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An economic study of date palms in Egypt and Sharkia Governorate

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Abstract: The study aims to identify the production of date palms in Egypt and Sharkia Governorate, The distribution of fruit-bearing date palms grown dispersed or collected in Sharkia Governorate, Indicators of productive, economic and marketing efficiency of date palms in the study sample, the most important problems facing date palm production and means to promote them according to the opinions of the sample farmers. And the problems that hinder the manufacture of date palms, and identify the most important images of the manufacture of date palm by-products, the most important indicators of production, economic and marketing efficiency of those products. The study relied on published and unpublished secondary data from Government agencies and the primary data of the study sample through questionnaire forms compiled in 2022. A deliberate sample was selected on fruit trees ranging in age from 10-15 years in three centers according to the relative importance of the number of fruit palms in them, namely Bilbeis, Abu Hammed and Husseiniya, 2 farms were selected for the collected palms from each center separately (the average number of palm trees was 116 palm/Fadden), and 100 fruit palms from each center separately, to study the efficiency indicators. Trees at this age are considered to be in the process of competent fruiting. The study found that the average production of dates produced (wet and red) in the study sample was 34 tons/feddan (293 kg/palm) in the case of collected palms, and 282 kg/palm in the case of dispersed palms. The net return amounted to 24.32 thousand LE/feddan (2096.6 LE/palm) in the case of collected palms, 1719.9 LE/feddan in the case of dispersed palms. The profitability of the spent pound amounted to 10.88 LE for the collected Palm, 2.95 LE for the dispersed Palm. By studying the percentage of disposal of by-products in the study sample, it turned out that in the case of the collected palm, the percentage of what was directed to manufacturing was 100% of the paper, 60% of the fiber, and 70% of the sp. The rest is directed either for home use or for disposal. In the case of the dispersed Palm, 5% of the paper was destined for manufacturing, 60% of the cotton, and the rest was destined for home use or disposal. By studying the efficiency indicators for the manufacture of palm tree by-products (grass, fronds, fiber, spikelet) with a sample of the study, it turns out that the weighted average net return for the combined production and manufacturing stages amounted to 4437.52 LE/palm. One of the most important problems faced by palm growers in the study sample is the infection of palm trees with palm weevil disease, the presence of wind or rain during the tree pollination process, which leads to repeating the process more than once, thereby increasing production costs and may reduce the efficiency of the pruning process and productivity decreases. One of the most important problems facing the manufacture of palm tree by-products is the lack of demand for manufactured products due to the availability of alternatives at lower prices, the high prices of inventory, transportation costs and labor wages, especially trained technicians, compared to previous years.
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Introduction:

The palm tree is one of the Blessed trees, which does not need to be defined by its value and importance, it has been honored and mentioned in all the heavenly books as a good tree, which is one of the trees that man has known and worked on cultivating since ancient times **(website of Al-Zaman newspaper, (February, 2022))**. The fruits of dates and dates are considered one of the most important economic products of the palm, as there are many forms of their consumption, they are eaten soft (fresh), dried and processed in many forms. The benefits of dates are that it is a source of energy because it contains a high content of fruit sugar **(Agricultural Income Bulletin 2020)**. Date palms have a great economic value, as the value of palm and its products in 2020 amounted to about 7.701 billion LE, or 2.39% of the value of plant production, which amounted to 321.8 billion LE. Date palm trees are characterized by many benefits, they have many products, namely dates (which is the main product), in addition to several secondary products, when

manufactured, ordinary monetary values are obtained, and therefore it is a very economically useful tree. Date palm cultivation is widespread in most Governorates of Egypt, and the area with palm trees in Sharkiya Governorate reached 134 feddans, representing 0.1% of total area planted with palm trees in Egypt in 2020, which is a very small percentage, despite the economic importance of date palms and the existence of important components for palm cultivation in Sharkiya Governorate. Palm trees in Egypt produce secondary products (such as grass, fiber, palm branches, etc.) in addition to the main product, which is Dates. Palms are grown in Egypt and Sharkiya Governorate either dispersed – it is planted in small numbers in agricultural fields with other crops or in house gardens in small numbers) and palm trees are also grown in a complex form in its own gardens and unit of area per feddan, and in Sharkiya Governorate, the percentage of fruit-bearing palm trees planted dispersed amounted to 98.33% of total number of fruit trees in the Governorate, and the rest planted collectively amounted to 1.67% during 2021 **(Directorate of Agriculture in Sharkia,2022)**. The date palm has a major role in modifying the dry desert climate and making agriculture possible and has the ability to combat desertification because of its morphological and physiological characteristics to withstand winds and stabilize sand dunes **(kenana online, Abril 2015)**.

