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Productive and Economic Efficiency of Milk Production in the Arab Republic of Egypt (Case Study in Sharkia Governorate)

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Abstract---This paper Identifies factors that affect the productivity and economic efficiency of dairy breeders. The research problem is focused on low production efficiency (milk production in Egypt compared to other countries), which is reflected in the lower average consumption of Egyptian animal protein than the level of safety. The research aims to show milk producers' productivity and economic efficiency from its various sources in the Ibrahimi and Minya al-Qamh Centres in the Al-Sharkia governorate. The research used SPSS V. 20 in linear, logarithmic, and double images to reach the best images, the results of which are consistent with statistical and economic logic. The study proved that the most important factors affecting the production of cow's milk were the amount of concentrated feed and the amount of human action, while the factors affecting buffalo milk production were the amount of green and dry feed. We conclude from the indicators of economic efficiency that Minya al-Qamh is better than that of The Patriarchs (except buffalo in the first category and this is consistent with the results of the production functions because production is done in the non-economic phase), and the best categories are the second category of cows in Minya al-Qamh, which is clear from the index of profitability of the pound spent 19%, and these results are consistent with the results of the production functions. The one-way variance analysis indicates that the statistically calculated value of (P) at the probability level 0.01, estimated at 23.47 indicates a moral difference between the problems facing dairy producers of cows and buffaloes in the Ibrahimi and Minya al-Qamh. The most important recommendation of the study is to work to solve all the problems facing dairy producers simultaneously because of their equal priority for producers.

Keywords---dairy cattle, milk production, Al-Sharkia governorate, economic performance, indicators efficiency production.

Introduction

Nutrition scientists have unanimously agreed that the importance of milk is because it is an easy-to-digest food and is cheaper than any food of equal nutritional value. In addition, it occupies a significant position in both the animal and agricultural sectors. The value of local milk production is estimated at 30,322 million pounds, representing about 22% of the value of animal production, which amounted to about 137,199 million pounds, representing about 8% of the value of agricultural production, which amounted to about 379.3 billion pounds during the period (2000 -2019) moa, (2021).

Milk has an important role as a vehicle for rural development, where milk is an important agricultural crop whose production is associated with increased soil fertility to grow the crop of clover, corn, and other legumes, which are used as fodder, and milk production also helps to alleviate the seasonal unemployment suffered by the agricultural sector, because the work continues throughout the year, and the income obtained is characterized by the speed of obtaining it compared to other crops.

Milk energy in Egypt depends on the number of dairy-producing farm animals in addition to the type of animal and breeds, cows and buffalo are the main sources of dairy production in Egypt, and there are other sources of goats, sheep, and camels found in the desert areas, and dairy production in Egypt is characterized by the presence of two systems, namely specialized and traditional, which is the most widespread, despite large numbers, but it is characterized by a decrease in productivity of dairy due to the lack of inputs of dairy production, the most important of which is nutrition, care and patriarchy and breeds produced (Rageh et al., 2012).

As a result of seasonal fluctuations in livestock feeding, average milk production per unit of production is very low, with poor nutrition during the summer compared to good nutrition during winter. Egypt's total milk production value is 5.2 million tons in 2019, which is insufficient to meet recommended consumption levels during the summer season, so imports are required to cover the rest of the actual market needs. An estimated consumption amounted to about 5.9 million tons, resulting in a structural gap of about 0.74 million tons and a decrease in per capita milk (CAPMAS, 2019; moa, 2021). FAO recommends that the average per capita dairy should reach about 150 kg and not less than 90 kg per year for minimum healthy nutrition (Adam & Walaa 2015).

Al-Sharkia governorate is one of the most important dairy-producing provinces; it is renowned for producing consumer-preferred cheeses, but its milk production accounts for about 9.1% of total milk production in the Arab Republic of Egypt in 2019. This is consistent with the study Mahrous, (2015), which indicated that Al-Sharkia governorate is the most producing milk, with milk production accounting

for 9.34%, 9.37% for cows, and buffaloes, respectively, as an average (2008-2013).

The problem of the research is the insufficient local production of milk to meet the increasing consumption needs, due to the low production efficiency of milk cattle compared to the global production efficiency, which led to a gap between the production and consumption of milk, where production amounted to about 5.193 million tons, while consumption amounted to about 6.246 million tons, and the milk gap was estimated at 1.055 million tons during (2014- 2019) (moa, 2021). This is due to the increased demand for milk and its products, which is reflected in the decline in the average consumption of Egyptian animal protein compared to the level of safety. This led to the reluctance of many producers to work in the field of dairy products for several reasons, the most important of which is the high prices of feed and workers' wages, in addition to not keeping up with the prices of dairy as a result of the prices of production supplies, which led to increased problems of dairy production in Egypt and Sharkia Governorate in particular.

This research aims to analyze study the production and economic efficiency of each of the milk animals, cows, and buffaloes for the carnivorous sample in Sharkia Governorate for the season (2020/2021), through statistical estimation of production functions, and estimation of economic efficiency. This shows the feasibility of these projects in the research sample, and the study shows the problems facing the milk producers in the Ibrahimia and Mina Al-Qamh centres in Sharkia Governorate.

Research Method and Data Sources

Data sources

There are two types of data first, secondary data: data issued by many entities, including The Ministry of Agriculture and Land Reclamation, the Economic Affairs Sector and the Directorate of Agriculture in Sharkia Governorate, the farm management of the selected centers in addition to some published scientific research and studies related to the subject of research. Second, preliminary data: obtained through the research sample in Sharkia Governorate.

The sampling method and the selection of the research sampel:

The research sample was randomly selected for two centres in Sharkia Governorate, the first of which is El Abrahamia centre as one of the largest centres for the numbers of animal heads. The second is Minya al-Qamh centre as one of the nearest Cairo governorate, and the data of the form were compiled through the personal interview conducted with a number of 188 singles for dairy producers of cows and buffaloes, which are distributed as follows 98 possessions of the El Abrahamia and represent about 4% of the total producers in El Abrahamia Centre, which amounts to about 2,469 products, 90 animal possessions in Minya al-Qamh center for both cows and buffaloes and represents about 3.6% of the total producers in Minya al-Qamh, which amounts to about 2500 products, The number of heads of cows and buffalo milking in the Minya al-Qamh animal enamel was about 1120, 586 heads representing about 4.9%, 8.2% respectively, and the numbers of heads of cows and buffalo milking in the center of El Abrahamia about 4153, 2477 heads representing About 18.4%, 34.8% respectively of the total number of milking heads of cows and buffaloes in the

province of about 22582, 7118 heads, in the productive season (2020/2021), Directorate of Agriculture in Sharkia Governorate (2021).

Research sample of cow producers

Category 1: Dairy producers include cows with fewer than 10 heads, 46 producers in this category, or 24.5% of the total sample of dairy producers from cows in research, including 25 producers at El Abrahamia, accounting for 13.3% of the total sample, 21 products in Minya al-Qamh, 11.2% of the total (Table 1).

Category II: Dairy producers include cows with more than 10 heads, and the number of producers in this category was 46, or 24.4% of the total sample of dairy producers of cows in research, and the number of producers in both El Abrahamia and Mina wheat was 23, accounting for 12.2% of the total.

2.2.2. Research sample for buffalo producers:

Category 1: Shows Table 1, includes producers with fewer than 10 heads, 48 producers in this category, or 25.5% of the total sample of buffalo dairy producers in the research, including 25 products at El Abrahamia, 13.3% of the total sample of buffalo dairy producers in the research, 23 products at the Minya al-Qamh, and 12.2% of the total.

