Economic and Marketing Efficiency of Onion and Garlic Crops in Egypt (A case Study: Fayoum Governorate)

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ABSTRACT: The crops of onion and garlic hold significant economic and strategic importance for Egypt among vegetable crops, particularly due to their export potential and role in providing foreign currency. Each crop occupies a distinguished position within the vegetable category, with Fayoum Governorate ranking ninth nationally in terms of cultivated area for both crops. The average cultivated area for onion and garlic in Egypt is approximately 168.56 and 33.83 thousand feddans, respectively. In Fayoum, these figures are around 15.15 and 5.96 thousand feddans, representing about 8.99% and 17.62% of the total cultivated area for onions and garlic in Egypt, respectively. Additionally, the average total production of these crops in Egypt is about 2,561.31 and 335.36 thousand tons, respectively, while in Fayoum, it amounts to approximately 229.85 and 57.63 thousand tons, accounting for around 8.97% and 17.18% of the total onion and garlic production in Egypt over the period (2008-2022).

Despite the importance of onion and garlic in the crop composition of Fayoum Governorate, a recent decline in cultivated area has been observed for both crops in the 2022/2023 season, dropping from approximately 19.7 and 18.1 thousand feddans in the 2021/2022 season to about 9.18 and 8.20 thousand feddans, respectively. This decline, along with reduced marketing efficiency for these crops in the study sample, has led to an overall increase in prices throughout the production season, largely due to the increased marketing margin for intermediaries. This situation negatively impacts the economic and marketing efficiency of producers in Fayoum Governorate.

The research aims to improve the efficiency of resource utilization in the production of onion and garlic crops to achieve the maximum possible return, as these crops are characterized by fast cash returns and are considered promising export crops. The study revealed that cultivating onion and garlic in new lands yields better results compared to old lands in terms of price indicators and net returns. Conversely, old lands demonstrate lower production cost indicators compared to new lands in the study sample.

Keywords: Onion, Garlic, Fayoum Governorate, Economic and Marketing Efficiency, Production and Marketing Issues.

1. INTRODUCTION:

The agricultural sector is one of the key economic sectors in Egypt, contributing significantly to the national income. It is also one of the primary production sectors that provide food for the population and raw materials for important agricultural processing industries in Egypt. Additionally, the agriculture sector absorbs a large portion of the labor force, and agricultural exports play a crucial role in generating foreign currency for the country. Onion is one of the crops that provides farmers with a substantial income, particularly in seed production, and it is also one of the key crops that contribute to increasing foreign currency revenues. Egypt is one of the world's leading exporters of onions, with Egyptian onion exports being significant due to their earlier availability compared to European onions. Similarly, garlic is an important vegetable crop, planted during the Nili season in September and October, either as a standalone crop or intercropped with other crops. Garlic is also one of Egypt's export vegetable crops, highlighting the importance of onion and garlic in generating substantial income for farmers, thereby improving their livelihoods.

The average cultivated area for onion and garlic crops in Egypt was approximately 148.8 and 34.2 thousand feddans, respectively, with around 12.7 and 5.8 thousand feddans in Fayoum

Governorate, respectively. The average total production of these two crops in Egypt amounted to approximately 2.210 and 463.5 thousand tons, respectively, with Fayoum Governorate contributing approximately 178.3 and 60.1 thousand tons during the average period (2008-2022). This underscores the relative importance of onion and garlic cultivation in Fayoum Governorate compared to the rest of Egypt during the study period. [1].

The research problem Despite the significance of onion and garlic crops in the crop composition, both for local consumption and export, a noticeable decline has been observed recently in the cultivated area of onions and garlic in Fayoum Governorate. The cultivated area decreased from approximately 19.7 and 18.1 thousand feddans, respectively, in the 2021/2022 season to about 18.1 and 8.20 thousand feddans, respectively, in the 2022/2023 season. This calls for a study of the reasons behind this decline and the identification of the problems facing producers, as it affects the economic and marketing efficiency of those crop producers in Fayoum Governorate.

The research aims to improve the efficiency of resource utilization in the production of onion and garlic crops to achieve the maximum possible return, as these crops are characterized by fast cash returns and are considered promising export crops. The study seeks to identify the optimal methods for utilizing production inputs for these crops in Fayoum Governorate to increase their production with high quality, and to examine the key economic and marketing challenges. The research will also provide recommendations for solutions that may help increase the production of the crops under study.

2. MATERIALS AND METHODS:

The study employed both descriptive and quantitative statistical analysis methods, in addition to using the simple linear model to estimate the annual growth rates of economic variables. The SPSS software was utilized to estimate economic and marketing efficiency, as well as to determine the amount of resources that achieved economic efficiency in the cultivation of onion and garlic crops. Furthermore, the study examined the difference between the average actual quantities of resources used and the optimal quantities that achieved economic efficiency in the sample, with the aim of identifying the farms that efficiently utilized resources and determining which of the two crops is more favorable for farmers.

The study depends on both published and unpublished data available in economic and statistical bulletins issued by the Economic Affairs Sector of the Ministry of Agriculture, as well as data from the Central Agency for Public Mobilization and Statistics (CAPMAS) and the

Agriculture Directorate in Fayoum Governorate. Additionally, the study primarily depends on section data obtained from some farmers cultivating the two crops under study in Fayoum Governorate, using a questionnaire designed for this purpose during the 2022/2023 season.

3. RESULTS AND DISCUSSIONS:
- Development of Production Indicators for Onion and Garlic Crops in Egypt and Fayoum Governorate:
Approximately 85% of the onion crop area is concentrated in nine governorates (Gharbia, Dakahlia, Sharqia, Sohag, Beni Suef, Beheira, Nubariya, Qalyubia, and Fayoum) during the (2022/2023) production season. Based on the ranking of governorates by their relative contribution to the total cultivated area, it was found that Gharbia Governorate ranks first, contributing about 51.6 thousand feddans, representing approximately 22.1% of the average total cultivated area of onions in Egypt. Dakahlia Governorate ranks second, contributing around 34.5 thousand feddans, or 13.5% of the national total, while Sharqia Governorate ranks third with an average area of about 22.3 thousand feddans, representing 9.5%. Fayoum Governorate accounts for approximately 18.1 thousand feddans, representing about 7.8% of the total onion area in Egypt during the (2022/2023) season [2].

Similarly, around 90.5% of the garlic crop area is concentrated in nine governorates (Beni Suef, Minya, Nubariya, Beheira, Giza, Dakahlia, Assiut, Aswan, and Fayoum) during the average period of (2020-2022). Based on the ranking of governorates by their relative contribution to the total cultivated area, Beni Suef Governorate ranks first, contributing around 20.2 thousand feddans, or about 39.9% of the national total garlic area. Minya Governorate ranks second, contributing approximately 9.3 thousand feddans, representing about 18.2% of the total, while Giza Governorate ranks third with an average area of about 2.4 thousand feddans, or about 4.7%. Fayoum Governorate contributes around 8.2 thousand feddans, representing about 1.6% of the total garlic area in Egypt during the average period (2020-2022) [3].

- Development of Production Indicators for Onion in Egypt and Fayoum Governorate:
Table (1) shows the development of the total cultivated area, yield per feddan, and total production of onions in Egypt and Fayoum Governorate for the period (2008-2022). The average cultivated area of onions in Egypt reached approximately 168.56 thousand feddans, while in

Fayoum Governorate, it amounted to about 15.15 thousand feddans, representing around 8.99% of the total onion area in Egypt.