The Research Problem:

The area planted with date palms in Egypt has decreased in recent years, and the average productivity per feddan of fruitful palms, and the total production of dates in Egypt, including Sharkiya Governorate, has also decreased. Despite the economic importance of date palms and the presence of important palm tree residues, and the economic importance of products manufactured from palm waste, palm cultivation faces many obstacles that prevent the expansion of palm cultivation and the expansion of the manufacture of its residues, especially as they are industries that serve the environment.

Objective:

The research aimed of production of date palms in Egypt and Sharkiya Governorate, the distribution of fruitful date palms grown singly or dispersed in Sharkiya Governorate, indicators of productive, economic and marketing efficiency of date palms in the study sample, the most important problems facing date palm production and means of promoting them according to the opinions of the sample farmers. And the problems that hinder the manufacture of date palms, and identify the most important images of the manufacture of date palm by-products, the most important indicators of production, economic and marketing efficiency of those products.

Methodology and Data sources:

The study was based on the data analysis and presentation of its results on the descriptive and quantitative methods, represented by percentages, arithmetic mean, weighted average in quantities, standard deviation and growth rate, indicators of economic and marketing efficiency of date production, and indicators of production and marketing efficiency of products manufactured from date palm by-products **(Mohamed Abdel Samie Anani, 2011)**. The following indicators were used:

1- Total revenue = Main revenue + Secondary revenue
2- Total costs = Fixed costs + Variable costs
3- Net revenue = gross revenue-total costs
4- Gross margin = total revenue-variable costs
5- Profitability per pound spent = net return/total costs
6- Average cost of production per ton = variable costs / average production per feddan
7- Net revenue per ton = total revenue / average production per feddan
8- Product incentive per ton = (net revenue per Ton / Ton price) * 100
9- Breakeven point for quantity = total costs / unit price.

Data sources:

The research used the published data from the official bodies in Egypt, including the central agency for public mobilization and statistics, the Ministry of Agriculture and land reclamation, and some specialized websites, both official and unofficial, and also used the preliminary data derived from the study sample through the data of questionnaire forms designed specifically for research. The questionnaire forms were compiled in 2022.

Sample of the study:

Questionnaire forms were collected from a sample of the most important administrative centers of the eastern Governorate according to the relative importance of date palms in the Governorate, namely the Abu Hammad centers and the city of Qurain was selected (as it is the largest city for date production in the Governorate), the center and the city of Belbeis, and the center and the city of Husseiniya, and 2 farms were selected for palm cultivation from each center separately, and a number of 100 fruitful palm trees were selected in each administrative center distributed in the gardens of houses and agricultural lands loaded with agricultural crops. A deliberate

sample was selected on fruit trees aged 10-15 years to study the efficiency indicators because at this age the tree is in the process of efficient fruiting (at the second stage of the law of diminishing returns).

The most important results and their discussion

Development of palm production in Egypt:

In table (1) of the study of the area planted with palms in Egypt, it is clear that it increased during the period (2000-2020) and rose to a maximum in 2020 and amounted to 134.1 thousand feddans, and decreased to a minimum in 2000 and amounted to 68.98 thousand feddans. The average for the period was 95.58 thousand feddans. The annual growth rate in the area planted with palm trees in Egypt reached 3%.

By studying the number of fruitful palms in Egypt, it is clear that it has increased in Egypt during the study period, as it rose to a maximum in 2020 and reached 14.86 million palms, and decreased to reach a minimum in 2000 and reached 9.46 million million palms. The average for the period was 12.35 million palms. The annual growth rate in the number of fruit palms in Egypt was 2%.

By studying the average productivity per feddan of dates in Egypt, it turns out that it fluctuated between high and low during the study period, but it increased to reach its maximum in 2020 and reached 115.07 kg/palm, and decreased to reach below in 2004 and reached 104.03 kg/palm. The average for the period was 109.60 kg/palm.

The study of total production of dates in Egypt shows that it increased during the study period and that it rose to a maximum in 2020 and reached 1.71 million tons. It fell below in 2000 and amounted to 1.01 million tons. The average for the period was 1.36 million tons. The annual growth rate in the total production of dates in Egypt was 3%.