Category II: Includes producers with more than 10 heads, with 48 producers in this category, or 25.5% of the total sample of buffalo dairy producers, including 25 products at El Abrahamia, accounting for 13.3% of the total sample of buffalo dairy producers in the research, 23 products at the Minya al-Qamh, accounting for 12.2% of the total.

Table 1

Distribution of the research sample of dairy producers according to the type (cows- buffalo) and the number of animals (less than 10 heads, more than 10 heads) in the research centers, and the relative importance of each category in the production season of coffee (2020/2021)

Type	Group	Center	Number	%Total
Cows	The first	El Abrahamia	25	13.3
		Minya al-Qamh	21	11.2
	The second	El Abrahamia	23	12.2
		Minya al-Qamh	23	12.2
Buffalo	The first	El Abrahamia	25	13.3
		Minya al-Qamh	23	12.2
	The second	El Abrahamia	25	13.3
		Minya al-Qamh	23	12.2
Total 188				100

Source: Collected and calculated from field research data during the season (2020/2021).

the first < 10 heads, the second > 10 heads**

Research Method and Statistical analysis

The research relied on both descriptive and quantitative analysis methods using statistical methods and methods that achieve the objectives of the research such as averages, percentages, and simple regression in addition to the statistical analysis of production and economic efficiency functions for the categories of the research sample.

Analysis of Variance (ANOVA) was performed with the Statistical Package for Social Sciences (SPSS) version 20 to analysis standard deviations and statistical differences; a test was used for multiply comparison of treatment means at a 95% significance level.

Description of the statistical estimation model for dairy production functions

The Cobb-Douglas function was used, in the following algebraic form (Abd El-Kader, 2009):

$$Q = aX_1^{b_1} X_2^{b_2} X_3^{b_3} \dots X_n^{b_n}$$

Where:-

Q: Amount of milk production, a: a constant of the function, X: Different production elements,

b: The productive elasticity of the elements. To estimate the parameters of this function, it is required to convert it into logarithmic form, which takes the following algebraic form:

$\log Q = (+)a (+)b_1 \log X_1 (+)b_2 \log X_2 \dots (+)b_n \log X_n$. This is to select the most important independent explanatory variables that have the most impact on the amount of acre productivity (Q) in all dairy-producing groups, whether they are cows or buffaloes, and at the level of the total sample of producers. The most important of these explanatory variables included in the statistical analysis was confined to the following:

X₁: The number of heads; X₂: Employment; X₃: Amount of green fodder; X₄: Amount of concentrated forage; X₅: Amount of dry fodder.

Results and Discussion

Dairy production in Egypt:

Cow's milk production:

Milk production from baladi cows: The data in Table 2, showed that the average milk production from baladi cows amounted to about 1116.8 thousand tons, and its minimum reached about 558.2 thousand tons in 2000, and the upper limit amounted to about 1044.8 thousand tons in 2006, by estimating the trend equation The general time frame for milk production from baladi cows during (2000-2019) (moa, 2021), the amount of baladi cow milk production increased annually, not statistically significant, which means that this increase is characterized by relative stability around its arithmetic average, as shown in Table 3.

Milk production from cross cows: Extrapolating the data from Table 2 and 3, it was found that the average milk production from cross cows amounted to about 1412.5 thousand tons, with a minimum of about 696.4 thousand tons in 2001,

and a maximum of about 3056 thousand tons in 2019 (moa, 2021), and an equation estimate The general temporal trend of milk production from **cross** cows shows an increase in the amount of milk production, an annual significant increase estimated at 72.76 thousand tons, representing about 5.15% of the average annual production during the research period.

Milk production from foreign cows: It was clear from the data of Table 2 and 3, that the average milk production from foreign cows amounted to about 560.8 thousand tons, with a minimum of about 281.5 thousand tons in 2000, and a higher limit of about 911 thousand tons in 2019 (moa, 2021), and the equation indicates The general time trend of milk production from foreign cows was a statistically significant decrease, which means that this decrease is characterized by relative stability around their arithmetic mean during the previously mentioned period.

Total cow milk production: It was shown from the data of Table 2, that the average total milk production from cows amounted to about 2.750 thousand tons, with a minimum of about 1,638 thousand tons in 2001, and a maximum of about 3966.8 thousand tons in 2019, with an estimate Equation of the general time trend of the total milk production from cows, the amount of milk production increased, an annual significant increase estimated at 62.02 thousand tons, representing about 2.3% of the average annual production during the research period, as shown in Table 3.

Total production of buffalo milk

The data in Table 2 and 3, that the average total production of buffalo milk amounted to about 2407 thousand tons, with a minimum of about 2030 thousand tons in 2000, and a maximum of about 2923 thousand tons in 2014, by estimating the equation of the general time trend for the production of buffalo milk The decrease in the quantity of buffalo milk production shows an annual decrease that is not statistically significant, which means that this decrease is characterized by relative stability around its arithmetic mean during the period.

Table 2
Evolution of the quantity of milk production from cows and buffaloes in Egypt
and Sharkia Governorate during (2000-2019)
(Production thousand tons)

Year	General Total Production						Sharkia Production		
	Cows			Total Cows	Total Buffalo	Total	Cows	Buffalo	Total
	Baladi	Cross	Foreign						
0222	55850	79857	08155	168851	028258	866857	146.64	173.87	320.51
0221	57151	69651	85251	161756	0018	888257	168.16	196.66	364.8
0220	57058	121057	88158	199658	028751	1281	141.66	164.82	306.48
0228	99058	82858	82155	059756	051956	511750	192.02	224.3	416.32
0221	91150	77955	58857	008051	006658	151950	170.8	200.86	371.66
0225	99857	98756	866	082058	060051	510157	201.66	233.57	435.23
0226	121158	121257	90156	098251	067858	5659	207.87	238.24	446.11
0227	90251	107558	99159	818758	0612	579751	252.76	228.36	481.12
0228	98855	187557	89750	801151	061256	5850	220.76	233.39	454.15

0229	725	176758	88259	082858	069657	5522	263.91	165.59	429.5
0212	81055	175158	181	099558	065850	561856	233.34	196.98	430.32
0211	77255	198650	85251	812751	056851	567558	340.75	273.46	614.21
0210	87858	192851	87756	8151	056156	571857	373.38	292.12	665.5
0218	89655	159151	11751	0928	050058	5181	280.43	287.19	567.62
0211	99958	111750	18551	055051	0908	517555	355.33	321.95	677.28
0215	755158	1528	16557	070950	089150	5123.4	199.33	200.92	400.25
0216	695528	1168	17050	0682	088158	4964.3	278.4	270	548.4
0217	77251	1688	52850	096151	085150	581056	520.92	262.89	783.81
0218	71851	1699	18150	088155	001155	5298	332.8	244.6	577.4
0219	2	825557	911	896658	100557	5192.5	300.75	171.95	472.7
Average	1116.82	1412.46	560.83	2750.15	2407.20	5155.53	259.08	229.09	488.9

Source: Ministry of Agriculture and Land Reclamation, Economic Affairs Sector, Livestock Bulletin, Various Numbers.

Total milk production: Table 2 and 3 data indicated that the average total milk production amounted to about 5,155.5 thousand tons, with a minimum of about 3688.7 thousand tons in 2000, and a maximum of about 5,852 thousand tons in 2008, and by estimating the equation of the general time trend of total milk production, it was The quantity of milk production increased significantly annually, estimated at 53.28 thousand tons, representing about 1.03% of the annual average of the total production during the research period.