Table (1): Evolution of Economic Indicators of Onion Crop in EGYPT and Fayoum Governorate for the period (2008-2022)

Years	EGYPT			Fayoum Governorate		
	Cultivated area Thousand feddans	Feddan productivity Ton/feddan	Total production Thousand tons	Cultivated area Thousand feddans	Feddan productivity Tons per feddan	Total production Thousand tons
2008	108.30	14.10	1527.00	10.5	12.4	130.2
2009	125.50	13.90	1744.50	11.2	13.4	150.1
2010	128.70	14.50	1866.20	11.4	16.5	188.1
2011	133.10	14.50	1930.00	11.6	15.8	183.3
2012	135.60	14.80	2006.90	12.1	14.9	180.3
2013	149.10	15.80	2355.80	13.8	15.7	216.7
2014	155.60	15.10	2349.60	14.2	15.1	214.4
2015	167.50	15.30	2562.80	15.9	14.9	236.9
2016	175.10	15.40	2696.50	16.1	15.6	251.2
2017	186.20	15.40	2867.50	17.5	15.2	266.0
2018	191.30	14.90	2850.40	17.9	15.8	282.8
2019	202.50	15.30	3098.30	18.5	14.7	272.0
2020	211.50	15.60	3299.40	18.7	15.2	284.2
2021	238.90	15.80	3774.60	19.7	15.6	307.3
2022	219.50	15.90	3490.10	18.1	15.7	284.2
Average	168.56	15.09	2561.31	15.15	15.10	229.85

Source: Compiled from: Ministry of Agriculture and Land Reclamation, Central Administration of Agricultural Economics, Agricultural Statistics Bulletins, various issues.
and the Directorate of Agriculture in Fayoum, the Information and Decision Support Center, unpublished data, various numbers.

Table (2) indicates that the cultivated area exhibited a statistically significant increasing trend of about 8.61 and 0.70 thousand feddans for Egypt and Fayoum, respectively, with an annual growth rate of approximately 5.42% and 4.10% for each. Additionally, Table (1) reveals that the average yield per feddan for onions in Egypt and Fayoum reached approximately 15.1 and 13.5 tons, respectively. Table (2) shows a statistically significant upward trend in yield per feddan, reaching about 15.09 and 15.10 tons per feddan for Egypt and Fayoum, respectively, with an annual increase of around 0.90% and 1.95% for each.

Furthermore, Table (1) shows that the average total onion production in Egypt and Fayoum was about 2,561.31 and 229.85 thousand tons, respectively. According to Table (2), total production also exhibited a statistically significant increasing trend, amounting to around 148.79 and 11.78 thousand tons for Egypt and Fayoum, respectively, with an annual growth rate of approximately 6.27% and 8.12% for each.

Table (2): Equations of the General Time Trend of Development of Economic Indicators of the Onion Crop in Egypt and Fayoum Governorate During the Period (2008-2022)

Depend Variable	General time trend equation	R^2	F	Annual rate of change (%)
Onion crop in Egypt				
Cultivated area Thousand feddans	$Y1_i = 99.67 + 8.61\ X_i$ (21.1)**	0.97	441.54**	5.42
Feddan productivity Ton/feddan	$Y2_i = 14.16 + 0.17\ X_i$ (5.46)*	0.70	29.81*	0.90
Total production Thousand tons	$Y3_i = 1370.96 + 148.79\ X_i$ (6.98)**	0.97	454.03**	6.27
Onion crop in Fayoum Governorate				
Cultivated area Thousand feddans	$Y1_i = 9.58 + 0.70\ X_i$ (14.95)**	0.95	223.65**	4.10
Feddan productivity Ton/feddan	$Y2_i = 14.31 + 0.10\ X_i$ (1.72)*	0.19	2.97*	1.95
Total production Thousand tons	$Y3_i = 135.58 + 11.78\ X_i$ (14.25)**	0.94	203.20**	8.12

Where: (i) the time factor in years as an independent variable, where e (1, 2, ... , 15).
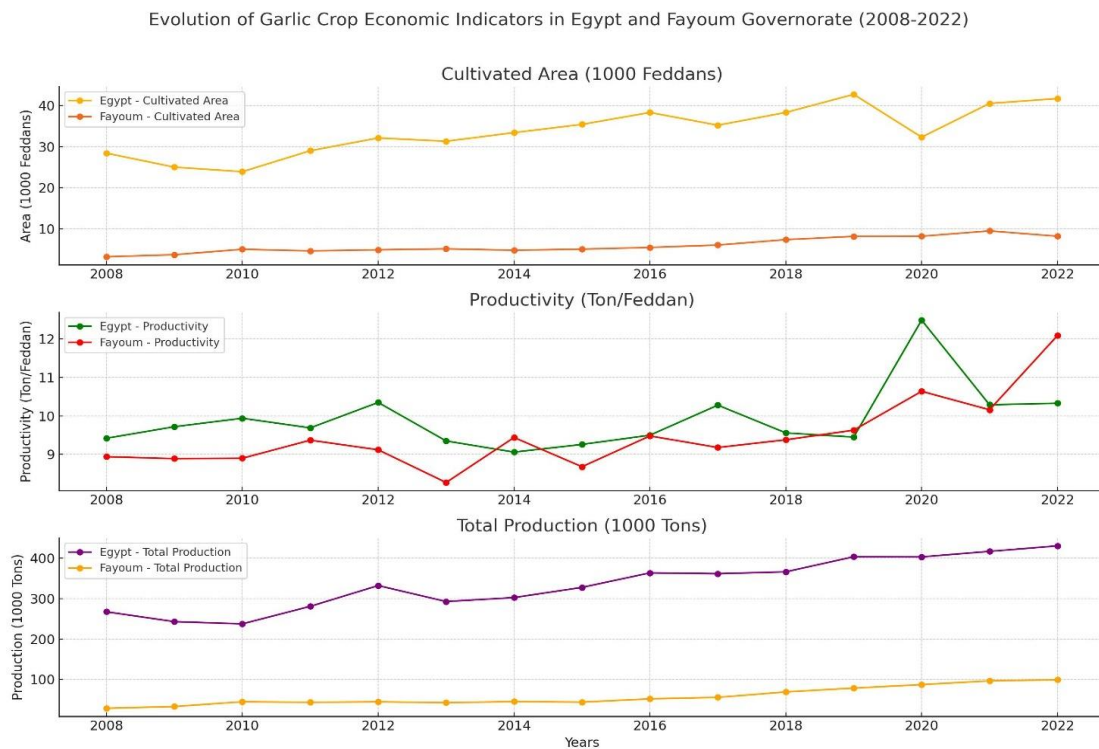**Indicates moral at (0.01) * Indicates moral at (0.05).
<u>Source</u>: Collected and calculated from the data contained in Table (1).