Development of palm production in Sharkiya Governorate:

In table (1) of the study of the area planted with palms in Sharkiya Governorate, it is clear that it is decreasing during the period (2000-2020), but it increased to its maximum in 2004 and amounted to 572 feddans by 0.7% of the same in Egypt, which amounted to 82.2 thousand feddans. It decreased to its lowest in 2020 and amounted to 134 feddans by 0.1% of the same in Egypt, which amounted to 134.4 thousand feddans. The average for the period was 336.5 feddans, 0.39% of the same in Egypt. The average annual decrease in the area planted with palms in Sharkiya Governorate was 6%.

By studying the number of fruitful palms in Sharkiya Governorate, it is clear that it increased during the study period, and it increased to reach a maximum in 2020 and reached 1.36 million palms, by 9.14% of the same in Egypt, which amounted to 14.86 thousand feddans. It decreased to reach below in 2005 and amounted to 1.08 million palms, 11.37% of the same in Egypt, which amounted to 9.46 million palms. The average period was 1.21 million palm trees, 9.94% of the same in Egypt. The annual growth rate in the number of fruitful palms in Sharkiya Governorate reached 1%.

A study of the average productivity per feddan of dates in Sharkiya Governorate shows that it decreased during the study period, but it increased to reach its maximum in 2006 and reached 198.22 kg/palm, and decreased to reach below in 2018 and reached 164.52 kg/palm. The average period was 180.43 kg/palm, higher than the same in Egypt, with an increase of about 64.62%. The annual decline rate in the average Palm productivity in Sharkiya Governorate reached 1%.

The table shows that the total production of the date crop in Sharkiya Governorate fluctuates between low and high during the study period and that it increased to its maximum in 2001 and reached 257.8 thousand tons by 23.16% of the same in Egypt, which amounted to 1.11 million tons. It decreased to reach below in 2009 and reached 120 thousand tons by 9.44% of the same in Egypt, which amounted to 1.27 million tons. The average for the period was 213.4 thousand tons, 16.11% of the same in Egypt. The annual growth rate in the total production of dates in Sharkiya Governorate reached 1%.

Inventory of Palm numbers distributed to the Centers of Sharkiya Governorate:

In table (2) it turns out that the total number of date palms in Sharkiya Governorate (including males and females, large and small trees, fruitful and non-fruitful, as well as collected and dispersed palms) reached 2.07 million palms in 2021 distributed among the administrative centers of the Governorate, Abu Hammad center occupies the first rank, and the number of Palms is about 676.2 Thousand Palms, 32.5% of total number of Palms in the Governorate, followed by Derb Najm center, with the number of Palms about 652.5 thousand 31.4%, followed by the Husseiniya center and amounted to about 351.6 Thousand Palms by 16.9%, the rest of the Centers come after that both in order .

Distribution of Palm numbers (collected and dispersed) to the Centers of Sharkiya Governorate:

Palm trees are planted in Sharkiya Governorate either as individual trees (dispersed) and they are planted in fields, in house gardens or others-

which is the prevailing method of palm cultivation in the Governorate – or they are planted grouped in the ground – which are palm farms – and these farms are few in number in the Governorate. In table (2) it is clear that the number of palm trees dispersed in 2021 amounted to 1.34 million palms representing 98.33% of total number of fruitful palms of 1.36 million palms in Sharkiya Governorate for 2021. The number of collected fruitful palms reached 22.77 Thousand Palms, representing 1.67%, there are a number of six administrative centers that do not cultivate the collected fruitful palms, namely Abu Kebir, Husseiniya, Abu Hammad, Diyarb Negm, market shop and Kafr Saqr. The rest of the administrative centers are growing it, and Belbeis occupies the first rank with 84.53%, followed by faqous center with 5.55%, followed by Hihya center with 2.63%. As for the number of fruit palms scattered, it is distributed to all administrative centers in Sharkiya Governorate without exception, and Abu Hammad center occupies the first rank with 28.41%, followed by Husseiniya with 18.73%, followed by Belbeis with 22.23%, followed by the rest of the administrative centers.

Table (1): Production of date palm in Egypt and Sharkiya Governorate during the period (2000-2020).

