is based on evaluating the domestic commodity, regardless of its status in international trade,The other shows the true value of the commodity under perfect competition, and the difference between the domestic price and the shadow price reflects the extent of government intervention in the production of the commodity, as well as the producer's incentive, whether negative or positive, to increase production, When the global price exceeds the domestic price, this means that there are implicit taxes on the product, and when the domestic price exceeds the global price, this means subsidizing the product.

3- The cost of production inputs:

It is the cost of factors of production that can be traded internally or externally, and it is the influencing aspect in the crop value added calculations;it is evaluated once at the market price and once at the border price (the shadow price). An increase in its value at the border price over its value at the market

price means that there is support for the product, and vice versa.

4- The cost of domestic resources:

It means the factors of production that are not traded commercially, such as land, labor and share capital, and which are assumed not to be transferred to other countries**,** The market price is often the same as the shadow or boundary price for these items.

5- Total production costs:

It is the sum of the costs of production requirements and domestic resources, and it is calculated once at the prevailing market prices in the community and again at the shadow prices.

6- Net return: It is the difference between the total production revenues and the production costs. It is also calculated at the domestic market prices and the border prices.

The general outline of the policy analysis matrix

Table No. (1) shows the general outline of the policy analysis matrix and the most important components of its structure,Where it is possible to calculate the indicators of the commodity or crop for each stage of the analysisstages,And then estimating some coefficients that can be used or deduced in the light of the degrees of protection enjoyed by the commodity or product at various stages.

Table (1): The general outline of the policy analysis matrix:

	Total return	production requirements	Cost of domestic resource			Net return	Value added
			labor	Land	Total		
Financial valuation	A	B	C	D	E	F	G
Economic valuation	H	I	J	K	L	M	N
Police effect	O	P	Q	R	S	T	U

Whereas:

A - Total return at domestic market prices.

H – Total return by economic valuation.

B - The value of production requirements at the domestic market prices.

I - The value of production requirements in economic evaluation.

C- The value of labor at domestic prices.

J- The value of work adjusted by the conversion factor.

D- Land rent at domestic prices.

K- Land rent at economic evaluation (same domestic price).

E- Total value of work and land (domestic prices).

L- The total value of work and land in economic evaluation.

F- Net return at domestic market prices, where F= (A-(B+E))

M – Net return by economic valuation, where M= (H-(I+L))

G- Value added at domestic market prices, where G = (A-B)

N- Value added by economic evaluation, where N = (H-I)

O – The effect of agricultural policy on total returns, where O = (A-B)

P- The impact of the agricultural policy on the prices of production inputs, where P = (B-I)

S- The effect of agricultural policy on the total value of domestic resources, where S = (E-L)

T- The effect of agricultural policy on the total net return, where T = (F-M)

U- The impact of agricultural policy on added value, where U = (G-N)

Through the indicators shown in the PAM policy analysis table, the following coefficients can be derived:

(1) Nominal Protection Coefficient (NPC)

The nominal protection coefficient (NPCO) is calculated as follows:

NPCO=A/H

For production inputs purchased, the NPCI is calculated as follows:

NPCI=B/I

- If (NPC = 1): it means that there is a neutral policy on the part of the country, meaning that the country does not impose taxes on the product, and does not take any policy to protect the production of the commodity in the domestic market, nor does it support the consumer.

- If (NPC > 1): it means the existence of a protectionist policy in favor of the producer by supporting the production of that commodity, as the domestic price exceeds the global price represented in the border

price, and therefore it supports the producer and imposes taxes on the consumer.

- If (NPC<1): it means that there is a policy of imposing taxes on the product, if the commodity is an export one, or supporting and protecting the prices of the commodity in the domestic market if the commodity is imported for the benefit of the consumer, until its prices are reduced in the domestic market.

(2)Nominal Protection Rate (NPR)

The nominal protection rate is calculated for the outputs: $NPRO= (NPCO – 1) X100$

The Nominal Protection Ratio (NPRI) for purchased inputs is calculated as follows:

NPRI= (NPCI -1) X100

- If (NPR = 0): it means that there is a neutral policy in the sense that both the agricultural price and the border price are equal, and accordingly the state does not take any protectionist policy, so that it does not impose taxes on the product, or support the consumer.