Fig.1. Evolution of Onion Crop Economic Indicators in Egypt and Fayoum Governorate (2008-2022)
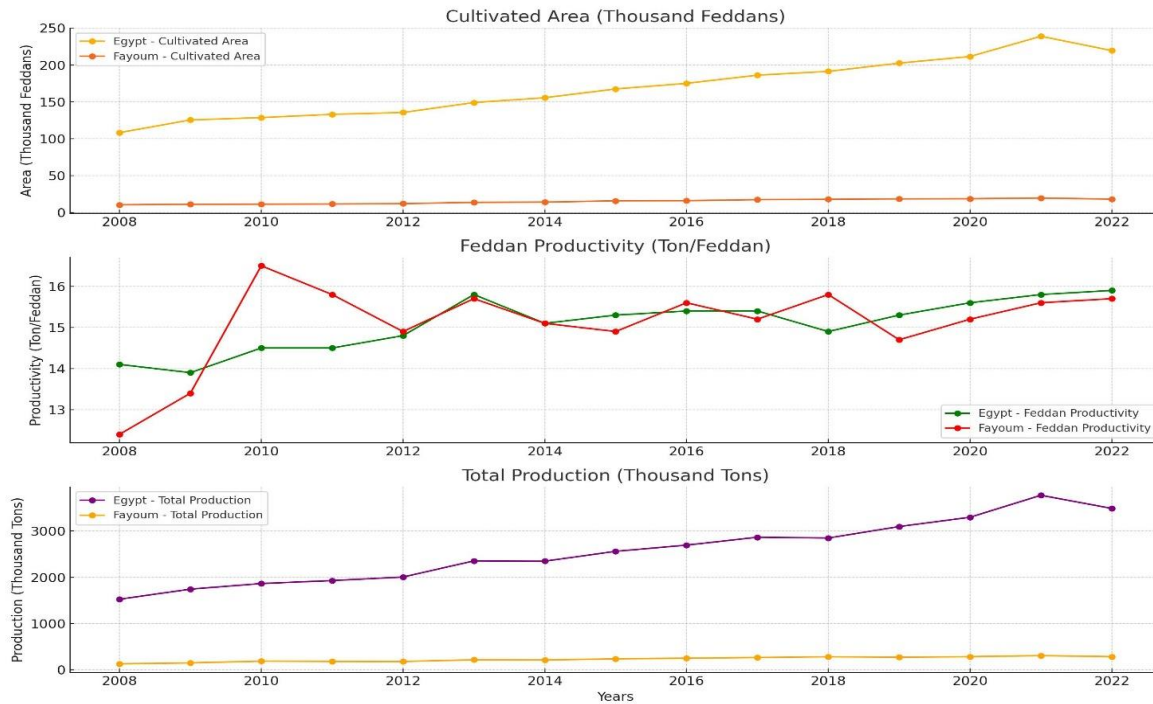
<u>Source</u>: Table (1).

Fig. 2. Evolution of Economic Indicators of Garlic Crop in Egypt and Fayoum Governorate for the Period (2008-2022)

<u>Source</u>: Table (3).

-Development of Production Indicators for Garlic in Egypt and Fayoum Governorate: Table (3) shows the development of the total cultivated area, yield per feddan, and total production of garlic in Egypt during the period (2008-2022). It shows that the average total area cultivated with garlic in Egypt and Fayoum Governorate was approximately 33.83 and 5.96 thousand feddans, respectively. Table (4) indicates that the cultivated area has shown a statistically significant increasing trend, with an annual increase of about 1.12 and 0.39 thousand feddans, representing an annual growth rate of approximately 3.59% and 7.62%, respectively.

As shown in Table (3), the average yield per feddan of garlic in Egypt and Fayoum Governorate was approximately 9.91 and 9.48 tons, respectively. Table (4) reveals that the yield per feddan for the same crop at the national level and in Fayoum Governorate exhibited a statistically significant increasing trend, reaching around 0.10 and 0.14 tons per feddan, with an annual growth rate of about 1.20% and 2.49%, respectively.

Additionally, Table (3) shows that the average total production of garlic in Egypt and Fayoum Governorate was approximately 335.36 and 57.63 thousand tons, respectively. Table (4) indicates that total production displayed a statistically significant increasing trend, amounting to around 13.59 and 4.76 thousand tons, with an annual growth rate of about 3.18% and 9.78%, respectively.

Table (3): Evolution of Economic Indicators of Garlic Crop in Egypt and Fayoum Governorate for the Period (2008-2022)

Years	Egypt			Al-Fayyoum		
	Cultivated Area Thousand feddans	Productivity ton/ feddan	Production Thousand tons	Cultivated Area Thousand feddan	Productivity ton/ feddan	Production Thousand tons
2008	28.40	9.42	267.40	3.21	8.94	28.70
2009	25.00	9.72	243.00	3.71	8.89	32.98
2010	23.90	9.94	237.50	5.03	8.90	44.77
2011	29.00	9.69	280.90	4.63	9.37	43.39
2012	32.10	10.35	332.30	4.90	9.12	44.67
2013	31.30	9.35	292.80	5.14	8.27	42.53
2014	33.40	9.06	302.60	4.79	9.44	45.22
2015	35.40	9.26	327.80	5.06	8.68	43.91
2016	38.30	9.50	363.70	5.48	9.48	51.96
2017	35.20	10.28	361.70	6.06	9.18	55.64
2018	38.30	9.56	366.30	7.37	9.38	69.10
2019	42.70	9.45	403.60	8.17	9.63	78.64
2020	32.30	12.49	403.32	8.20	10.64	87.21
2021	40.50	10.29	416.91	9.50	10.16	96.56
2022	41.68	10.33	430.51	8.20	12.09	99.16
Average	**33.83**	**9.91**	**335.36**	**5.96**	**9.48**	**57.63**

Source: Compiled from: Ministry of Agriculture and Land Reclamation, Central Administration of Agricultural Economics, Agricultural Statistics Bulletins, various issues [1].
and the Directorate of Agriculture in Fayoum, the Information and Decision Support Center, unpublished data, various numbers.

Table (4) Equations of the General Time Trend of the Development of Economic Indicators of the Garlic Crop in Egypt and Fayoum Governorate During the Period (2008-2022)

Garlic Crop in Egypt				
Depend Variable	General time trend equation	R^2	F	Annual rate of change (%)
Cultivated area Thousand feddan	$Y1_i = 24.86 + 1.12\ Xi$ (6.23)**	0.75	38.77**	3.59
Feddan productivity Ton/feddan	$Y2_i = 9.30 + 0.10\ Xi$ (1.65)*	0.17	2.72*	1.20
Total production	$Y3_i = 226.61 + 13.59\ Xi$	0.92	154.94**	3.81

Thousand Tons	(12.45)**			
Garlic crop in Fayoum Governorate				
Cultivated area **Thousand feddan**	$Y1_i = 2.83 + 0.39\ X_i$ (9.64)**	0.88	93.03**	7.62
Feddan productivity **Ton/feddan**	$Y2_i = 9.60 - 0.14\ X_i$ (3.81)**	0.53	14.50**	2.49
Total production **Thousand tons**	$Y3_i = 19.51 + 4.76\ X_i$ (9.49)**	0.87	89.99**	9.78

where i: the time factor in years as an independent variable, where i (1, 2, ... , 15).

• **Indicates moral at (0.01). * Indicates the moral at the level of (0.05).

<u>Source</u>: Collected and calculated from the data in Table (3).

- Economics of Onion and Garlic Production in the Study Sample from Fayoum Governorate:
This part discusses the economics of onion and garlic production in the study sample from Fayoum Governorate. It covers a description of the study sample and examines the production and economic indicators of onion and garlic crops in Fayoum Governorate for the 2022/2023 production season.