Table 3

Equations of the general time trend of the quantity of milk production from cows and buffaloes in Egypt and Sharkia Governorate During (2000-2019)

Statement	Equation	R ²	T	Average	Rate of change
Republic Total					
Cows Baladi	$Y_i = 620.34 + 47.27 X_i$	0.03	0.78	1116.8	-
Cows Cross	$Y_i = 648.46 + 72.76 X_i$	0.2559	5.05**	111055	5515
Cows Foreign	$Y_i = 579.6 - 1.78 X_i$	0.002	0.18-	560.8	-
Total Cows	$Y_i = 2089.9 + 62.02 X_i$	0.44	3.79**	2750	2.3
Total Buffalo	$Y_i = 2498.9 - 8.74 X_i$	0.02	0.18-	2407	-
Total	$Y_i = 4597.9 + 53.28 X_i$	0.2581	2.38*	5155.53	1528
Sharkia Governorate					
Cows	$Y_i = 135.32 + 11.78 X_i$	0.56	4.8**	259.08	4.5
Buffalo	$Y_i = 193.9 + 3.35 X_i$	0.19	2.05	229.09	-
Total	$Y_i = 329.25 + 15.13 X_i$	0.50	4.25**	488.9	3.09

Source: Calculated and collected from Table (2).

Y_i: Indicates the quantity of cow and buffalo milk production in thousand tons.

x_i: time variable; I: number of years.)1,0,8 , ,02,(

**Significant at the level of 0.01; *Significant at the level of 0.05, (-) Not significant.

Milk production in Sharkia Governorate

Extrapolating the data from Table 2 shows that the average milk production from cows in Sharkia Governorate amounted to about 259.08 thousand tons, with a minimum of about 141.7 thousand tons in 2002, and a maximum of about 520.9 thousand tons in 2017, with an estimation of the equation The general time trend of milk production from cows The amount of milk production shows an annual significant increase estimated at 11.78 thousand tons, representing about 4.5% of the average annual production during the research period as shown in Table 3.

Tables 2 and 3, showed that the average production of buffalo milk amounted to about 229.09 thousand tons, with a minimum of about 164.8 thousand tons in 2002, and a maximum of about 321.9 thousand tons in 2014, by estimating the equation of the general time trend of production buffalo milk The amount of buffalo milk production increased by an annual statistically insignificant increase, which means that this increase is characterized by relative stability around its arithmetic mean during the research period.

Indicated data Table 2 and 3, that the average total milk production amounted to about 488.9 thousand tons, with a minimum of about 320,5 thousand tons in 2000, and a maximum of about 783.7 thousand tons in 2017, and by estimating the equation of the general time trend of the total Dairy production The total milk production increased significantly annually, estimated at 15.13 thousand tons, representing about 3.09% of the annual average of total production.

Number of milking heads of cows and buffaloes

Extrapolating data from Table 4 and 5, shows that the average number of milking cows in the Republic amounted to about 1620.5 thousand heads, with a minimum of about 1372 thousand heads in 2000, and an upper limit of about 1826.5 thousand heads in 2019, and by estimating the equation of time trend In the year, the increase in the number of dairy cows shows an annual increase that is not statistically significant, which means that this increase is characterized by relative stability around its arithmetic average during the research period. It was clear from the data of Table 4, that the average number of milking buffaloes in the Republic amounted to about 1531 thousand heads, with a maximum of about 1797.8 thousand heads in 2009, and a minimum of about 1023.9 thousand heads in 2019, and by estimating the equation of the general time trend, it was found The number of milking buffaloes decreased, a statistically significant annual decrease estimated at 19.27 thousand heads, representing about 1.3% of the annual average of the total numbers of buffaloes in Egypt during the research period.

Table 4
Evolution of the number of heads of milking cows and buffaloes in Sharkia
governorates and Republic during the period (2000-2019)
(Num. Thousand of head)

Year	Republic Total		Sharkia Governorate			
	Cows Num.	Buffalos Num.	Cows Num.	Buffalos Num.	% Cows of The Republic Total	% Buffalos of The Republic Total
2000	1372	1515	115.5	133.2	8.42	8.79
2001	1450	1537	119.4	135.8	8.23	8.84
2002	1536.2	1557.6	100.95	122.99	6.57	7.90
2003	1581.9	1590.5	126.04	140.93	7.97	8.86
2004	1635.3	1619.1	131.35	143.46	8.03	8.86
2005	1678.2	1631.8	133.46	151.68	7.95	9.30
2006	1728.6	1650.1	137.47	153.66	7.95	9.31
2007	1690.4	1739.9	138.98	152.24	8.22	8.75
2008	1724	1657	136.6	152.5	7.92	9.20
2009	1419.7	1797.8	102.28	110.39	7.20	6.14
2010	1650.7	1632.7	128.96	141.83	7.81	8.69
2011	1690.9	1607.1	170.39	171.13	10.08	10.65
2012	1742.9	1640.2	180.48	190.98	10.36	11.64
2013	1747.4	1592.7	161.3	181.31	9.23	11.38
2014	1719.2	1599.9	165.85	176.22	9.65	11.01
2015	1583.6	1354.9	117.05	113.71	7.39	8.39
2016	1631.2	1268.2	120.95	106.43	7.41	8.39
2017	1513.61	1302.56	248.87	145.65	16.44	11.18
2018	1488.5	1308.55	102.09	140.73	6.86	10.75
2019	1826.5	1023.9	208.9	180.62	11.44	17.6
Average	1620.54	1531.3	142.34	148.01	8.78	9.67

Source: Ministry of Agriculture and Land Reclamation, Economic Affairs Sector,
Livestock Bulletin, Various Numbers

Table 4 and 5, data showed that the average number of milking cows in Sharkia Governorate amounted to about 142.3 thousand, representing about 8.7% of the average number of milking cows in the Republic during (2000-2019), with a minimum of about 100.9 thousand head of the year 2002, and an upper limit of about 248.8 thousand heads in 2017, representing about 16% of the total number of cows in the Republic in that year, and by estimating the equation of the general time trend, the increase in the number of milking cows shows a statistically significant annual increase estimated at 3.21 thousand heads, representing about 2.3% of the annual average For the total number of cows in the governorate. The results in Table 4 that the average number of milking buffaloes in Sharkia Governorate amounted to about 148 thousand heads, representing about 9.67% of the total numbers of buffaloes in the Republic during the research period, with a maximum of about 190.9 thousand heads in 2012, representing about 11.6% Of the total buffaloes in the Republic in the same year, a minimum of about 106.4 thousand heads in 2016, and by estimating the

general time trend equation, the increase in the numbers of milking buffaloes shows an annual statistically insignificant increase, which means that this increase is characterized by relative stability around its arithmetic average during as shown in Table 5.