Year	Egypt				Sharkiya Governorate						
	Cultivated area (Thousand feddan)	number of fruitful palms (million)	Average Palm productivity (Kg/palm)	Total production of dates (million)	Cultivated area (thousand feddan)	%	number of fruitful palms (million)	%	Average Palm productivity (Kg/palm)	Total production of dates (million)	%
2000	68.98	9.46	106.37	1.01	542	0.79	1.08	11.37	183.75	197.7	19.64
2001	70.13	10.23	108.83	1.11	565	0.81	1.39	13.64	184.71	257.8	23.16
2002	70.52	10.38	105.03	1.09	565	0.80	1.17	11.31	188.78	221.5	20.32
2003	78.07	10.73	104.50	1.12	565	0.72	1.21	11.32	190.30	231.2	20.61
2004	82.18	11.21	104.03	1.17	572	0.70	1.21	10.77	190.24	229.6	19.69
2005	86.08	11.40	101.70	1.16	296	0.34	1.26	11.04	190.58	239.9	20.64
2006	85.19	11.89	111.77	1.33	303	0.36	1.29	10.82	198.32	255.1	19.20
2007	89.79	12.04	109.12	1.31	303	0.35	1.04	8.68	190.10	198.7	15.13
2008	87.68	12.18	108.85	1.33	306	0.35	1.14	9.35	192.55	219.4	16.54
2009	87.91	12.14	104.62	1.27	311	0.35	1.14	9.39	192.90	120	9.44
2010	99.87	12.18	111.10	1.35	335	0.34	1.17	9.60	182.85	213.7	15.80
2011	99.17	12.26	112.02	1.37	299	0.30	1.18	9.60	177.92	209.4	15.24
2012	91.67	12.53	111.69	1.40	274	0.30	1.19	9.50	178.93	212.1	15.15
2013	90.29	12.30	108.03	1.33	274	0.30	1.21	9.81	172.25	207.7	15.63
2014	104.85	12.83	114.21	1.46	269	0.26	1.21	9.45	169.26	205.2	14.01
2015	115.61	14.96	112.56	1.68	260	0.22	1.21	8.10	171.54	207.8	12.33
2016	117.28	13.62	113.76	1.55	257	0.22	1.22	8.96	166.28	202.8	13.09
2017	119.70	13.62	113.18	1.54	254	0.21	1.25	9.20	169.26	212.1	13.75
2018	113.22	14.09	110.95	1.56	191	0.17	1.26	8.93	164.52	207	13.24
2019	117.97	14.38	114.36	1.64	191	0.16	1.26	8.75	169.14	208.2	12.66
2020	134.13	14.86	115.07	1.71	134	0.10	1.36	9.14	164.90	224	13.09
Average	95.58	12.35	109.60	1.36	336.5	0.39	1.21	9.94	180.43	213.4	16.11
Growth rate (%)	3%	2%	0%	3%	-6%	-	1%	-	-1%	1%	-

(*)average productivity of Palms in table includes large and small trees.

Source: Ministry of Agriculture and land reclamation, economic affairs sector, Agricultural yield statistics bulletin, miscellaneous numbers.

Table (2): Number of date palms in Sharkiya Governorate distributed among the administrative centers in 2022.

Administrative Center	Total number of Palms(1) (Palm)	(%) Of total number of Palms	Number of total fruitful palms (combined+ dispersed) (palm)	Collected fruit palms		Fruiting palms are dispersed	
				Number of Palms (Palm)	(%) Of total number of fruitful palms	Number of Palms (Palm)	(%) Of total number of fruitful palms
Minya El Qamh	105688	5.09	84847	549	84847	5.09	105688
Hihya	31764	1.53	26652	600	26652	1.53	31764
El Ibrahimiya	12000	0.58	9752	550	9752	0.58	12000
Abu Kebir	33772	1.63	27570	-	27570	1.63	33772
El Husseiniya	351582	16.90	298134	1263	298134	16.90	351582
Faqous	132077	6.36	116683	401	116683	6.36	132077
Zagazig	61891	2.98	41549	-	41549	2.98	61891
Abu Hammad	676257	32.50	381092	-	381092	32.50	676257
Diyarb Negm	652460	31.40	42470	19250	42470	31.40	652460
Bilbeis	320000	15.40	270498	-	270498	15.40	320000
Mashtool El Souk	50200	2.42	29225	-	29225	2.42	50200
Kafr Saqr	33730	1.62	30491	160	30491	1.62	33730
Awlad Saqr	8833	0.43	4992	22773	4992	0.43	8833
Total	207894	100	1363955		1363955	100	2078094

(1) It means the total number of Palms in the Governorate and administrative centers and includes males and females, fruitful and non-fruitful, collected and dispersed.

Source: Directorate of Agriculture in Sharkiya, Department of orchards, fruit Department, unpublished data, statistics for 2022.