- If (NPR > 0): It means that there is a product subsidy protectionist policy and consumer taxation policy.

- If (NPR < 0): means that there is a direct or indirect taxation policy on the product, and a consumer support protectionist policy.

(3) Total Effective Protection

Effective Protection Coefficient (EPC):

This coefficient is calculated as follows: $EPC=A-B/H-I=G/N$

(EPC =1): Neutral, where the state does not take any protective measures to produce the commodity, nor does it impose any taxes on the product or subsidize the consumer, and this shows that the added value at domestic prices is equal to the value added at border prices**.**

(EPC >1):A protectionist policy in favor of the producer by supporting the production of that commodity, as the added value at the domestic price exceeds the added value at the border price, and therefore the state supports and protects the product at the expense of imposing taxes on the consumer.

(EPC< 1): It means the existence of a policy of imposing taxes on the product if the commodity is an export one, or subsidizing and protecting the prices of the commodity if it is an import one for the benefit of the consumer.

(4)Effective protection rate (EPR)

EPR= (EPC -1) X100

(EPR=0): It means the existence of a neutral policy in the sense that each of the added value at the domestic price is equal to its counterpart at the border price, and accordingly the state does not take any protectionist policy and also does not impose taxes on the product or support the consumer.

(EPR > 0):It means the existence of a protectionist policy to support the production of the commodity

domesticly for the benefit of the producer and to follow the policy of imposing taxes on the consumer.

(EPR < 0): It means the existence of a direct or indirect taxation policy on the product, and a consumer protection policy.

1- Indicators of comparative advantage

The domestic resource cost coefficient shows the relative advantage of the commodity at the level of the national economy in terms of the possibility of continuing domestic production or relying on imports, and therefore it compares theopportunity cost of domestic production and the added value at the border price,It is used to compare the relative efficiency of different agricultural activities, and therefore activities with a low value for the cost of domestic resources are more efficient,These resources must be channeled into the productive process,The cost of domestic resources is estimated by dividing the values of domestic resources for non-tradeable production inputs at domestic shadow prices by the difference between (production value - the value of tradeable inputs) at the border price as follows:

(5) Coefficient of Comparative Advantage or Domestic Resource Cost (DRC):

This coefficient is calculated as follows: $DRC=J+K/H-I \ L/N$

(6)Government subsidy rate for producers (SRP):

It is calculated as follows: $SRP=B/H$

(7) Subsidy Policy Cost (PPC) Rate:

It is calculated as follows: $PPC=E/G$

In order to arrive at the production cost valued at shadow prices (economic evaluation), conversion coefficients were used that were reached by the experts of the World Bank for Egypt in 1991. These coefficients were estimated according to the rates of the bank referred to for the year 2000, which are: 5.1 for seeds, 1.1 for chemical fertilizers. 2.1 For pesticides, 67.0 for the human factor, 1.1 for machinery, while the other items remained unchanged, as for land; its opportunity cost is the extent to which the producer can obtain a return from it without bearing the burdens of agricultural production risks,It is usually the economic rent (renting it to others for a full year) denominated by the crop's stay on the land.

The domestic resource cost factor can be explained as follows:

- **(DRC <1)**:This means that the country saves foreign currency from the production of the commodity domesticly, because the production of the domestic unit is less than the added value at the border price,Therefore, it is advised to increase production and reduce dependence on imports, as it makes profits if the commodity is exportable, or provides hard currency if the commodity is imported.

- **(DRC>1):**This means that the state bears higher costs in producing that commodity domesticly, as the

domestic production costs are greater than the value added per unit at the border price,In this case, you will not achieve export profits,It is advised to rely on imports and reduce production because there is no comparative advantage in producing that commodity domesticly.

- (DRC = 1): This shows the balance between the country's gain and provision from producing that commodity.