Table 5
Equations of the general time trend of the number of milking heads of cows and buffaloes in Egypt and Sharkia Governorate during (2000-2019)
(Num. thousand heads)

Statement	Equation	R ²	T	Average	Rate of change
Republic Total					
Num. cows	$Y^i = 1542 + 7.45 X_i$	2510	1.6	160255	-
Num. buffaloes	$Y^i = 1733.7 - 19.28 X_i$	2588	-3.3**	1581	158
Sharkia Governorate					
Num. cows	$Y^i = 108.8 + 3.21 X_i$	2585	2.5*	11058	058
Num. buffaloes	$Y^i = 137.45 + 0.935 X_i$	2525	1.01	118	-

Source: Calculated and compiled from Table (4)

Y_i : Indicates the number of milking heads of cows and buffaloes in the Republic and Sharkia Governorate, in thousand heads.

x_i : x: time variable; I: number of years (1,2,3,4,,,,,,,,,,,,,20)

**Significant at the level of 0.01; *Significant at the level of 0.05; (-) Not significant.

Economic indicators for Dairy in Egypt

Extrapolating the data from Table 6 and 7 that the average milk consumption in Egypt amounted to about 6123.2 thousand tons, and its minimum was about 4961 thousand tons in 2000, and the highest amounted to about 6707 thousand tons in 2007, by estimating the equation of the general time trend of milk consumption in Egypt During (2000-2019), it was shown that the amount of dairy consumption increased with an annual increase that was not statistically significant, which means that this increase is characterized by relative stability around its arithmetic average. The data in Table 6 showed that the milk gap in Egypt fluctuated up and down as it ranged between a minimum of about 523 thousand tons in 2010, and a maximum of about 1653.7 thousand tons in 2016 and an average of about 965.8 thousand tons, by estimating the equation of the time trend General of the milk gap in Egypt. It was found that the milk gap has taken a general annual decreasing trend that is not statistically significant, which means that this decrease is characterized by relative stability around its arithmetic mean as shown in Table 7.

Table 6
The development of some economic indicators for dairy in Egypt during (2000-2019)

(Quantity: Thousand tons)

Year	Production quantity	Available for consumption	Milk gap	% Self-sufficiency	Milk per capita kg/year	Import quantity	Export Quantity
2000	3668.7	4961	1292.3	73.95	77.6	1167	29
2001	3830.7	5198	1367.3	73.70	79.6	1276	32
2002	4084	5483	1399	74.48	80.7	1319	47
2003	5147.2	6601	1453.8	77.98	97.1	1401	80
2004	4549.2	5407	857.8	84.14	78	766	40
2005	5424.7	6557	1132.3	82.73	92.8	1142	136
2006	5659	6389	730	88.57	88.7	731	129
2007	5797.1	6707	909.9	86.43	91.1	948	165
2008	5852	6699	847	87.36	89.1	1049	330
2009	5500	6093	593	90.27	79.3	869	400
2010	5648.6	6172	523.4	91.52	78.4	980	582
2011	5675.3	6337	661.7	89.56	78.8	1061	630
2012	5718.7	6248	529.3	91.53	75.7	1408	497
2013	5431	6117	686	88.79	72.3	1058	551
2014	5475.5	6518	1042.5	84.01	75.1	1324	485
2015	5123.4	6599	1475.6	77.64	71.9	1684	462
2016	4964.3	6618	1653.7	75.01	70.5	1747	279
2017	5312.6	5904	591.4	89.98	60.2	1010	541
2018	5093	5921	828	86.02	59.1	1220	500
2019	5192.5	5934	741.5	87.50	58.1	1215	508
Average	5155.53	6123.15	965.78	84.06	77.71	1168.75	321.15

Source: Ministry of Agriculture and Land Reclamation, Economic Affairs Sector, Food Balance Bulletin, various issues

Table 7
General time trend rates for dairy consumption, milk gap, and quantity of dairy imports and exports in Egypt during the period (2000-2019)

Statement	Equation	R ²	T	Average	Rate of change
Available for consumption	$\hat{Y}_i = 5768.9 + 33.74 X_i$	2515	157	610850	-
Milk gap	$\hat{Y}_i = 1171 - 19.55 X_i$	2512	151-	96558	-
Self-sufficiency	$\hat{Y}_i = 79.039 + 0.478 X_i$	2502	0518	81526	-
Milk per capita kg/year	$\hat{Y}_i = 92.09 - 1.37 X_i$	2556	**158-	7757	1.76
Import quantity	$\hat{Y}_i = 1040 + 12.25 X_i$	2527	150	116857	-
Export Quantity	$\hat{Y}_i = 1.153 + 30.475 X_i$	2569	**658	80150	9.5

Source: Calculated and compiled from Table 6

Y_i: Indicates the quantity of milk consumption, the milk gap, self-sufficiency, and the quantity of imports and exports in Egypt.

x_i: x: time variable, I: number of years(1,2,3,4,,,,,,,,,20).

**Significant at the level 0.01, *Significant at the level 0.05, (-) is insignificant.

The results in Table 6 and 7 that the rate of dairy self-sufficiency in Egypt amounted to about 84%, and its minimum was about 73.7% in 2001, and the maximum was about 91.5% in 2012, by estimating the equation of the general time trend of the rate Self-sufficiency of milk during (2000-2019), it was found that the rate of self-sufficiency has taken a general trend of an annual increase that is not statistically significant, which means that this increase is characterized by relative stability around its arithmetic average during the research period. That the average per capita share of milk amounted to about 77.7 kg /year, with a maximum of about 97 kg /year in 2003, and a minimum of about 58 kg/year in 2019, with an estimation of the equation The general temporal trend of the average per capita share of milk showed that it took a general statistically significant annual decreasing trend estimated at 1.37 kg/year, representing about 1.7% of the average per capita share of milk during the research period, as shown in Table 6 and 7, and the decrease in per capita share may be due to From dairy to high prices.

The data in Table 6, showed that the quantity of imports of milk in Egypt amounted to about 1168.7 thousand tons, with a minimum of about 731 thousand tons in 2006, and a maximum of about 1747 in 2016, by estimating the equation of the general time trend of the quantity of imports of milk during (2000 - 2019) (CAPMAS, 2019). It was found that the amount of imports has taken a general trend of an annual increase that is not statistically significant, which means that this increase is characterized by relative stability around its arithmetic average during the research period as shown in Table 7. It was clear from the data of Table 6 that the average amount of dairy exports amounted to about 321.2 thousand tons, with a minimum of about 29 thousand tons in 2000, and a higher limit of about 630 thousand tons in 2011, and by estimating the equation of the general time trend For the quantity of exports of milk, it was found that the quantity of exports took a general trend increasing annually, statistically significant, estimated at 30.47 thousand tons, representing about 9.5% of the quantity of exports of milk during the research period, as shown in Table 7. (CAPMAS, 2019).

Geographical distribution of dairy products and numbers of milking cows and buffaloes in Egypt:

Geographical distribution of dairy production in Egypt:

The data of Table 8, indicate the distribution of milk production over the governorates of Egypt, as it turns out that the Beheira governorate occupies the first place among the governorates of the Republic, as the annual average of milk production during the period from (2013-2019) is estimated at 663.5 thousand tons, which represents about 12.69% of the average Milk production in Egypt, and Sharkia governorate comes in second place for the producing governorates. Its production amounted to about 523.7 thousand tons, representing about 10.02%, followed by the governorates of Menoufia, Gharbia, Nobarria Region, Minya, Dakahlia, Fayoum with a production quantity of about 359.4, 343.9, 309.7, 303.5%, 286, 246.8 thousand tons, respectively, at rates representing about 6.88%, 6.58%, 5.9%, 5.8%, 5.5%, and 4.7%, respectively, of the total milk production in Egypt, while the rest of the governorates collectively represent about 18.9% of milk production in Egypt.