Distribution of the most important cultivated varieties of fruit date palm (collected and dispersed) in Sharkiya Governorate:

It is clear In table (3) that there are many cultivated varieties of fruit date palm in Sharkiya Governorate in 2021, these varieties differ in both collected and dispersed palms, for the collected fruit palm varieties, Zaghloul dates occupy the first rank by 42.41%, followed by Samani dates by 26.52%, followed by yesterday dates by 16.96%, followed by other species of total collected fruit palm, which is 22.773 Thousand Palms in Sharkiya Governorate. As for the varieties of fruit-bearing date palms, animal dates occupy the first place with 44.66%, followed by Zaghloul dates with 12.27%, and unknown dates occupy 9.63%. The rest of the varieties represent different proportions of total cultivated varieties of dispersed fruitful Palms, which amount to about 1.341 million palms in Sharkiya Governorate during 2021.

Table (3): The most important cultivated varieties of date palm (collected and dispersed) in Sharkiya Governorate in 2022

Varieties	The number of collected fruitful palms	%	The number of scattered fruitful palms	%	Total number of fruitful palms (collected and dispersed)	Total output (tons)	The relative importance of varieties (%)	Average Palm productivity (kg/palm)
Hayani	2363	10.38	598964	44.66	601327	112448.1	50.58	187
Zaghloul	9657	42.41	164523	12.27	174180	28739.7	12.93	165
Samani	6040	26.52	113693	8.48	119733	19636.2	8.83	164
Bent Eisha	850	3.72	97037	7.31	98887	16810.8	7.56	170
Aglani	0	0	125376	9.35	125376	21063.2	9.47	168
Amhaat	0	0	7868	0.59	7867	975.51	0.44	124
Sewi	0	0	415	0.03	415	48.55	0.02	117
Amri	0	0	62267	4.64	62267	10211.8	4.59	164
Kapoushi	0	0	12640	0.94	12640	1971.8	0.89	156
Anonymous	0	0	129099	9.63	129099	20139.44	9.06	156
Sofer El domin	0	0	7405	0.55	7405	1221.8	0.55	165
Badara	0	0	20575	1.53	20575	3333.15	1.50	162
Barhi	3863	16.96	300	0.02	4663	704.11	0.32	151
Magdool	0	0	20	0.001	20	3.06	0.00	153
Total	32773	100	1341182	100	1363955	222324.7	100	163

(*) Average productivity of Palms includes large-fruited and small-fruited palms

Source: Directorate of Agriculture in Sharkiya, Department of orchards, fruit Department, statistics for 2022.

Total production and average production of fruit date palm varieties in Sharkiya Governorate:

It is clear In table (3) that the number of fruitful palms in Sharkiya Governorate in 2021 amounted to 1.36 million palms distributed among the different varieties of date palms, and the total production of the different varieties together amounted to about 222.3 thousand tons. Animal dates occupy the first place in terms of production quantity by 50.58%, followed by Zaghloul dates by 12.93%, followed by calf dates by 9.47% of total production quantity. The average production reached the maximum in live dates with an average of 187 kg of mussels per Palm. The minimum amount in SIWI dates reached an average of 117 kilograms per palm, and the average production for different varieties together was about 163 kilograms per palm in Sharkiya Governorate during 2021.

The spread of palm trees in the study sample:

In table (4), it turned out that the date palm planted in agricultural lands in the study sample in Sharkiya Governorate for the year 2022, loaded with other agricultural crops occupies the first and largest ranking and represents about 70%, followed by the spread of palm in front of agricultural land, and home gardens, each representing 12% separately, and finally the cultivation of palm in its own farms, representing 6% of total places of Palm spread in the study sample in Sharkiya Governorate. Thus, it becomes clear that the largest percentage of the date palms planted in Sharkiya Governorate is grown singly or dispersed and represents a total of 94%, while the date palms planted collectively in their own farms represent a small percentage, which is 6%.

Cultivated palm varieties by study sample:

Table (4) shows the relative importance of palm varieties planted in the study sample in Sharkiya Governorate in 2022 and shows that the animal date variety comes in first place by 37%, followed by Zaghloul dates by 37%, then Samani dates represent 12% and finally the other varieties represent 9% of total palm varieties in the study sample in Sharkiya Governorate in 2022.