- Description of the Study Sample:
Description of the Study Sample for Onion in Fayoum Governorate for the 2022/2023 Season:
A multi-stage stratified random sampling method was relied to collect primary data through a questionnaire during the 2022/2023 agricultural season, which included approximately 120 farmers cultivating onions. The centers for the study sample were selected based on the relative importance of the cultivated area for the crops in Fayoum Governorate.

As indicated in Table (5), the total cultivated area for onions in Fayoum Governorate was approximately 18.10 thousand feddans. The areas for the centers of Youssef El-Sedek and Tamiya were approximately 4,800 and 4,200 feddans, respectively, representing about 26.52% and 23.20% of the total onion area cultivated in Fayoum Governorate for the 2022/2023 production season.

In Youssef El-Sedek centers, the cultivated onion area in old and new lands was approximately 1,885 and 1,884 feddans, respectively, representing about 39.27% and 23.25% of the total onion area cultivated in this center. In Tamiya, the cultivated onion area in old and new lands was approximately 1,699 and 1,637 feddans, respectively, with these areas representing around 40.45% and 38.98% of the total onion area cultivated in Tamiya for the 2022/2023 season.

Fig. 3. Egypt map showing El-Faiyum governorates

Table (5): Total Cultivated Area of Onion Crop in Fayoum Governorate for the Season (2022/2023)

Yousef Al-Siddique Center 4800 feddan		26.52% of the total area planted with Onions In the province	Tamiya Center 4200 feddan		23.20% of the Total area planted Onions in the governorate
The area planted Onions in the center of Yousef Al-Siddique/ feddan		% of total center	The area planted Onions in the center of Tamiya/ feddan		% of total center
Old lands	1885	39.27	Old lands	1699	40.45
New land	1884	23.25	New land	1637	38.98
Remaining Area of the Center	1031	21.48	Remaining Area of the Center	864	20.57
The total area planted with Onions in Fayoum Governorate			18100		

Source: Information and Decision Support Center, Directorate of Agriculture in Fayoum Governorate <u>Unpublished data</u>. Production season 2022/2023.

-Characterization of the Study Sample for the Garlic Crop in Fayoum Governorate for the 2022/2023 Season:

It is evident from Table (6) that the total cultivated area of garlic in Fayoum Governorate in 2023 reached about 8.2 thousand feddans. Youssef El-Siddiq district ranked first with approximately 2.4 thousand feddans, representing about 29% of the total garlic cultivation area in Fayoum Governorate, followed by Fayoum district in second place with around 2.2 thousand feddans, representing about 26.8% of the total area. For the garlic crop study sample, 120 individuals were selected and evenly distributed between the old and new lands in Youssef El-Siddiq district and Fayoum district. The area of garlic cultivated in Youssef El-Siddiq district for the old lands and new lands was approximately 542 and 599 feddans, representing about 22.5% and 24.9% respectively, of the total garlic cultivation area in Youssef El-Siddiq district. In Fayoum district, the area cultivated with garlic in the old lands and new lands was approximately 939 and 807 feddans, representing about 42.6% and 36.6% respectively, of the total garlic cultivation area in Fayoum district for the 2022/2023 season.

Table (6): Total Cultivated Area of Garlic Crop in Fayoum Governorate for the Season (2022/2023)

Yousef Al-Siddique Center 2400 feddan		29.27% of the total cultivated area of Garlic In the province	Fayoum Center 2200 feddan		26.83% of the total cultivated area of Garlic In the province
The area planted with Garlic in Yousef Al-Siddique center/ feddan		% of total center	The area planted with Garlic in Fayoum center / feddan		% of total center
Old lands	542	22.58	Old lands	939	42.68
New Lands	599	24.96	New Lands	807	36.68
Total area planted Garlic in Fayoum Governorate			8200		

Source: Information and Decision Support Center, Directorate of Agriculture in Fayoum Governorate Unpublished data. Production season 2022/2023 [14].

3.1. Economic Efficiency Indicators for Production Factors of Onion and Garlic Crops in Fayoum Governorate:

Economic efficiency refers to the ability to achieve the maximum value from the resources used in crop production, ensuring a better standard of living for farmers and the local community. The economic efficiency of production factors for onion and garlic crops in the study sample was estimated by dividing the marginal value product of each production factor by its unit price [5]. If this value exceeds one, it indicates that economic efficiency is achieved from using this factor in the production process, and there is potential to increase the quantity used to boost productivity, within the limits of its production flexibility. Conversely, if the value falls below one, it suggests that the production factor is used more intensively than its economic limit, necessitating a reduction in its quantity to achieve economic efficiency [6].

3.1.1. Economic Efficiency Indicators for Production Factors of Onion Crop in Fayoum Governorate:

The relationship between the marginal value product and the price of the production factor was studied to determine the economic efficiency of

onion crops in Youssef El-Siddiq and Tamiya districts for the production season (2022/2023), as shown in Table (7). The findings are as follows:

- Youssef El-Siddiq District (Old Lands):
The elasticity of production for the main factors affecting the productivity per feddan of onion crops in the old lands of Youssef El-Siddiq district was calculated for manure, number of seedlings, and potassium fertilizer, with values of approximately 0.06, 0.30, and 0.20 respectively. This indicates that these factors are used in the economic phase (the second phase of the Law of Diminishing Returns), and that farmers have not reached the optimal production stage. The overall elasticity was estimated at approximately 0.56, reflecting an increase in returns to scale, meaning that the quantities of these factors can be increased within their production flexibility.

The economic efficiency of onion production in the old lands for the aforementioned factors was estimated at approximately 4.3, 2.8, and 2.0 respectively, indicating that economic efficiency is achieved from using these factors in the production process of onion crops in the old lands of Youssef El-Siddiq district, reflecting an increase in returns to scale.

- Youssef El-Siddiq District (New Lands): The elasticity of production for the main factors affecting the productivity per feddan of onion crops in the new lands of Youssef El-Siddiq district was estimated for potassium fertilizer, nutrients per feddan, and human labor, with values of approximately 0.06, 0.10, and 0.50 respectively. This indicates that these factors are used in the economic phase (the second phase of the Law of Diminishing Returns), and that farmers have not reached the optimal production stage. The overall elasticity was estimated at approximately 0.66, reflecting an increase in returns to scale, meaning that the quantities of these factors can be increased within their production flexibility.

The economic efficiency of the production factors for onions in the new lands was estimated at approximately 1.0%, 2.7%, and 3.5% respectively. This indicates that economic efficiency is achieved from using these factors in the production process of onion crops in the new lands of Youssef El-Siddiq district, suggesting that there is potential to increase the quantities used to boost productivity, within the limits of the production flexibility of these factors.