Table 8
Geographical distribution of the number of dairy cows and buffaloes and the
amount of milk production in Egypt during (2013-2019)
(Quantity: Thousand tons, Num. thousand heads)

Year	Quantity of milk thousand tons		Number of milking cows thousand heads		Numbers of milking buffalo thousand heads	
	Average	% from the total republic	Average	% from the total republic	Average	% from the total republic
Alexandria	101.91	1.95	8691.17	5.10	8298.57	11.96
Behera	663.49	12.69	9509.00	5.58	4315.00	6.22
Gharbia	343.98	6.58	5990.50	3.52	2919.86	4.21
Kafr El-sheikh	244.40	4.68	2232.17	1.31	1238.71	1.79
Dakahlia	286.18	5.47	7003.50	4.11	1918.71	2.77
Damietta	78.91	1.51	12102.33	7.10	1750.86	2.52
Sharkia	523.74	10.02	16894.00	9.91	5640.71	8.13
Menoufia	359.44	6.88	6979.67	4.10	2871.71	4.14
Qalyoubia	169.65	3.25	4639.00	2.72	6378.71	9.19
Giza	161.72	3.09	4762.67	2.79	4102.71	5.91
Fayoum	246.85	4.72	13096.33	7.68	3819.43	5.50
Menia	303.47	5.81	2091.00	1.23	1096.57	1.58
Assuit	243.64	4.66	2067.17	1.21	1675.57	Luxor
Luxor	122.44	2.34	3869.50	2.27	2865.57	4.13
Noubaria	309.71	5.92	56657.17	33.25	12298.86	17.72
The rest	992.01	18.97	17186.2	10.09	8374.9	12.06
Republic Total	5227.45	100.00	170416.50	100.00	69388.00	100.00

Source: Ministry of Agriculture and Land Reclamation, Economic Affairs Sector, Livestock Bulletin, Various Numbers.

Geographical distribution of cows and milking buffalo heads in Egypt:

Extrapolating the data from Table 8, which shows the relative importance of the numbers of milking cows in the governorates of Egypt. Where the number of cows heads reached about 56,657, 16894, 13096, 12102, 9509, 8691 thousand heads, respectively, contributing about 33.3%, 9.9%, 7.7%, 7.1%, 5.58%, 5.1%, respectively, of the total number of dairy cows in Egypt During (2013-2019), then came the rest of the other governorates of the Republic, which represent about 10.09% of the total number of milking cows in Egypt.

Table 8 data showed the relative importance of the number of buffalo milk heads in the governorates of Egypt, as it was found that the Nubaria region, and the governorates of Alexandria, Qalyubia, Sharkia, Beheira, Fayoum, Giza, the largest provinces in the numbers of buffalo milk heads. The number of buffalo heads reached about 12298.8, 8298.5, 6378.7, 5640.7, 4315, 4102.7, 3819 thousand

heads, respectively, contributing about 17.7%, 11.9%, 9.19%, 8.03%, 6.22%, 5.9%, 5.5%, respectively, of the total number of milking buffalo heads in Egypt during (2013-2019), then came the rest of the other governorates of the republic, which represent about 12.06% of the total number of milking buffalo heads in Egypt.

Statistical estimation of production functions of dairy producers in the research sample for the season (2020/2021):

This part deals with an economic analysis of the milk production activity in Sharkia Governorate in the Ibrahimia and Mina Al-Qamh centres in its logarithmic form for the two product categories, which are as follows:

- i: Category (<10 heads) and it amounts to 94 heads.
- ii: Category (>10 heads) which also amounts to 94 heads.

Statistical estimation of a production function in the first category (<10 heads):
Cow's milk-producing countries:

It is evident from the estimates of the production function of cow milk for the first productive group (<10 heads) that its statistical significance is confirmed at the probability level (0.05), as shown by Eq. (1) in Table (9), from which it is found that the most explanatory variables have an impact on milk production from cows in the first category. In the Ibrahimia Center, it is the number of heads (X_1), the quantity of green fodder (X_3), and the quantity of dry fodder (X_5), where there is a direct relationship between them and the quantity of milk production, and thus this model corresponds to the economic logic, where the elasticity coefficients are about (0.032, 0.053, 0.026) for each of them, respectively, and this means that an increase in these explanatory variables by 10% leads to an increase in the amount of milk production from cows in the first category in the Ibrahimia Center by (0.3, 0.53, 0.26) for each of them, respectively, and the adjusted coefficient of determination (R^{-2}) that 35% of the changes occurring in the amount of milk production are due to the independent variables that explain the model, and the total production elasticity was about 0.11, which is less than the correct one, which indicates that production takes place in the economic stage in light of the optimal use of resources and production inputs.

It is clear from the estimation of the logarithmic model (Step-Wise) presented in Table 9 and Eq. (2), and it is clear that the most explanatory variables affecting the production of milk from cows in the first category in Minya Al-Qamh enamel are the number of heads (X_1) and the quantity of green fodder (X_3) and the quantity of dry fodder (X_5), where there is a direct relationship between them and the amount of milk production, and therefore this model corresponds to the economic logic, where the elasticity coefficients have reached about (0.021, 0.056, 0.023) for each of them, respectively, and this means that the increase of these explanatory variables by 10% leads to an increase in the amount of milk production from cows in the first category in Minya Al-Qamh by (0.21, 0.56, 0.23) per kilo of them, respectively, and the adjusted coefficient of determination (R^{-2}) indicates that 29% of the changes in the amount of milk production are due to the independent variables that explain the model, the total production elasticity

was about 0.10, which is less than the correct one, which indicates that production takes place in the economic stage in light of the optimal use of resources and production inputs.

It is clear from Eq. (5) in Table (9) the significance of the model used, and from it appears that the most explanatory variables affecting the milk production of buffaloes in the first category in the Ibrahimia Center are the number of heads (X_1), the quantity of green fodder (X_3) and the quantity of dry fodder (X_5), where The relationship between them and the amount of milk production is a direct relationship and therefore the model corresponds to the economic logic, where the elasticity coefficients have reached about (0.131, 0.61, 0.71) per kilo of them, respectively, and this means that the increase of these explanatory variables by 10% leads to an increase in the amount of milk production from Buffaloes are in the first category in the Ibrahimia Center with a ratio of (1.31, 6.1, 7.1) to each of them, respectively, and the adjusted coefficient of determination (R^2) indicates that 26% of the changes in the quantity of milk production are due to the independent variables that explain the model, while the elements of the model were used. Production in the first economic stage, which is the non-economic stage for the product, where the total elasticity of production reached about 1.45, which is greater than the correct one, which indicates that there is a relationship of increasing return to capacity, and this is that the increase in the production elements referred to in the function combined in proportions 1% under the prevailing production conditions will lead to an increase in the production of buffalo milk in the first category by 1.45%.

It is clear from Eq. 6 in Table 9 the significance of the model used, and from it becomes clear that the most explanatory variables affecting the milk production of buffaloes in the first category in Minya Al-Qamh are the number of heads (X_1), the quantity of green fodder (X_3) and the quantity of dry fodder (X_5). The relationship between them and the amount of milk production is a direct relationship and therefore the model corresponds to the economic logic, where the elasticity coefficients have reached about (0.11, 0.58, 0.81) for each of them, respectively, and this means that the increase of these explanatory variables by 10% leads to an increase in the amount of milk production of the buffaloes in the first category in Minya Al-Qamh with a ratio of (1.1, 5.8, 8.1) for each of them, respectively, and the adjusted coefficient of determination (R^2) indicates that 26% of the changes in the quantity of milk production are due to the independent variables that explain the model, and the elasticity of the total production is about 1.50, which is greater than the correct one, as the production elements are used in the first economic stage, which is the non-economic stage for the product, which means that there is a relationship of increasing return to capacity, and this means that the increase in the production elements referred to in the combined function is by 1% under the prevailing production conditions, it will lead to an increase in the production in the first category by 1.5%. Such results were found by El Said, & Hamam, (2015); Foad, (2019).