General features of palm trees with a study sample:

In table (5) it is clear that the average age of Palms in the study sample in Sharkiya Governorate for 2022 is about 13.5 years for collected palms, 12.5 for dispersed palms. By studying the average number of palms under study, it turned out that it reached 116

palms/feddan for the collected palm trees, while for the dispersed palm trees it averaged 2 palms, whether in the field or the garden planted with palm trees, and the average productivity of the palm ranges from 293 kg/palm (34 tons/feddan) in the case of the collected palm and 282 kg for the dispersed Palm. The production quantity of dates in the sample amounted to 39.6 tons for the collected palm and 0.7 tons for the dispersed Palm.

Table (4): The relative importance of the spread of palm trees in the study sample in Sharkiya Governorate in 2022.

	Statement	%		Statement	%
The prevalence of cultivated palms in the study sample	In front of the agricultural land	12	Cultivated palm varieties with a study sample	Hayani	42
	In agricultural lands loaded with other crops	70		Zaghloul	37
	In home gardens	12		Samani	12
	In special palm plantations	6		others	9
	Percentage	100		percentage	100

(*)Other items include bint Aisha, Barhi and Omari

Source: Data of the questionnaire form for the study sample in 2022.

Table (5): General features of palm trees in the study sample in Sharkiya Governorate in 2022.

Statement	Units	Collected palms	Scattered palms
The average age of Palms	Year	13.5	12.5
Average number of Palms per view	Palm	116	2
Average Palm productivity	Kg	360	350
Sample date production quantity	Ton	39.6	0.7
Average number of Palms per feddan	Palm	100	0
Average number of hours of human work	Hear/year	124	20
Average amount of organic fertilizer	M^3	4	0
Average amount of chemical fertilizer	Pack (50 kg)	2	0
Average amount of pesticides	Letter	1	0.05
Average amount of sulfur	Pack (50 kg)	1	0
Average amount of vinegar	Bottle	550	0

Source: Data of the questionnaire form for the study sample in 2022.

The average number of hours of human labor required to complete agricultural operations was 124 hours/year in the case of collected palms, while it reached 20 hours/ Year in the case of dispersed palms. The average amount of organic fertilizer for the collected Palms was 4 m^3, while there is no amount to be added in the case of dispersed palms. Similarly, the average amount of chemical fertilizer was 2 packs in the case of the collected palm and there are no additives in the case of the dispersed Palm.

Finally, for the average amount of pesticides was about one liter in the case of the collected palm and about 0.05 liters in the case of the dispersed palm, and the average amount of sulfur was about one packs for the collected palm and there is no for the dispersed palm, and for the average amount of vinegar the amount was about 550 bottles in the case of the collected palm and there is no in the case of the dispersed Palm.

Cost items of service requirements in the study sample:

By studying the items of the costs of agricultural service requirements in the study sample in Sharkiya Governorate in 2022, it was found In table (6) that in the case of collected palms (116 palms/feddan), the cost of organic fertilizer is 437.5 LE/feddan by 9.41% of total costs of production requirements for feddan planted with palm trees, while the cost of chemical fertilizer was 700 LE/feddan by 15.06%, and the cost of pesticides was 250 LE/feddan by 5.38%, and the cost of vinegar used was 1650 LE/feddan by 35.5%, and the cost of cages used to fill dates was 1000 LE/feddan by 21.52%, and the cost of Shakers was 300 LE/feddan by 6.46%, and the cost of using laces per feddan Planted with palm trees 60 LE, or 1.29%, of total costs of supplies for an feddan planted with palm trees in the complex, which is about 4647.5 LE/feddan of the complex.

In the case of disperser (one palm), the average cost of pesticides was 25 LE/palm by

58.82%, and the cost of Pack was 10 LE/palm by 23.53%, and the cost of laces was about 7.5 LE representing about 17.65% of total cost of supplies per palm, which is about 42.5 LE/ palm, and it is clear from the above that both organic fertilizer, chemical, sulfur and vinegar are not added per Palm because the high cost of purchasing the unit from these supplies, as well as the cages are not used in the case of a single dispersed palm.

Table (6): The structure of the cost items of agricultural service requirements in the study sample in Sharkiya Governorate in 2022.