Results and Discussion
- First: Analysis of Agricultural Policies for the Potato Crop in Egypt:
In order to analyse the agricultural policies of the potato crop in Egypt, a financial and economic assessment must be made for each of the per feddan production costs, the productive yield, and the net yield for this crop,This is in addition to reviewing the results of the agricultural policy analysis matrix in order to find out the effects of these policies on the yield of the crop under study, using the policy analysis indicators during the period 2000-2021.

1- Financial and economic evaluation of cost items:
The items of production costs per feddan are considered one of the main elements of the agricultural policy analysis matrix. It is evident from the data of Table (2), which shows the items of production costs for the potato crop in Egypt, which are represented in labor wages,Machinery wages, animal wages, seed price, natural fertilizer price, chemical fertilizer price, pesticides price, variable public expenses, and land rent.By comparing the financial evaluation and the economic evaluation of each of the wages of machinery, the price of seeds, the price of chemical fertilizers, and the price of pesticides, we find that the financial evaluation is less than the economic evaluation of these items, which indicates that they are subsidized by the state for potato farmers.

Comparing the financial and economic assessment of land rent, animal wages, natural fertilizer price and public expenses, it turns out that they are equal, which indicates that the state does not interfere in the prices of these items.

Table (2): Financial and economic evaluation of cost items for the potato crop in Egypt during the period 2000-2021

Cost articles		Financial valuation	Economic evaluation
Local resource cost of labor	Labor wages	3446	2309
	animal wages	38.8	38.8
	Machinery wages	1801.6	1981.8
	general expenses	1361.9	1361.9
Total ofDomestic resource		6648	5692
Cost of production inputs	seed price	6924	7270
	Manure price	692	692
	chemical fertilizer price	2047.5	2252.3
	Pesticides price	584	701
Total of production inputs		10247.5	10915.3
total of variable costs		16895.8	16606.8
Rent		2970.8	2970.8
Total cost		19866.6	19577.6

* The economic value was calculated using the following conversion factors: 1.05 for seeds, 1.1 for chemical fertilizers, 1.2 for pesticides, 0.67 for human labor, 1.1 for machines.
Source: Collected and calculated from data: Table No. (1) in the appendix.

By comparing the variable costs and workers' wages, it was found that the financial evaluation exceeds the economic evaluation, reaching about 6,648،3446 pounds financially, while it amounted to about 5,692 ،2,309 pounds economically, respectively, This means higher variable costs and workers' wages domesticly than globally for the potato crop, By estimating the total production cost per

feddan of the potato crop economically and comparing it with the financial evaluation, it turns out that the economic evaluation is less than the financial evaluation of the potato crop,This means that potato growers did not receive state subsidies for their total production costs during the study period,It also indicates a decline in world prices for total costs by

comparing them with domestic prices for the potato crop during the period 2000-2021.

2- Financial and economic evaluation of the feddan yield:

The yield per feddan is the most important component of the quantity produced of a crop multiplied by its farm price.But if the border price is used instead of the farm price, then in this case it is called the economic feddan return,By looking at the data of Table (3), the agricultural policy analysis

matrix can be seen and expressed in outputs and crop outputs, It is that the per-feddan yield of the potato crop evaluated at economic prices exceeds that of the resident at farm prices, as the economic yield per feddan of potatoes was estimated at about 32.8 thousand pounds, while the financial return was estimated at about 28.8 thousand pounds.This is due to the large discrepancy in the difference between the domestic prices and the international prices used in estimating the per feddan yield.

Table (3): The yield per feddan is evaluated financially and economically for the potato crop in Egypt during the period 2000-2021

Item	Financial valuation	Economic valuation
The average unit price (tons) of the main product	2593	2973.6
Average production per feddan of the main product (ton/feddan)	10.62	10.62
Total yield per feddan (pounds)	28821.5	32863

Source: Compiled and calculated from data:
- Ministry of Agriculture and Land Reclamation, Economic Affairs Sector, Central Administration of Agricultural Economy, Bulletin of Agricultural Statistics, various issues.
- Central Agency for Public Mobilization and Statistics, Foreign Trade Bulletins, various issues.