Table (7): Economic Efficiency Indicators of the Production Elements of the Onion Crop in the Study Sample for the season 2022/2023

Center	Yousef Al-Siddique Center (Old Lands)						Yousef Al-Siddique Center (New Lands)					
Indicators/ Production Elements	Production flexibility	Marginal product	Marginal product value	Item Unit Price	Average price per ton	Economic efficiency	Production flexibility	Marginal product	Marginal product value	Item Unit Price	Average price per ton	Economic efficiency
Municipal manure	0.06	0.100	509.5	120	5100	4.3	-	-	-	-	-	-
Number of seedlings	0.30	0.163	803.1	300	5100	2.8	-	-	-	-	-	-
Potassium Fertilizer	0.20	0.082	417.7	215	5100	2.0	0.06	0.036	188.5	185	5200	1.0
Nutrients per feddan	-	-	-	-	-	-	0.10	0.028	145.6	55	5200	2.7
Human Labor	-	-	-	-	-	-	0.50	0.101	525.1	150	5200	3.5
	Tamiya Center (Old Lands)						Tamiya Center (New Lands)					
Watering amount	-	-	-	-	-	-	0.02	0.177	910.8	200	5150	4.6
Phosphate fertilizer	0.06	0.015	73.4	35	5050	2.1	-	-	-	-	-	-
Potassium Fertilizer	0.24	0.097	491.3	220	5050	2.2	-	-	-	-	-	-
Nutrients per feddan	0.11	0.036	183.8	60	5050	3.1	0.11	0.027	137.4	60	5150	2.3

Source: Collected and calculated from the study sample in Fayoum Governorate for the productive season 2022/2023.

- Tamiya District (Old Lands): The elasticity of production for the main factors affecting the productivity per feddan of onion crops in the old lands of Tamiya district was estimated for phosphate fertilizer, potassium fertilizer, and nutrients per feddan, with values of approximately

0.06, 0.24, and 0.11 respectively. and that farmers have not reached the optimal production stage. The overall elasticity was estimated at approximately 0.41, reflecting an increase in returns to scale, meaning that the quantities of these factors can be increased within their production flexibility.

The economic efficiency of the production factors for onions in the old lands of Tamiya district was estimated at approximately 2.1%, 2.2%, and 3.1% respectively. This indicates that economic efficiency is achieved from using these factors in the production process of onion crops, suggesting that there is potential to increase the quantities used to boost productivity, within the limits of their production flexibility.

- Tamiya District (New Lands): The elasticity of production for the main factors affecting the productivity per feddan of onion crops in the new lands of Tamiya district was estimated for irrigation quantity and nutrients per feddan, with values of approximately 0.2 and 0.11 respectively. This indicates that these factors are used in the economic phase (the second phase of the Law of Diminishing Returns), and that farmers have not reached the optimal production stage. The overall elasticity was estimated at approximately 6.9, reflecting an increase in returns to scale, meaning that the quantities of these factors can be increased within their production flexibility.

The economic efficiency of the production factors for onions in the new lands of Tamiya district was estimated at approximately 4.6% and 2.3% respectively for irrigation quantity and nutrients per feddan. This indicates that economic efficiency is achieved from using these factors in the production process of onion crops, suggesting that there is potential to increase the quantities used to boost productivity, within the limits of their production flexibility.

3.1.2. Economic Efficiency Indicators for Garlic Production Factors in Fayoum Governorate:
By studying the relationship between marginal product value and the price of the production factor to obtain the economic efficiency for garlic production in Youssef El-Siddiq and Fayoum districts for the production season (2022/2023), as shown in Table (8), the following is observed:

- Youssef El-Siddiq District (Old Lands): The elasticity of production for garlic production factors in the old lands of Youssef El-Siddiq district was estimated for organic fertilizer, machine working hours, and phosphate fertilizer, with values of approximately 0.12, 0.17, and 0.17 respectively. This indicates that these factors are used in the economic phase (the second phase of the Law of Diminishing Returns), and that farmers have not reached the optimal production stage. The overall elasticity was estimated at approximately 0.46, reflecting an increase in returns to scale,

meaning that the quantities of these factors can be increased within their production flexibility.
The economic efficiency of the garlic production factors mentioned above was estimated at approximately 5.2%, 4.8%, and 3.6% respectively.

This indicates that economic efficiency is achieved from using these factors in the production process of garlic in the old lands of Youssef El-Siddiq district, suggesting that there is potential to increase the quantities used to boost productivity, within the limits of their production flexibility.

- Youssef El-Siddiq District (New Lands): The elasticity of production for garlic production factors in the new lands of Youssef El-Siddiq district was estimated for organic fertilizer and potassium fertilizer, with values of approximately 0.11 and 0.23 respectively. This indicates that these factors are used in the economic phase (the second phase of the Law of Diminishing Returns), and that farmers have not reached the optimal production stage. The overall elasticity was estimated at approximately 0.34, reflecting an increase in returns to scale, meaning that the quantities of these factors can be increased within their production flexibility.

The economic efficiency of the garlic production factors mentioned above was estimated at approximately 4.6% and 5.3% respectively. This indicates that economic efficiency is achieved from using these factors in the production process of garlic in the new lands of Youssef El-Siddiq district, suggesting that there is potential to increase the quantities used to boost productivity, within the limits of their production flexibility.

- Fayoum District (Old Lands): The elasticity of production for garlic production factors in the old lands of Fayoum district was estimated for organic fertilizer, phosphate fertilizer, and nutrients per feddan, with values of approximately 0.13, 0.15, and 0.14 respectively. This indicates that these factors are used in the economic phase (the second phase of the Law of Diminishing Returns), and that farmers have not reached the optimal production stage. The overall elasticity was estimated at approximately 0.42, reflecting an increase in returns to scale, meaning that the quantities of these factors can be increased within their production flexibility.

The economic efficiency of the garlic production factors mentioned above was estimated at approximately 5.7%, 3.4%, and 5.2% respectively. This indicates that economic efficiency is achieved from using these factors in the production process of garlic in the old lands of Fayoum district, suggesting that there is potential to increase the quantities used to boost productivity, within the limits of their production flexibility.

Table (8): Economic efficiency indicators of the production elements of the Garlic crop in the study sample for the season 2022/2023

Indicators/ Production Elements	Yousef Al-Siddique (Old Lands)						Yousef Al-Siddique (New Lands)					
	Production flexibility	Marginal product	Marginal product value	Item Unit Price	Average price per ton	Economic efficiency	Production flexibility	Marginal product	Marginal product value	Item Unit Price	Average price per ton	Economic efficiency
Municipal manure	0.12	0.13	627	120	4750	5.2	0.11	0.118	557	120	4740	4.6
Number of automated working hours	0.17	0.20	953	200	4750	4.8	-	-	-	-	4740	-
Phosphate fertilizer	0.17	0.03	144	40	4750	3.6	0.23	0.045	2.3	40	4740	5.3
Fayoum (Old Lands)							**Fayoum (New Lands)**					
Municipal manure	0.13	0.15	711	125	4810	5.7	-	-	-	-	4830	-
Seed quantity	-	-	-	-	4810	-	0.11	0.07	354	300	4830	1.2
Phosphate fertilizer	0.15	0.03	136	40	4810	3.4	-	-	-	-	4830	-
Nitrogen fertilizer	-	-	-	-	4810	-	0.14	0.04	211	150	4830	1.4
Nutrients per feddan	0.14	0.06	285	55	4810	5.2	-	-	-	-	4830	-

Source: Collected and calculated from the study sample in Fayoum Governorate for the productive season 2022/2023.

- Fayoum District (New Lands): The elasticity of production for garlic production factors in the new lands of Fayoum district was estimated for seed quantity and nitrogen fertilizer, with values of approximately 0.11 and 0.14 respectively. This indicates that these factors are used in the economic phase (the second phase of the Law of Diminishing Returns), and that farmers have not reached the optimal production stage. The overall elasticity was estimated at approximately 0.25, reflecting an increase in returns to scale, meaning that the quantities of these factors can be increased within their production flexibility.