Statement	Unity	Collected palms(1)				Scattered palms(2)			
		Quantity	Price (LE / unit)	Value (LE)	%(3)	Quantity	Price (LE / unit)	Value (LE)	%3
Organic fertilizer	M^3	5	87.5	437.5	9.41	0	0	0	0
Chemical fertilizer	Pack	2	350	700	15.06	0	0	0	0
Pesticides	lieter	1	250	250	5.38	0.1	250	25	58.82
Sulfur	pack	1	250	250	5.38	0	0	0	0
Vinegar	Bottle	550	3	1650	35.50	0	0	0	0
Pack	number	200	5	1000	21.52	0	0	0	0
Shakir	number	500	0.6	300	6.46	10	1	10	23.53
Ligatures	Kilo	4	15	60	1.29	0.5	15	7.5	17.65
Total	-	-	-	4647.5	100	-	-	42.5	100

(1) Calculated on an average of 116 palms per feddan, (2) calculated for one palm, (3) attributed to the total cost of operations

Source: Data of the questionnaire form for the study sample in 2022.

Items of costs of agricultural operations with a study sample:

The cost items of agricultural operations carried out for palm trees during the productive year include the costs of operations: (pruning, pollination, minimization, lightening, shaking, chopping). It is clear In table (7) that the total costs of these operations in the study sample in Sharkiya Governorate in 2022 amounted to 12900 LE/feddan (111.21 LE/palm) in the case of collected palms, 540 LE/palm in the case of dispersed palms.

In the case of an feddan of collected palms, the cost of pruning was 1350 LE/feddan by 10.47%, the costs of insemination were 2700 LE/feddan by 20.93%, the costs of minimization and lightening were 1250 LE/feddan by 9.69%, the cost of shaking was 5000 LE/feddan by 38.76%, and the costs of cutting were 1350 LE/feddan by 10.47% this is from the total cost of operations per feddan of palm, which is about 12900 LE.

In the case of one dispersed palm (in the case of dispersed palm), the cost of pruning was 70 LE/palm by 12.96%, the cost of pollination was 100 LE/palm by 18.52%, the costs of minimization and lightening were 50 LE/palm by 9.26% for each operation separately, the shaking process was 200 LE/palm by 37.04%, the cost of cutting process was 70 LE/palm by 12.96 this is% of total operating costs for one dispersed palm tree, which is about 540 LE.

Table (7): The cost items of operations in the sample of the study in Sharkiya Governorate in 2022.

Operation	Average number of procedures	Collected palms(1)				Scattered palms			
		The number of human labor	Worker's wage (LE)	Value (LE/ feddan)	%(2)	The number of human labor	Worker's wage (LE)	Value (LE/ palm)	%(2)
Pruning	1	5	270	1350	10.47	1	70	70	12.96
Pollination	2	5	270	2700	20.93	1	50	100	18.52
Minimalism	1	5	250	1250	9.69	1	50	50	9.26
Lightening	1	5	250	1250	9.69	1	50	50	9.26
Shaking	4	5	250	5000	38.76	1	50	200	37.04
Slicing	1	5	270	1350	10.47	1	70	70	12.96
Total	-	-	-	12900	100	-	-	540	100

(1) It calculated that the average man has 100 palms a day, and the daily wage is 270 or 250 LE.
(2) Attributable to total acquisition costs
Source: Data of the questionnaire form for the study sample in 2022.

Total cost items in the study sample in Sharkiya Governorate:

By studying the items of total costs with a sample of the studyin Sharkiya Governorate in 2022, it was found In table (8) that in the case of feddan of collected palms, the costs of supplies amounted to 4647.5 LE/feddan by 20.80%, and the costs of agricultural operations amounted to 12900 LE/feddan by 57.72%, thus the total variable costs amounted to 17547.5 LE/feddan by 78.52%, and the fixed costs (rent of land planted with palm trees) amounted to 4800 LE/feddan by 21.48% of total cost of producing an feddan of date palm, which is 22347.5 LE/feddan.

Table (8): Total cost items in the study sample in Sharkiya Governorate in 2022.

Operation	unit	Collected palms		Scattered palms	
		Feddan	%(1)	palm	%(1)
Supply costs	LE	4647.5	20.80	42.5	7.30
Operational costs	LE	12900	57.22	540	92.70
Total variable costs	LE	17547.5	78.52	582.5	100
Fixed costs (rent) (2)	LE	4800	21.48	0	0
Total costs	LE	22347.5	100	582.5	100

(1) Attributable to total costs. (2) Calculated on the basis of half the rent because the palm is loaded on other crops.
Source: Data of the questionnaire form for the study sample in 2022.