3- Financial and economic evaluation of net return:

Table (4) shows the net yield per feddan of the potato crop, financially and economically,Where it is clear from it that the net yield of the potato crop, evaluated at economic prices, exceeds that of the farm prices, as the net economic return was estimated at

about 13.3 thousand pounds, while it amounted to about 8.9 thousand pounds for the net financial return, an increase of about 4.3 thousand pounds,This is due to the large discrepancy in the difference between the domestic prices and the international prices used in estimating the net return.

Table (4) Matrix for analysing agricultural policies for the potato crop in Egypt during the period 2000-2021

Statement	Total return	inputs	Cost of domestic resource			Net return	Value added
			Labour	Land	Total		
Financial valuation	28822	10248	6648.3	2971	9619.1	8955	18574
Economic valuation	32863	10915	5691.5	2971	8662.3	13285	21948
Police effect	4041-	667.8-	956.8	0	956.8	4330-	3374-

Source: Collected and calculated from the data of Table (2), (3).

4- The results of measuring the agricultural policy analysis matrix of the potato crop in Egypt:

The following is a review of the results of the agricultural policy analysis matrix for the potato crop in Egypt using policy analysis indicators, which are illustrated in Table (5) during the period 2000-2021.

(a) Nominal coefficient of protection of the outputs:

It can be seen from Table (5) that the nominal protection coefficient of the potato crop outputs during the study period was about 0.88,This explains the absence of a fair production policy during that period because the value of this coefficient is lower than the correct one, or what means that the domestic potato prices are lower than their global counterparts, and thus potato farmers obtain the equivalent of only about

88% of the value of their output at the global price,That is, the percentage of what the farmer bears as implicit taxes is about 12% of the value of the product, and this percentage also represents the support that consumers receive for this crop.

(b) Nominal Protection Factor of Production Inputs:

By reviewing the results, which are reflected in the same table previously referred to, it is clear that the value of the nominal protection coefficient for production requirements amounted to about 0.94,That is, the farmer pays about 94% of the value of production inputs at international prices, and this means that the subsidy he receives decreases to about 6% of their global value,Perhaps this is consistent with

the trends of the agricultural policy, which is moving towards the gradual abolition of subsidies from production requirements in order to make them compatible with their economic cost,This would lead

to a lack of supervision in their use and access to the most appropriate use of them, in addition to reducing the burden on the state budget.

Table (5) Results of the coefficients of the agricultural policy analysis matrix for the potato crop in Egypt during the period2000-2021

Statement	Abbreviation	The results of the agricultural policy analysis matrix coefficients
Nominal protection coefficient	NPCO	0.88
Nominal protection coefficient	NPCI	0.94
Nominal protection coefficient	NPRO	(12.3)
Nominal protection coefficient	NPRI	(5.9)
Effective protection coefficient	EPC	0.85
Effective protection coefficient	EPR	(15)
Domestic resource cost factor	DRC	0.39
policy cost coefficient of subsidy	PPC	0.52

Numbers in brackets are negative.

(c) Effective Protection Factor:

It is clear from the results of the aforementioned table that the value of the effective protection coefficient was about 0.85 during the study period,this means that the net effect of the economic policy was represented in the subjection of potato producers to indirect taxes on production and its requirements, amounting to about 85%.This means that the value added at market prices of the potato crop during this period amounted to about 18574, or only about 85% of the value added at economic prices, which amounts to about 21948 pounds.This means that the potato crop did not enjoy government protection during that period.

(d) Domestic Resource Cost Factor (Comparative Advantage):

It is clear from the results of Table (5) also that the domestic resource cost coefficient for the potato crop has reached about 0.18, and this means that there is a comparative advantage for the potato crop,In the sense that it takes 0.39 domestic monetary units of resources to generate a unit of foreign exchange, meaning that there is a preference for producing the potato crop domesticly without importing it from abroad to meet domestic consumption,It also indicates the continued high cost of importing it from abroad compared to producing it domesticly.