The economic efficiency of the garlic production factors mentioned above was estimated at approximately 1.2% and 1.4% respectively. This indicates that economic efficiency is achieved from using these factors in the production process of garlic in the new lands of Fayoum district, suggesting that there is potential to increase the quantities used to boost productivity, within the limits of their production flexibility.

3.2. Marketing Efficiency Indicators for Onion and Garlic Crops in Fayoum Governorate for the 2022/2023 Growing Season:

- Profitability of the Invested Pound: This refers to the net return achieved per pound spent on all the components of the total costs necessary to complete the production process. The higher the value of this indicator, the greater the profitability of the pound spent in the production process, indicating economic efficiency in production [7].

Profitability of the Invested Pound = Net Crop Return / Total Production Costs

- Marketing Efficiency is a true indicator of the performance of marketing services, which depends on the marketing system, consisting of producers, intermediaries, and consumers. The goals of each differ to fulfil their desires producers and intermediaries aim to maximize their profits, while consumers aim to obtain goods at the lowest price. Below are the key concepts and formulas related to marketing efficiency:

Marketing Margin: This is synonymous with marketing costs and refers to what intermediaries earn in return for providing marketing services for the crop (such as costs for sorting, grading, collecting, packaging, transporting, selling, buying, converting, plus the profits earned by intermediaries or minus their losses) during the marketing chain from the farmer to the final consumer, including all intermediary wages. The importance of studying marketing costs lies in comparing them with production costs or achievable prices, studying the distribution of marketing costs among intermediaries and marketing functions, formulating marketing policies based on the study of marketing costs, and attempting to minimize marketing costs while maintaining marketing efficiency for goods and products [8]. **The total marketing costs (absolute price spread) are expressed by the price spread, where:**
- Price Spread of the First Link (Share of the Wholesale Trader) = Wholesale Price – Farm Price.
- Price Spread of the Second Link (Share of the Retail Trader) = Retail Price – Wholesale Price.
- Total Price Spread = Price Spread of the First Link + Price Spread of the Second Link [9].

Distribution of the Consumer's Pound: This refers to how one pound of the final consumer price paid by the

consumer is distributed among the producer or farmer, the wholesale trader, the retail trader, and the marketing functions (collection, transportation, etc.), and the share each receives from this pound, where:
- Farmer's Share of the Consumer Pound (%) = (Farm Price / Retail Price) * 100.
- Wholesale Trader's Share of the Consumer Pound (%) = (Wholesale Trader's Share / Retail Price) * 100.
- Retail Trader's Share of the Consumer Pound (%) = (Retail Trader's Share / Retail Price) * 100.
Price Markup: Sometimes referred to as the price increase rate, it is calculated as:
Price Markup = (Price Spread (Absolute Price Difference) / Farm Price) * 100.
- Marketing Efficiency refers to performing marketing functions optimally, with the lowest marketing costs, and at the right time. High marketing efficiency indicates reduced marketing costs, increased product prices, and lower consumer prices, and vice versa.
Marketing efficiency reflects both: Technological Efficiency: This involves using the best scientific and practical means to perform marketing functions such as transportation, storage, cooling, grading [9].
- Economic Efficiency: This refers to the behavior of the producer and consumer and how goods and products reach the consumer in the right form, time, place, and price, as well as the markets dealing with the goods [10].
Marketing efficiency can be calculated as follows:
Marketing Efficiency (%) = 100 - ((Marketing Costs per Ton) / (Marketing Costs per Ton + Production Costs per Ton)) * 100. [11]
3.2.1. Marketing Efficiency Indicators for Onion Crop in Fayoum Governorate:

Table (9) outlines the key marketing indicators for the onion crop in the study sample, across both old and new lands, in Yousef Al-Siddique and Tamia Districts in Fayoum Governorate for the 2022/2023 growing season as follows: The results from Table (9) indicate that the profitability of the pound invested in onion crops in the old and new lands in Yousef Al-Siddique District was approximately 1.4 and 1.59 EGP per feddan, respectively. In Tamia District, it was estimated at around 1.2 and 1.4 EGP per feddan, indicating a decline in the economic efficiency of onion crops in Fayoum Governorate for the 2022/2023 growing season.

Additionally, the marketing efficiency of onion crops in the old and new lands in Yousef Al-Siddique District was estimated at 20.9% and 18.2%, respectively, while in Tamia District, it was estimated at 22.2% and 19.2%. This reflects the high marketing costs compared to the production costs per ton of onions and the inefficiency of the local marketing system for onions in Fayoum Governorate. This inefficiency is due to the high share of intermediaries, which was estimated at 61.07% and 63.38% for the old and new lands, respectively, in Yousef Al-Siddique District, and around 60.5% and 63.2% for the old and new lands in Tamia District. Therefore, there is a need to work on improving the farmer's share to raise the living standards of these farmers and their ability to cover production costs, ultimately enhancing the efficiency of the local marketing system for this crop.

Table (9): Marketing efficiency indicators for Onion crop in Fayoum Governorate for the productive season 2022/2023

Indicators	Yousef Al-Siddique		Tamiya	
	Old lands	New Lands	Old lands	New Lands
1- Productivity feddan (ton/ feddan)	15.8	17.5	15.6	17.3
2- Total production costs (Pound / feddan)	33500	35200	34600	36400
3- Production costs per ton (Pound /ton)	2120	2011	2218	2104
4- Total revenue (Pound / feddan)	80580	91000	78780	89095
5- Net Return (Pound / Feddan)	47080	55800	44180	52695
6- Net Return on Costs (Pound /feddan)	2.40	2.59	2.28	2.45
7- Profitability of the invested pound (pound / feddan)	1.41	1.59	1.28	1.45
8- Farm price (Pound / ton)	5100	5200	5050	5150
9- Wholesale price (Pound /ton)	9300	10000	9200	9600
10- Retail Price (Pound /ton)	13100	14200	12800	14000
11- The price spread of the first episode (the wholesaler's share %)	4200	4800	4150	4450
12- The price spread of the second ring (the share of the retailer %)	3800	4200	3600	4400
13- Price spread %	8000	9000	7750	8850
14- Distribution of consumer pounds to farms %	38.93	36.62	39.45	36.79
15- Distribution of consumer pound to wholesaler %	32.06	33.80	32.42	31.79
16- Distribution of consumer pounds to the retailer %	29.01	29.58	28.13	31.43
17- Brokers' share of the consumer pound %	61.07	63.38	60.55	63.21
18- Price increase (price increase) (Pound / ton)%	156.86	173.08	153.47	171.84
19- Marketing efficiency %	20.95	18.26	22.25	19.21

Source: Collected and calculated from the study sample in Fayoum Governorate for the productive season 2022/2023.

3.2.2. Marketing Efficiency Indicators for Garlic in Fayoum Governorate:

Table (10) highlights the key marketing indicators for the garlic crop in the study sample, covering both old and new lands in Yousef Al-Siddique and Fayoum Districts in Fayoum Governorate for the 2022/2023 growing season, as follows:

The results from Table (10) show that the profitability of the invested pound for garlic in old and new lands in Yousef Al-Siddique District was approximately 0.73 and 0.84 pounds per feddan, respectively. In Fayoum District, it was estimated at around 0.74 and 0.77 pounds per feddan, respectively. This suggests a decrease in economic efficiency for the garlic crop in Fayoum Governorate for the 2022/2023 growing season.