Statistical estimation of a production function in the second category (>10 heads): Eq. (3) in Table (9) related to the production function of cow's milk for the second category (>10 head) in the Ibrahimia indicates that there is a direct relationship between the total production of cow's milk and each of the number of heads (X_1), the number of labor (X_2), and the quantity of fodder the center (X_4), and the amount of dry fodder (X_5), the significance of the model used has been proven, as its elasticity coefficients are about (0.084, 0.077, 0.063, 0.27) for each of them, respectively. This means that the increase of these explanatory variables by 10% leads to Increasing the amount of milk production from cows in the first category in the Ibrahimia by (0.84, 0.77, 0.63, 2.7) for each of them, respectively, and the adjusted coefficient of determination (R^2) indicates that 56% of the changes in the amount of milk production are due to the variables The independent explanation of the model, and the total production elasticity was about 0.49, which is less than the correct one, which indicates that production takes place in the economic stage in light of the optimal use of resources and production inputs. Thus the model used matches the economic logic.

Eq. (4) in Table 9 in the status of Minya Al-Qamh enamel for the second category (>10 head) indicates that there is a direct relationship between the total production of cow's milk and each of the number of heads (X_1), the number of workers (X_2), and the quantity of concentrated feed (X_4), and the amount of dry fodder (X_5), and the significance of the model used has been proven, and therefore the model is consistent with the economic logic, where the elasticity coefficients have reached about (0.042, 0.066, 0.055, 0.56), respectively. This means that the increase of these explanatory variables by 10% leads to Increasing the quantity of milk production from cows in the first category in Minya Al-Qamh by (0.4, 0.66, 0.55, 5.6), respectively, and the adjusted coefficient of determination (R^2) indicates that 61% of the changes in the amount of milk production are due to the independent explanatory variables. For the model, the total production elasticity was about 0.72, which is less than the correct one, which indicates that production takes place in the economic stage in light of the optimal use of resources and production inputs. This was evidenced by the study Abd El Hamid. et al. (2017),

It is clear from Eq. (7) in Table (9) the significance of the model used, and from it turns out that the most explanatory variables affecting the production of buffalo milk in the second category in the Ibrahimia are the number of heads (X_1), the number of workers (X_2), the quantity of concentrated feed (X_4), the quantity of dry fodder (X_5), and the significance of the model used were proven, and its elasticity coefficients were about (0.052, 0.053, 0.05, 0.21), respectively.

This means that the increase of these explanatory variables by 10% leads to an increase in the amount of production in the Ibrahimia by (0.5), 0.5, 0.5, 2.1), respectively, and the adjusted coefficient of determination (R^2) indicates that 41% of the changes in the quantity of milk production are due to the independent variables that explain the model, and the overall production elasticity was estimated at 0.37, which is less than the correct one, which It indicates that production takes place in the economic stage in light of the optimal use of resources and production inputs.

It is clear from Eq. (8) in Table 9 the significance of the model used, and from it becomes clear that the most explanatory variables affecting the production of buffalo milk in the second category in the center of wheat mina are the number of heads (X_1), the number of workers (X_2), and the quantity of concentrated fodder (X_4). the quantity of dry fodder (X_5), and the significance of the model used was proven, and its elasticity coefficients amounted to about (0.033, 0.051, 0.014, 0.31) for each of them, respectively, and this means that the increase of these explanatory variables by 10% leads to an increase in the amount of production in Minya Al-Qamh by (0.3, 0.5, 0.14, 3.1), respectively, and the adjusted coefficient of determination (R^2) indicates that 41% of the changes in the quantity of milk production are due to the independent variables that explain the model, and the total production elasticity was estimated at 0.41, which is less than one, this indicates that production takes place in the economic stage in light of the optimal use of resources and production inputs.

The study of Suzanne. et al. (2017), Atta Allah, (2019), also showed that the most important factors affecting the amount of dairy produced in Egypt are the area of the highest green and female numbers of cows and buffaloes and the productivity of the head.

Indicators of the efficiency of the economic performance of dairy producers in the research sample in Sharkia Governorate:

Indicators of economic performance efficiency of dairy producers for the first category in the research sample: Table 10 shows that the average volume of production for each of the cows and buffaloes of the first category in Ibrahimia is about 6.65 and 3.9 tons, respectively. And about 6.7 and 3.9 tons, respectively, in Mina Al-Game. The average total costs for each of the cows and buffaloes for the first category in the Ibrahimia are about 32.6 and 26 thousand pounds, respectively. And about 32 and 25.2 thousand pounds, respectively, in Minya al-Qamh, and the net return amounted to about 6.7 and 4 thousand pounds, respectively, in Ibrahimia and about 10.2 and 5 thousand pounds each in Mina al-Qamh.

And by measuring the ratio of total return to total costs, "economic efficiency rate" was about 123.6%, 115.6% for each of the cows and buffaloes for the first category in Ibrahimia. The return on the invested pound for each of them amounted to about 0.236 and 0.156 pounds, respectively, and the profit margin for the product was about 19% and 13%, respectively. The economic efficiency rate in Mina Al-Qamh was estimated at 132.0% and 119.5%, respectively, with a return on the invested pound of 0.320 and 0.195 pounds, respectively, and the product's profit margin is about 24.3% and 16.3%, respectively.

From this, it is clear that the cows and buffaloes in Mina Al-Qamh in this category give the product a greater profit margin than their counterparts in Ibrahimia, in addition to the fact that the cow unit is more economically efficient in producing milk than its buffalo counterpart.

Table 9
Results of the statistical estimation of dairy production functions from cows and buffaloes in the Ibrahimia and Minya al-Qamh

N.	Type	Category	Place	Equation	R ²	F	Overall production flexibility
1	Cows	The first < 10 heads	Ibrahimia	$\text{Log Q} = 1.26 + 25280 \text{Log X}_1 + 0.053 \text{Log X}_3 + 0.026 \text{Log X}_5$ (7.149)* (3.2145)* (2.126)* (0.815)	0.35	1051**	0.11
0			Minya al-Qamh	$\text{Log Q} = 0.5121 + 25221 \text{Log X}_1 + 0.056 \text{Log X}_3 + 0.008 \text{Log X}_5$ (6.0)** (2.1)* (1.1) (4.8)*	2509	1158**	0.10
8		The second > 10 heads	Ibrahimia	$\text{Log Q} = 0.11 + 25281 \text{Log X}_1 + 0.277 \text{Log X}_2 + 0.063 \text{Log X}_4 + 0.27 \text{Log X}_5$ (2.4)* (2.4)* (1.5) (3.6)* (3.5)*	2556	8.1**	0.49
1			Minya al-Qamh	$\text{Log Q} = 0.65 + 25212 \text{Log X}_1 + 0.066 \text{Log X}_2 + 0.055 \text{Log X}_4 + 0.56 \text{Log X}_5$ (2.8)* (2.6)* (1.6) (3.4)* (3.6)*	0.61	8.3**	0.72
5	Buffaloes	The first < 10 heads	Ibrahimia	$\text{Log Q} = 2.3 + 2.13 \text{Log X}_1 + 0.61 \text{Log X}_3 + 0.71 \text{Log X}_5$ (6.4)* (1.9) (3.2)* (2.7)*	2506	1151**	1.45
6			Minya al-Qamh	$\text{Log Q} = 1.19 + 2.11 \text{Log X}_1 + 0.58 \text{Log X}_3 + 0.81 \text{Log X}_5$ (8.1)* (1.9) (1.8) (4.9)*	2558	1158**	1.50
7		The second > 10 heads	Ibrahimia	$\text{Log Q} = 1.56 + 25250 \text{Log X}_1 + 0.053 \text{Log X}_2 + 0.050 \text{Log X}_4 + 0.01 \text{Log X}_5$ (10.2)* (1.2) (8.4)** (3.1)* (7.6)**	2511	5658**	0.37
8			Minya al-Qamh	$\text{Log Q} = 1.8 + 25288 \text{Log X}_1 + 0.051 \text{Log X}_0 + 0.011 \text{Log X}_4 + 0.81 \text{Log X}_5$ (11.8)* (2.2)* (7.7)** (2.1)* (6.4)**	2511	6158**	0.41

Source: Collected and calculated from questionnaire form data for the season 2021/2020

Where: Q = indicates the amount of milk produced in kilograms

X₁ = Number of heads, X₂ = Number of workers, X₃ = Amount of green fodder (kilograms)

X₄ = Amount of concentrated feed (kilograms), X₅ = Amount of dry fodder (kilograms)

R² = the adjusted coefficient of determination, F = the significance test of the statistical model as a whole.