(e) Subsidy Policy Cost Coefficient:

It is clear from the data of Table (5) that the coefficient of the cost of the subsidy policy for the potato crop during the study period was about 0.52, which means that the added value is much more than

the cost of domestic resources, as 0.52 pounds of the cost of domestic resources gives one pound as added value, and this indicates an increase in the efficiency of domestic resources.

Second: Analysis of Agricultural Policies for the Tomato Crop in Egypt:

In order to analyze the agricultural policies of the tomato crop in Egypt, a financial and economic assessment must be made for each of the per feddan production costs, the productive yield, and the net yield for this crop,This is in addition to reviewing the results of the agricultural policy analysis matrix in order to find out the effects of these policies on the yield of the crop under study, using the policy analysis indicators during the period 2000-2021.

1- Financial and economic evaluation of cost items:

The items of per feddan production costs are considered one of the main elements of the agricultural policy analysis matrix. It is evident from the data of Table (6), which shows the items of production costs for the tomato crop in Egypt, which are workers' wages, machinery wages, animal wages, the price of seeds, the price of natural fertilizer, and the price of chemical fertilizer. The price of pesticides, variable general expenses, and land rent. By comparing the financial evaluation and the economic evaluation of each of the wages of machinery, the price of seeds, the price of chemical fertilizers, and the price of pesticides, we find that the financial evaluation is less than the economic evaluation of these items, which indicates that they are subsidized by the state for

tomato farmers. Comparing the financial and economic assessment of land rent, animal wages, municipal fertilizer price and public expenses, it turns out that they are equal, which indicates that the state does not interfere in the prices of these items.

Table (6): Financial and economic evaluation of cost items for the tomato crop in Egypt during the period 2000-2021

Cost items		Financial valuation	Economic valuation
Domestic resource cost of labour	Labor wages	4860	3256
	animal wages	1.14	1.14
	Machine wages	2083.9	2292.3
	general expenses	1101	1101
Total of local resource		8046.0	6650.6
Cost of production inputs	seed price	1644.3	1715.8
	Manure price	594.4	594.4
	chemical fertilizer price	2072	2222
	Pesticides price	856.6	1003.8
Total of production inputs		5167	5536
total of variable costs		13213	12187
Rent		4262.7	4262.7
Total cost		17475.7	16449.7

* The economic value was calculated using the following conversion factors: 1.05 for seeds, 1.1 for chemical fertilizers, 1.2 for pesticides, 0.67 for human labor, 1.1 for machines.
Source: Collected and calculated from data: Table No. (2) in the appendix
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And by comparing the variable costs and workers' wages, it was found that the financial evaluation exceeds the economic evaluation, reaching about 8046,4860 financial pounds, while it amounted to about 6650.6, 3256 economic pounds, respectively,This means higher variable costs and workers' wages domesticly than globally for the tomato crop,By estimating the total production cost per feddan of the tomato crop economically and comparing it with the financial evaluation, it turns out that the economic evaluation is less than the financial evaluation of the tomato crop,This means that tomato farmers did not receive support from the state for total production costs during the study period, and also indicates a decrease in global prices for total costs compared to domestic prices for tomato crops during the period 2000-2021.

2- Financial and economic evaluation of the feddan yield:

The yield per feddan is the most important component of the quantity produced of a crop multiplied by its farm price,But if the border price is used instead of the farm price, then in this case it is called the economic feddan return,By looking at the data of Table (7), the agricultural policy analysis matrix is shown and is expressed in the results and outputs of the crop, which is that the per-feddan yield of the tomato crop evaluated at economic prices exceeds that of the resident at farm prices, as the economic yield per feddan of tomatoes was estimated at about 349.8 thousand pounds, while the estimated financial return is about 163.5 thousand pounds, This is due to the large discrepancy in the difference between the domestic prices and the international prices used in estimating the per feddan yield.