Additionally, the marketing efficiency for garlic in old and new lands in Yousef Al-Siddique District was found to be approximately 23.7% and 22.3%, respectively. In Fayoum District, it was estimated at around 23.19% and 23.98%, respectively. This indicates high marketing costs relative to the production costs per ton of garlic, revealing inefficiencies in the local marketing system for this crop in Fayoum Governorate. The share of intermediaries was estimated at approximately 64.9% and 65.2% for old and new lands, respectively, in Yousef Al-Siddique District, and about 65.5% and 64.2% in Fayoum District. This calls for efforts to improve the farmers' share to enhance their standard of living and ability to cover production costs, ultimately leading to improved efficiency of the local marketing system for this crop.

Table (10): Marketing efficiency indicators for Garlic crop in Fayoum Governorate for the productive season 2022/2023

Indicators	Yousef Al-Siddique		Al-Fayyoum	
	Old lands	New Lands	Old lands	New Lands
1- Productivity feddan (ton/ feddan)	12.1	12.5	12.9	12.1
2- Total production costs (pound / feddan)	33200	32600	35100	33200
3- Production costs per ton (pound /ton)	2744	2608	2721	2744
4- Total revenue (pound / feddan)	57475	60125	61146	58685
5- Net Return (pound / Feddan)	24275	27525	26046	25485
6- Net Return on Costs (pound /feddan)	1.73	1.84	1.74	1.77
7- Profitability of the invested pound (pound / feddan)	0.73	0.84	0.74	0.77
8- Farm price (pound / ton)	4750	4810	4740	4850
9- Wholesale price (pound /ton)	9950	10250	10100	9950
10- Retail Price (pound /ton)	13550	13850	13750	13550
11- The price spread of the first episode (the wholesaler's share %)	5200	5440	5360	5100
12- The price spread of the second ring (the share of the retailer %)	3600	3600	3650	3600
13- Price spread %	8800	9040	9010	8700
14- Distribution of consumer pounds to farms %	35.06	34.73	34.47	35.79
15- Distribution of consumer pound to wholesaler %	38.38	39.28	38.98	37.64
16- Distribution of consumer pounds to the retailer %	26.57	25.99	26.55	26.57
17- Brokers' share of the consumer pound%	64.94	65.27	65.53	64.21
18- Price increase (price increase) (pound / ton)%	185.26	187.94	190.08	179.38
19- Marketing efficiency%	23.77	22.39	23.19	23.98

Source: Collected and calculated from the study sample in Fayoum Governorate for the productive season 2022/2023.

3.3. Key Production and Marketing Issues for Onion and Garlic Crops in the Study Sample:

The study of key production and marketing issues for the old and new lands of onion and garlic crops in Fayoum Governorate for the 2022/2023 growing season revealed the following challenges:

1. Severe shortage of available irrigation water, leading to reduced yield per feddan.
2. Lack of high-yielding varieties.
3. Agricultural extension services not fulfilling their role for the studied crops in both old and new lands.
4. Widespread occurrence of diseases and insect pests.
5. High prices of production inputs and lack of price control.
6. Shortage of trained labor for agricultural operations for the studied crops and high labor costs.

7. Insufficient information on the importance of contract farming for onion and garlic crops.
8. Lack of sufficient information on potential marketing and export opportunities for farmers.
9. Inadequate and delayed disbursement of loans, high-interest rates, and increased collateral requirements.
10. Producers' exposure to the greed of traders and intermediaries, leading to price fluctuations.
11. High transportation costs and lack of suitable transportation means.

The reasons that led to the increase in onion and garlic prices for the 2022/2023 season, ranked by importance from the perspective of wholesale and retail traders, are as follows:
1. Decrease in cultivated areas this year due to losses from previous years.
2. Increased quantities of damaged produce during storage.
3. Rise in the quantity of onions exported this season.
4. Diseases affecting the crop, resulting in reduced productivity.
5. Traders bearing the costs of production, leading to market monopolization.
6. Traders purchasing crops for storage or export.

The proposed solutions to avoid future increases in onion and garlic prices, ranked by importance and the responsible entities from the perspective of wholesalers, include:
1. Halting exports during times of crisis.
2. Providing agricultural financing to farmers for necessary production inputs.
3. Reducing transportation costs.
4. Lowering entry fees to wholesale markets.
5. Ensuring adequate storage facilities.
6. Organizing extension fields for farmers.

The reasons that led to the increase in onion prices for the 2022/2023 season, ranked by importance from the perspective of the working team, are as follows:
1. Farmers' reluctance to cultivate the crop in the 2022/2023 season due to significant losses incurred in the previous season (2021/2022), as previously mentioned.
2. Decreased crop productivity, leading to lower market supply amid rising demand.
3. Increased quantities exported abroad.
4. Lack of extension seminars on recommended practices for the crop.
5. Crop damage from diseases and pests.
6. Storage of the crop by wholesale traders.
7. Rising costs of production inputs.
8. Disorderly farming and marketing practices for the crop.
9. Significant losses incurred by farmers in the previous year, resulting in their decision not to plant in the 2022/2023 season.

10. Absence of a contractual farming system for onion crops.

4. CONCLUSION:
The study results revealed that the production elasticity coefficient for the most impactful factors on the per-feddan productivity of onion crops in the old lands of Yusuf Al-Siddiq district, including organic fertilizer, the number of seedlings, and potassium fertilizer, were approximately 0.06, 0.30, and 0.20, respectively. This indicates that the use of these elements is within the economic phase (the second phase of the Law of Diminishing Returns), and that farmers have not yet reached the optimal production stage. The total elasticity coefficient was estimated at about 0.56, reflecting an increase in returns to scale, meaning that the quantities used of these elements can be increased within the elasticity limits.

Similarly, the study showed that the production elasticity coefficient for the most impactful factors on the per-feddan productivity of onion crops in the new lands of Yusuf Al-Siddiq district, including potassium fertilizer, nutrients per feddan, and manual labor, were approximately 0.06, 0.10, and 0.50, respectively. This also suggests that the use of these elements is within the economic phase, and that farmers have not reached the optimal production stage. The total elasticity coefficient was estimated at around 0.66, indicating an increase in returns to scale, meaning that the quantities used of these elements can be increased within their elasticity limits.

The study results also indicated that the production elasticity coefficient for the most impactful factors on the per-feddan productivity of onion crops in the old lands of Tamiya district, including phosphate fertilizer, potassium fertilizer, and nutrients per feddan, were approximately 0.06, 0.24, and 0.11, respectively. This suggests that the use of these elements is within the economic phase, and that farmers have not reached the optimal production stage. The total elasticity coefficient was estimated at around 0.41, reflecting an increase in returns to scale, meaning that the quantities used of these elements can be increased within their elasticity limits.

On the other hand, it was found that the production elasticity coefficient for the most impactful factors on the per-feddan productivity of onion crops in the new lands of Tamiya district, including the quantity of irrigation and nutrients per feddan, were approximately 0.2 and 0.11, respectively. This indicates that the use of these elements is within the economic phase, and that farmers have not reached the optimal production stage. The total elasticity coefficient was estimated at around 6.9, reflecting an increase in returns to scale, meaning that the quantities used of these

elements can be increased within their elasticity limits.