(*) = indicates the stability of the model's significance at the 0.05 level of significance.

Indicators of economic performance efficiency of dairy producers for the second category in the research sample:

Table 10, shows that the average volume of production for each of the cows and buffaloes of the second category in Ibrahimia is about 7.86 and 5.24 tons, respectively. And about 7.8 and 5.3 tons, respectively, in Minya al-Qamh. The average total costs for each of the cows and buffaloes of the second category in Ibrahimia are about 25.59 and 17.62 thousand pounds, respectively. And about 23.44 and 17.03 thousand pounds, respectively, in Minya Al-Qamh. The net return amounted to about 25.36 and 16.4 thousand pounds, respectively, in Ibrahimia, and about 27.8 and 18 thousand pounds each in Mina Al-Qamh.

The ratio of the total return to the total costs "economic efficiency rate" was estimated at 199%, 193% for each of the cows and buffaloes for the first category in Ibrahimia. The return on the invested pound for each of them amounted to about 0.991, 0.931 pounds, respectively, and the profit margin for the product was about 49.8%, 48.2%, respectively. The economic efficiency rate in Mina Al-Qamh was estimated at 218.6% and 205.5%, respectively, with a return on the invested pound of 1.186 and 1.055 pounds, respectively, and the profit margin rate for the product is about 54.3% and 51.3%, respectively. From this, it is clear that Cows and buffaloes in Mina Al-Qamh in this category give the product a greater profit margin than its counterparts in the Ibrahimia, in addition to the fact that the cow unit is more economically efficient in producing milk than its buffalo counterpart. This was confirmed by study Hemedat, (2018); Abd El Hamid. et al, (2017).

Table 10

Indicators of the efficiency of the economic performance of dairy producers in the research sample during the season (2020/2021)

Indications	Ibrahimia Center				Minya Al-Qamh Center			
	The first category		The second category		The first category		The second category	
	Cows	Buffalo	Cows	Buffalo	Cows	Buffalo	Cows	Buffalo
N.of heads	25	25	23	25	21	23	23	23
The average total Return (Pound)	40248	82288	50950	34018	41900	30099	51237	35000
The average total costs(Pound)	32575	05989	25587	17616	31738	25186	23438	17030
Average total net return	7673	4044	25363	16402	10162	4913	27799	17970
Average production volume	6654	3924	7786	5242	6699	3941	7801	5299
Average cost per ton	490	662	329	336	474	639	300	321
Total yield per ton	605	765	654	649	625	764	657	661
Net yield per ton	115	103	326	313	152	125	356	339
Ratio of total return / total costs%	123.6	115.6	199.1	193.1	132.0	119.5	218.6	205.5
Return on Pounds Spent	0.236	0.156	0.991	0.931	0.320	0.195	1.186	1.055
Pound Profit Spent%	23.6	15.6	99.1	93.1	32.0	19.5	118.6	105.5
Product Profit Margin%	19.1	13.5	49.8	48.2	24.3	16.3	54.3	51.3

Source: Collected and calculated from questionnaire form data for the season 2020/2021

1. Total Return = (Average Total Quantity of Milk * Average Selling Price of Milk)
2. The average total costs = the average of the total costs mentioned in the questionnaire
3. Average total net return = average total return - average costs
4. Average cost per ton = (average total costs ÷ total average production) * 100
5. Total yield per ton = (average milk value / average milk production) * 100
6. Net yield per ton = average yield per ton - average costs per ton
7. Ratio of total return to total costs % = (total return / total costs) * 100
8. Return on Pounds Spent = (Average Net Return ÷ Average Total Costs)
9. Profitability of the Pound Spent % = (Average Net Return ÷ Average Total Costs) *100
10. Product Profit Margin % = (Average Net Return / Average Total Return) * 100

Conclude from the analysis of the results of the economic performance efficiency indicators:

- The efficiency of the economic performance of dairy producers in the center of Mona wheat is better than that of the Patriarchs (except buffalo in the first category, which is consistent with the results of the production functions in that the production of buffalo is in the stage of non-economic production), confirmed by Table 11 and Fig.1 The average selling price of a ton of milk in Minya Al-Qamh core is higher, and the second is that the cost of feed-in Ibrahimia is higher than Minya Al-Qamh.
- The best categories in economic efficiency indicators are the second category of cows in the Minya Al-Qamh maintenance, as evidenced by the 19% pound profitability index, which is confirmed by Fig 1. These results are consistent with those of production functions.

Table 11

Comparative analysis of indicators of economic performance efficiency of dairy producers between the Ibrahimia and Minya Al-Qamh Centres in the Sharkia

Indicators	Efficiency of the economic performance of dairy producers between The Ibrahimia and Minya Al-Qamh Centres			
	Category 1		Category 2	
	Cow	Buffalo	Cow	Buffalo
Average total return (pound)	1652	66	287	982
Average total costs (pound)	-837	-803	-2149	-586
Average total net return (pound)	2489	869	2436	1568
Average production volume (ton)	45	17	15	57
Average cost per ton (pound)	-16	-23	-28	-15
Total return per ton (pound)	21	-2	2	12
Net return per ton (pound)	36	22	31	26
Total return to total costs%	8	4	19	12
Return on the pound spent	0.1	0.04	0.2	0.1
Profitability of the pound spent %	8	4	19	12
Product profit margin ratio %	5	3	4	3

Source: Collected and calculated from Table 10.

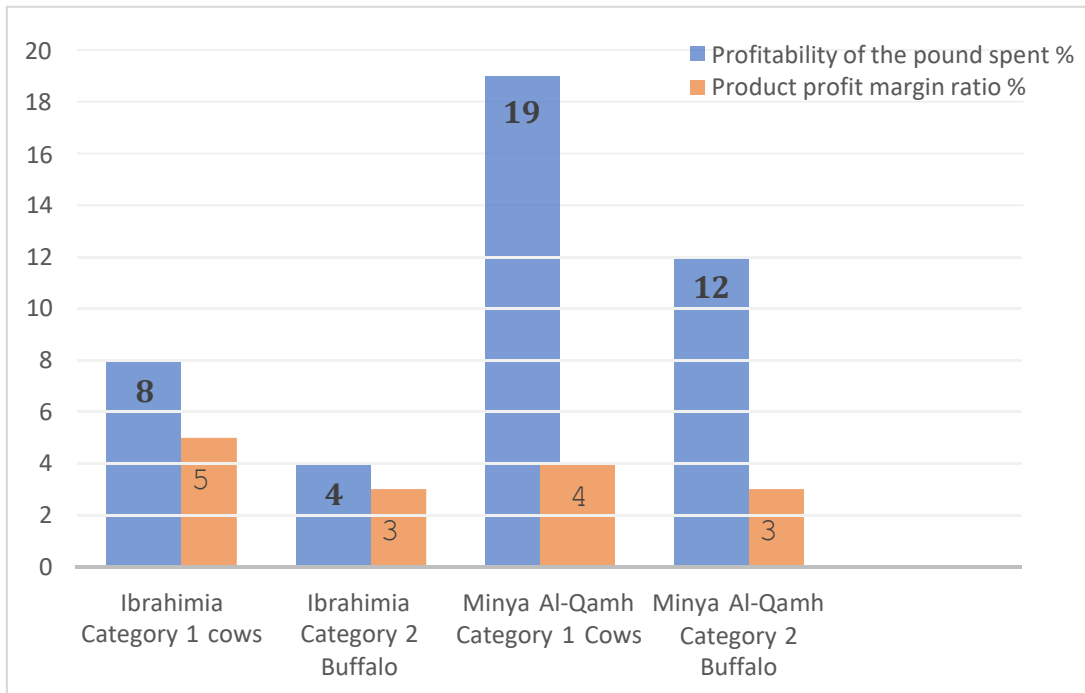


Figure 1. Profitability of the pound spent and profit margin in the centres
Source: Collected and calculated from Table 11.