3- Financial and economic evaluation of the net return:

Table (8) shows the net yield per feddan of the tomato crop, financially and economically,Where it is clear from it that the net return of the tomato crop, evaluated at economic prices, exceeds that of the farm prices, where the net economic return was estimated at about 333 thousand pounds, while it amounted to about 146 thousand pounds for the net financial return, an increase of about 187 thousand pounds,This is due to the large discrepancy in the difference between the domestic prices and the international prices used in estimating the net return.

Table (7): Yield per feddan as a financial and economic estimator of the tomato crop in Egypt during the period 2000-2021

The average unit price (tons) of the main product	Financial valuation	Economic valuation
Average production per feddan of the main product (ton/feddan)	3172	6787
Total yield per feddan (pounds)	51.54	51.54
The average unit price (tons) of the main product	163507	349830

Source: Compiled and calculated from data:
- Ministry of Agriculture and Land Reclamation, Economic Affairs Sector, Central Administration of Agricultural Economy, Bulletin of Agricultural Statistics, various issues.
- Central Agency for Public Mobilization and Statistics, Foreign Trade Bulletins, various issues.

Table (8) Agricultural policy analysis matrix for the tomato crop in Egypt during the period 2000-2021

Statement	Total Return	Inputs	Cost of Domestic Resources			Net return	Value added
			Labour	Land	Total		
Financial valuation	163507	5167	8046	4262.7	12309	146031	158340
Economic valuation	349830	5536	6650.6	4262.7	10913	333381	344294
Police effect	186323-	369-	1395.4	0	1395.4	187349-	185954-

Source: Collected and calculated from the data of Tables (6) and (7)

4- The results of measuring the agricultural policy analysis matrix of the tomato crop in Egypt:

The following is a review of the results of the agricultural policy analysis matrix for the tomato crop in Egypt using policy analysis indicators, which are illustrated in Table (9) during the period 2000-2021.

(a) Nominal protection coefficient of the outputs:

It can be seen from Table (9) that the nominal protection coefficient of the tomato crop outputs during the study period was about 0.47,This explains the absence of a fair production policy during that period because the value of this coefficient was lower than the correct one,Or, which means that domestic tomato prices are lower than their global counterparts, and thus tomato farmers obtain the equivalent of only about 47% of the value of their produce at the global price,That is, the percentage of what the farmer bears as implicit taxes is about 53% of the value of the product, and this percentage also represents the support that consumers receive for this crop.

(b) Nominal Protection coefficient of Production Inputs:

By reviewing the results, which are reflected in the same table previously referred to, it becomes clear that the value of the nominal protection coefficient for production requirements has reached about 0.93, meaning that the farmer pays about 93% of the value of production requirements at international prices, and this means that the support he received decreased to about 7% of global values,Perhaps this is consistent with the trends of the agricultural policy, which is moving towards the gradual abolition of subsidies on production requirements, to make them compatible with their economic cost,This would lead to a lack of supervision in their use and access to the most appropriate use of them, in addition to reducing the burden on the state budget.

Table (9) the results of the agricultural policy analysis matrix coefficients for the tomato crop in Egypt during the period 2000-2021

Statement	abbreviation	The results of the agricultural policy analysis matrix coefficients
Nominal protection coefficient	NPCO	0.47
Nominal protection coefficient	NPCI	0.93
Nominal protection coefficient	NPRO	(53.3)
Nominal protection coefficient	NPRI	(6.7)
Nominal protection coefficient	EPC	0.46
Effective protection coefficient	EPR	(54)
Effective protection coefficient	DRC	0.03
Domestic resource cost factor	PPC	0.08

Source: Collected and calculated from the data of Table (3,4). The numbers in brackets are negative.

(c) Effective Protection coefficient:

It is clear from the results of the aforementioned table that the value of the effective protection coefficient was about 0.46 during the study period, this means that the net effect of the economic policy was represented in the subjection of tomato producers to indirect taxes on production and its requirements, amounting to about 46%,This means that the added value at market prices of the tomato crop during this period amounted to about 158 thousand pounds, or only about 46% of the added value at economic prices, which amounts to about 344 thousand pounds,This means that the tomato crop did not enjoy government protection during that period.