When estimating the marketing efficiency of onion crops in the old and new lands of Yusuf Al-Siddiq district, it was found to be around 20.9% and 18.2%, respectively, while in Tamiya district, it was estimated at 22.2% and 19.2%, respectively. This indicates that marketing costs are higher compared to production costs per ton of onions, and that the local marketing system for onions in Fayoum Governorate is inefficient. This inefficiency is due to the high share of intermediaries, which was estimated at about 61.07% and 63.38% for the old and new lands, respectively, in Yusuf Al-Siddiq district, and about 60.5% and 63.2% for the old and new lands, respectively, in Tamiya district. This requires efforts to improve the farmers' share to raise their living standards and their ability to cover production costs, leading to an improvement in the efficiency of the local marketing system for this crop.

The study results also showed that when estimating the marketing efficiency of garlic crops in the old and new lands of Yusuf Al-Siddiq district, it was found to be around 23.7% and 22.3%, respectively, while in Fayoum district, it was estimated at 23.19% and 23.98%, respectively. This indicates that marketing costs are higher compared to production costs per ton of garlic, and that the local marketing system for this crop in Fayoum Governorate is inefficient. This inefficiency is due to the high share of intermediaries, which was estimated at about 64.9% and 65.2% for the old and new lands, respectively, in Yusuf Al-Siddiq district, and about 65.5% and 64.2% in Fayoum district. This necessitates efforts to improve the farmers' share to raise their living standards and their ability to cover production costs, leading to an improvement in the efficiency of the local marketing system for this crop.

RECOMMENDATIONS:

In light of the above findings, the following recommendations are made to enhance the economic and marketing efficiency of onion and garlic crops:

1. Develop high-yielding varieties and implement modern irrigation systems to conserve water for the studied crops.
2. Activate the role of agricultural extension to help farmers maximize their production by determining the optimal mix of production inputs for onions and garlic to achieve the highest possible return from cultivation, as well as providing technical information and assisting farmers in applying integrated crop management practices.
3. Link production in new lands to market needs and encourage production for export.
4. Promote the concept of contract farming and connect farmers with more profitable markets by providing marketing contracts for onion and garlic crops, ensuring farmers have more profitable marketing opportunities and protection from market fluctuations.
5. Provide a database on prices and available quantities of onions and garlic in major markets.
6. Monitor the prices of production inputs and establish appropriate pricing policies for onion and garlic crops.
7. Support agricultural cooperatives in marketing these strategic crops, ensuring marketing based on actual production costs to increase farmers' share of the consumer pound and stabilize the final price for consumers.
8. Launch field schools to connect onion and garlic farmers with profitable markets in Fayoum Governorate.

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الكفاءة الاقتصادية والتسويقية لمحصولي البصل والثوم في مصر
(دراسة حالة: محافظة الفيوم)

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2. المعمل المركزي لتحليل متبقيات المبيدات والمعادن الثقيلة في الأغذية (QCAP) ، مركز البحوث الزراعية (ARC) ، الدقي، الجيزة، 12311، مصر .

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بلغ متوسط المساحة المزروعة لمحصولي البصل والثوم في مصر نحو 168.56، 33.83 ألف فدان لكل منهما على الترتيب، وفي الفيوم بلغت نحو 15.15، 5.96 ألف فدان، تمثل نحو 8.99%، 17.62% لكل منهما على الترتيب من إجمالي مساحة البصل والثوم المزروعة في مصر، كما بلغ متوسط الإنتاج الكلى لتلك المحاصيل في مصر نحو 2561.31، 335.36 ألف طن لكل منهما، وفي الفيوم نحو 229.85، 57.63 ألف طن لكل منهما على الترتيب، بنسب قدرت بحوالي 8.97%، 17.18% من إجمالي إنتاج البصل والثوم في مصر عن متوسط الفترة (2008–2022)، وقد لوحظ في الآونة الأخيرة انخفاض المساحة المزروعة بالبصل والثوم في موسم 2021/2022 من حوالي 19.7، 18.1 ألف فدان على الترتيب في موسم 2021/2022 إلى نحو 9,18، 8,20 ألف فدان على التوالي في موسم 2022/2023، وقد استهدف البحث تقدير وتفسير أهم مؤشرات الكفاءة الاقتصادية والتسويقية لإنتاج محصولي البصل والثوم بعينة الدراسة، والتعرف على أهم المشاكل الاقتصادية والتسويقية، وكانت من أهم نتائج الدراسة عند تقدير الكفاءة التسويقية لمحصول البصل بالأراضي القديمة والجديدة بمركز يوسف الصديق أنها بلغت نحو 20.95%، 18.26% على الترتيب، كما قدرت بمركز طامية بنحو 22.25%، 19.21% على الترتيب، مما يدل على ارتفاع التكاليف التسويقية مقارنة بالتكاليف الإنتاجية للطن من محصول البصل، وعدم كفاءة الجهاز التسويقي المحلي لمحصول البصل بمحافظة الفيوم، وذلك لارتفاع نصيب الوسطاء، والذي قدر بنحو 61.07%، 63.38% للأراضي القديمة والجديدة على الترتيب بمركز يوسف الصديق، ونحو 60.55%، 63.21% للأراضي القديمة والجديدة بمركز طامية، كما تبين من تقدير الكفاءة التسويقية لمحصول الثوم بالأراضي القديمة والجديدة بمركز يوسف الصديق، أنها بلغت نحو 23.77%، 22.39% على الترتيب، كما قدرت بمركز الفيوم بنحو 23.19%، 23.98% على الترتيب، مما يدل على ارتفاع التكاليف التسويقية مقارنة بالتكاليف الإنتاجية للطن من محصول الثوم، وعدم كفاءة الجهاز التسويقي المحلي لهذا المحصول بمحافظة الفيوم، وذلك لارتفاع نصيب الوسطاء، والذي قدر بنحو 64.94%، 65.27% للأراضي القديمة والجديدة على الترتيب بمركز يوسف الصديق، ونحو 65.53%، 64.21% بمركز الفيوم، الأمر الذي يتطلب معه العمل على تحسين نصيب المزارع

من أهم التوصيات:

-   ربط الإنتاج في الأراضي الجديدة باحتياجات السوق وتشجيع الإنتاج من أجل التصدير .

-   نشر مفهوم الزراعة التعاقدية، وربط المزارعين بالأسواق الأكثر ربحية من خلال توفير عقود تسويقية لمحصولي البصل والثوم، بما يضمن للمزارع فرص تسويقية أكثر ربحية، ولتأمين المزارعين من تقلبات وتغيرات السوق.

-   توفير قاعدة معلومات عن الأسعار والكميات المتاحة لمحصولي البصل والثوم بالأسواق الرئيسية.

-   يجب مراقبة أسعار مستلزمات الإنتاج، وتحديد سياسات تسعير مناسبة لمحصولي البصل والثوم.

-   إطلاق مدارس حقلية لربط مزارعي البصل والثوم بالأسواق المربحة بمحافظة الفيوم.

الكلمات المفتاحية: البصل، الثوم، محافظة الفيوم، الكفاءة الاقتصادية، الكفاءة التسويقية، المشاكل الإنتاجية والتسويقية.