Analysis of the problems facing dairy producers in the research sample:

Estimating the relative importance of the problems under study is a good way to explain and clarify the relative importance of each of these problems, and since some of the relative differences between these problems are so minor that the relative differences between those problems cannot be determined, the method of contrast analysis can be used to illustrate the morality of the differences between those problems.

The (F) test the entire model, if (P) is moral, this means a difference between the variables (problems that make up the entire model), it cannot be said that all of these variables differ morally at a certain probability level, so it is necessary to use a lower moral difference method (L.S.D), which can only be used if the P test is morally proven, as this method depends on the difference between any two averages are considered moral at the probability level of 0.05 or 0.01 if this difference between the two averages exceeds the value of the lowest moral difference (L.S.D) at 0.05 or 0.01 and by examining the problems facing dairy producers in the first and second categories of Minya Al-Qamh and Ibrahimia. It has been found that there are many productive problems facing producers, which in one way or another negatively affect the efficiency of dairy production of cows and buffaloes in the Ibrahimia and Minya Al-Qamh.

By examining the relative importance of these problems, the results of Table 12 showed that the problem of high prices of animal feed and the lack of feed

components in local markets (X1) represented 18.6% of the producers' interests, while the problem of the lack of dairy collection centers At the level of the governorates of the Republic (X5) in the second place among the interests of producers by 16.3%, while the third place in the interests of producers was the problem of the rise in the purchase prices of livestock heads of production age (X3) by 16%, and for the rank The fourth came to the problems X2, X4, which is the problem of the lack of supply of male cows and buffalo, the problem of the exposure of female cows and buffalo to mastitis, lack of care and veterinary medicines and high prices of 15.1% each, and in fifth place The problem of lack of clean drinking water for animals led to a 10.2% shortage of milk production, while the problem of foraging cheats with stones and dust, which affects the digestion of feed ingredients and milk production, ranked sixth and last among the problems in the interests of producers by 8.7%.

Table 12

The relative importance of the production problems facing dairy producers cows and buffaloes in the Ibrahimi and Minya Al-Qamh centres during the season (2020/2021)

N.	Problems	Number of choices	Relative importance%
X1	High prices of animal feed and lack of components in local markets.	106	1856
X2	Lack of supply of male cows and buffaloes	120	1551
X3	High prices for the purchase of livestock heads of production age	128	1652
X4	Female cows and buffaloes are exposed to mastitis, lack of care and veterinary medicines, and high prices	120	1551
X5	Few dairy collection centres in the republic's provinces.	112	1658
X6	The lack of clean drinking water for animals leads to a lack of milk production.	69	1250
X7	Cheats of feed with stones and dust, affect the digestion of feed ingredients and milk production.	59	857
	Total selections	676	122

Source: Collected and calculated from questionnaire form data for the season 2020/2021.

Table 13 results of variance analysis of problems and using one-way variance analysis as in Table 13 showed that the statistically calculated P value at the probability level 0.01, which is estimated at 23,469 This indicates a moral difference between the problems faced by dairy producers of cows and buffaloes in the Ibrahimi and Minya Al-Qamh, and to arrange those constraints and to know the moral differences between them, the method of the least moral difference (L.S.D) was used as shown in Table 14.

Table 13
Contrast analysis of problems faced by dairy producers in the research sample

The source of the difference	Degrees of freedom	Total deviation boxes	Average total deviation boxes	Estimated (F)
Between problems	6	652.138	108.690	23.469**
Inside the problems	1302	6029.701	4.631	
Total	1308	6681.838		

Source: Collected and calculated from questionnaire form data for the season 2020/2021.

** Probability level 0.01.

Table 14
Use a less moral difference method to arrange problems for dairy producers in the research sample

Rank	First place		Second place			Third place	Fourth place
Problems	X1	X2	X8	X1	X6	X5	X7
Average	0.42	0.42	1.01	1.25	1.03	1.4	1.5

Source: Collected and calculated from questionnaire form data for the season 2020/2021

Using the lowest moral difference method (L.S.D), there were no statistically moral differences between the problems of high prices of animal feed, lack of feed components in local markets (X1), and the lack of supply of male cows and buffaloes (X2) together first place among dairy producers of cows and buffaloes. While the problem of high prices for the purchase of livestock heads of production age (X3), the problem of exposure of female cows and buffaloes to mastitis, lack of care and veterinary medicines and high prices (X4), and the problem of lack of clean drinking water for animals leads to a lack of milk production (X6) together second place among the interests of dairy producers of cows and buffalo in the centers of Ibrahimia and Minya Al-Qamh, where the use of the method of the least moral difference (L.S.D) showed that there are no statistical moral differences between the problems Three.

While it came in third place among the interests of dairy producers of cows and buffaloes in the centers of Ibrahimia and Minya Al-Qamh problem of the lack of dairy collection centers at the level of the provinces of the Republic (X5) and in the fourth and last place came the problem of fraud of feed with stones and dust, which affects the digestion of feed components and milk production (X7).

This shows the difference in the priorities and order of problems after using the least moral difference method (L.S.D), which indicates the importance of using this analytical method, and that problems that do not have moral differences require that these problems be resolved together simultaneously because they are equal in priority for producers. We draw from the study of the proposals of educators in the research sample, to raise production within each farm of cows and buffalo milking in Egypt, especially in the eastern province of the two centers

of the study to reach the levels of economic volumes resulting according to each category of possession through the following:

- Provide high-production breeds to reach the optimal volume of production that achieves savings for production capacity.
- Improving production practices within milk farms, raising the prevailing level of production, and helping to reach optimal new production volumes and for the farm, achieves greater capacity savings.
- Provide feed to breeders at the right times and at the right prices to maintain the provision of production inputs and prices, thereby stabilizing milk prices.
- The need to improve veterinary care and animal health services and provide them.
- Focus on the role of agricultural scientific research in the development of improved breeds, as well as the role of agricultural extension in the dissemination and adoption of new technologies and improved production practices.
- Provide funding to expand milk production farms to reach economic volumes of production both in the short and long term.
- Encourage the establishment of accredited dairy collection centers in various provinces of the Republic, by expanding the establishment of cooperative associations specialized in dairy marketing, while providing them with the necessary equipment and equipment for these centers, leading to the creation of jobs in those centers, as well as increased dairy production.
- They need not slaughter females, whether cows or buffaloes until they are used, vaccinated, have small children, and also obtain milk production from them.

The study recommends working to solve all the problems facing dairy producers simultaneously because they are equally a priority for producers.

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