(d) Domestic Resource Cost coefficient (Comparative Advantage):

The results of Table (9) also show that the domestic resource cost coefficient for the tomato crop has reached about 0.03, and this means that there is a comparative advantage for the tomato crop,That is, it takes 0.03 domestic monetary units of resources to generate a foreign exchange unit,That is, there is a preference for producing the tomato crop domesticly without importing it from abroad to meet domestic consumption, It also indicates the continued high cost of importing it from abroad compared to producing it domesticly.

(e) Subsidy Policy Cost Coefficient:

It is clear from the data of Table (9) that the coefficient of the cost of the subsidy policy for the tomato crop during the study period amounted to about 0.08, which means that the added value is much more than the cost of domestic resources, as 0.08 pounds of the cost of domestic resources gives one pound as an added value,This indicates an increase in the efficiency of domestic resources.

Recommendations:

1. Establishing a higher price apparatus in which the responsible bodies concerned with agricultural price policies in Egypt participate, working on studying international crop prices periodically to guide them when setting crop prices in order to encourage exports and limit imports and achieve protection for the producer and consumer by linking the agricultural policy of each of them to achieve stability price.

2. The need to raise the implicit taxes borne by producers for potato and tomato crops in order to improve competitiveness in global markets as a source of foreign currencies and to preserve cultivated areas.

3. Vertical expansion through the development of high-productivity varieties to increase production and provide support to farmers in the form of good seeds, fertilizers and other production requirements to encourage farmers to grow these crops.

4. Benefiting from the comparative advantage in the production of the two crops under study by increasing the quantities of their exports, achieving access to international markets, and responding to the nature of these markets and the tastes of consumers.

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. **Appendix:**
Source: Central Administration for Economic Affairs - Ministry of Agriculture and Land Reclamation - various issues.

Table (1): Development of the production costs of the potato crop, distributed into wages and production inputs during the period (2000-2021)

Years	Human Workforce	Animal Workforce	Machine Work	Other Expenses	Rent	Seeds Costs	Manure Costs	Chemical Fertilizers Costs	Pesticide Costs
2000	916	43	419	418	1090	2228	260	644	373
2001	907	48	410	403	1087	2160	197	672	367
2002	927	44	426	451	1197	2592	226	685	369
2003	1036	33	440	524	1289	3156	261	791	442
2004	1085	46	505	670	1314	4418	312	935	460
2005	1198	39	533	497	1363	4583	363	943	404
2006	1585	36	570	796	1538	5165	353	1115	418
2007	1713	39	612	910	1799	6110	388	1281	448
2008	2182	65	720	1076	2586	6694	515	1845	504
2009	2563	35	826	1094	2420	6366	498	1826	601
2010	2771	15	946	1051	2902	5548	409	1951	580
2011	3409	36	989	1144	3014	5941	511	1971	445
2012	3673	92	1055	1280	2623	6497	469	2611	465
2013	4271	80	1190	1396	2686	6341	501	2661	473
2014	3195	67	1177	1164	2685	6011	493	2023	485
2015	3445	13	1060	1173	2868	6059	516	1944	523
2016	4014	124	1478	1451	4628	7872	636	2117	613
2017	6777	0	3281	2270	5139	10277	1259	2893	735
2018	7117	0	5245	2743	5077	12033	2026	3084	976
2019	6679	0	6284	3278	5105	14897	1925	3492	856
2020	7660	0	5168	2800	5347	12264	1386	3569	1059
2021	8696	0	6303	3374	7602	15117	1719	5992	1263
Average	**3446**	**38.83**	**1802**	**1362**	**2971**	**6924.03**	**692**	**2048**	**584.5**

Table (2): Development of the production costs of the Tomatoes crop, distributed into wages and production inputs during the period (2000-2021)

Years	Human Workforce	Animal Workforce	Machine Work	Other Expenses	Rent	Seeds Costs	Manure Costs	Chemical Fertilizers Costs	Pesticide Costs
2000	1863.8	14.2	824	394	1603	567	274	813	518
2001	1858.2	7.9	938	501	1790	631	303	984	586
2002	2224.5	0	930	519	1754	670	334	1007	670
2003	2383	0	959	563	1857	724	338	1159	726
2004	2659	0	950	612	1865	848	375	1274	816
2005	2722	1	1266	656	1951	827	378	1297	792
2006	2670	1	1177	641	2261	836	394	1302	826
2007	2818	0	1233	659	2369	902	407	1416	664
2008	2965	0	1310	702	3000	963	444	1698	519
2009	3037	1	1530	756	3276	1011	400	1586	571
2010	3494	0	1256	793	3274	1110	483	1635	571
2011	3602	0	1390	786	3336	1113	486	1627	596
2012	3670	0	1466	819	3734	1148	478	1678	659
2013	3952	0	1550	903	4030	1213	519	1782	711
2014	4330	0	1838	993	4199	1277	568	1932	753
2015	5015	0	2007	1096	4354	1336	560	2083	778
2016	5842	0	2396	1269	7807	1406	728	2354	916
2017	7288	0	2783	1537	7605	1773	867	2798	1004
2018	9628	0	3532	1897	8124	2369	968	2846	1039
2019	9771	0	4031	2020	7643	2611	1058	3134	1139
2020	11182	0	5076	2256	7744	2914	1116	3589	1190
2021	13946	0	7405	3857	10204	9927	1600	7595	2801
Average	4860	1.14	2084	1101	4263	1644	594	2072	857

Table (3) potatoes prices, production and revenues during the period (2000-2021)

Years	Farm Price (Pounds/Ton)	Yield Per Feddan	Total Revenue	Borders Price per Ton
2000	1053	9.57	10441	602.5
2001	1056	9.75	10482	631.7
2002	1079	9.67	10635	826.7
2003	1222	9.97	12062	884.3
2004	1195	10.07	12706	1077.7
2005	1177	10.40	12551	1126.3
2006	1493	10.70	16239	1009.1
2007	1918	10.91	21634	1540.4
2008	2017	11.00	23095	2373.5
2009	2242	11.03	25131	3726.8
2010	2324	10.36	24761	2427.5
2011	2628	10.96	29438	2292.1
2012	2381	11.12	26357	1766.6
2013	2495	10.79	26604	3260.1
2014	2524	10.81	27016	3306.9
2015	2546	10.62	26605	2928.6
2016	3243	10.60	33543	3399.1
2017	3933	11.42	44930	7163.3
2018	4641	10.77	51318	7339.4
2019	4668	11.33	54894	6459.4
2020	4691	11.04	53801	5436.7
2021	6521	10.86	79830	5840.3
Mean	2593	10.62	28822	2973.6

Source: Central Agency for Public Mobilization and Statistics bulletins, various issues

Source: Central Administration for Economic Affairs - Ministry of Agriculture and Land Reclamation - various issues.

Table (4) Tomatoes prices, production and revenues during the period (2000-2021)

Years	Farm Price (Pounds/Ton)	Yield Per Feddan	Total Revenue	Borders Price per Ton
2000	1164	46.36	53963	905
2001	1116	47.18	52653	985
2002	1148	46.98	53933	1126
2003	1347	50.32	67781	1532
2004	1542	52.70	81263	1417
2005	1569	54.08	84852	1175
2006	1916	51.96	97242	1316
2007	1802	51.58	92947	1155
2008	2430	51.76	125777	7842
2009	1953	55.89	109153	4626
2010	2754	50.25	138389	6663
2011	4355	49.33	214832	1825
2012	3903	51.31	200263	7385
2013	3923	51.27	201132	5539
2014	3939	51.01	200928	8102
2015	4019	51.33	206295	9519
2016	4200	52.95	222390	10549
2017	4686	54.21	254028	26897
2018	4842	52.07	252123	27063
2019	4942	53.01	261975	7628
2020	6109	52.84	322800	7834
2021	6129	55.50	340160	8233
Average	**3172**	**51.54**	**165222**	**6787**

Source: Central Agency for Public Mobilization and Statistics bulletins, various issues

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