In the case of one scattered Palm (scattered palm), the costs of supplies amounted to 42.5 LE/palm by 7.30%, and the costs of agricultural operations amounted to about 540 LE/palm by 92.7%, out of total variable costs necessary to produce one palm, which is about 582.5 LE/palm, which also represents the total costs due to the lack of rent for the land planted with one palm, often in the vicinity of the research house, and from the above it is clear that the total variable costs represent the largest part by about two-thirds of total costs the remaining third is represented by fixed costs, and this is due to the high costs of agricultural operations carried out to produce an feddan of date palm.

Total revenue items in the study sample in Sharkiya Governorate:

In table (9) that the total revenue value of the study sample in Sharkiya Governorate in 2022 amounted to 265.6 thousand LE in the case of collected palms (2.29 thousand LE/palm), and in the case of dispersed palms amounted to 2.30 thousand LE). It also turned out that in the case of the collected date palm, the average amount of the main product (dates) was about 34 tons/feddan with a value of 257 thousand LE/feddan, and the dates produced are distributed as follows: 10.2 tons/feddan of red dates with a value of 85.7 thousand LE, 23.8 tons/feddan of wet dates with a value of 171.3 thousand LE/feddan. The total secondary income amounted to 8.61 thousand LE /feddan.

In the case of dispersed date palms, the average amount of the main product (dates) was about 280 kg/palm with a value of 2.22 LE/palm, and the dates produced are distributed as follows: 196 kg/red date palm with a value of 1.49 thousand LE, 84 kg/wet date palm with a value of 735 LE/Palm. The total secondary revenue amounted to 77.8 LE / Palm.

Table (9): The revenue items in the study sample in Sharkiya Governorate in 2022.

Operation	Product	unit	Collected palms					Scattered palms		
			Quantity per feddan	Average Palm productivity	Price (LE / unit)	Value (LE/ feddan)	Value (LE/ Palm)	Quantity	Price (LE)	Value (LE)
ai n re ve nu	Red dates	Kg	10196.4	87.9	8.4	855649.8	738.4	196	7.6	1489.6
	Wet dates	Kg	23791.6	205.1	7.2	171299.5	1476.7	84	8.75	735
total of main revenue		LE	33988	-	0	256949.3	2215.1	280	0	2224.6
Seco ndary reven ue	Grass	Unit	2088	18	1	2088	18	18	1.1	19.8
	Spikelet	Unit	1160	10	5.1	5916	51	10	5.25	52.5
	Fiber	Unit	1210	10.43	0.5	6055	5.2	11	0.5	5.577.8
Total of secondary		-	-	-	-	8609	74.2	-	-	2302.4

revenue									
Total of revenue	-	-	-	-	265558.3	2289.3	-	-	

Source: Data of the questionnaire form for the study sample in 2022.

Indicators of productive, economic and marketing efficiency of dates by study sample:

By studying the most important indicators of the economic efficiency of the collected palm, it is clear In table (10) that the net yield reached 24.2 thousand LE/feddan(2.1 thousand LE/feddan), the gross margin reached 225.7 thousand LE/feddan(1.94 thousand LE/palm), the profitability of the spent pound reached 10.88 LE, the ratio of total revenue to variable costs reached 15.13, the ratio of total revenue to total costs reached 11.88, the net yield per ton 6.60 thousand LE, the product incentive reached

90.94%, the break-even point of the quantity reached 3.08 tons.

By studying the most important indicators of the economic efficiency of the dispersed date palm, it turns out that the net yield amounted to 1.72 thousand LE/palm, the gross margin amounted to 1.14 thousand LE/palm, the profitability of the spent pound amounted to 2.95 LE, the ratio of total revenue to variable costs amounted to 3.95, the ratio of total revenue to total costs amounted to 3.95, the net yield per ton of dates amounted to 6.34 thousand LE, the product incentive amounted to 75.42%, the breakeven point of the quantity reached 0.07 tons.

From the above, it is clear that the indicators of economic efficiency are high in the case of the collected Palm compared to its dispersed counterpart.

Table (10): Indicators of productive, economic and marketing efficiency of the produced mussels in the study sample in Sharkiya Governorate in 2022.

The index	unit	Collected palms	For a single palm (in the case of combined palms)	Scattered palms
Average production of red dates	Kg	10196.4	87.9	196
Average production of wet dates	Kg	23791.7	205.1	84
Average production (red + wet dates)	Kg	33988	293	282
Total variable costs	LE	17547.5	151.3	582.5
Fixed costs (rent)	LE	4800	41.4	0
Total costs	LE	22347.5	192.7	582.5
Main income (proceeds from the sale of dates)	LE	256949.3	2215.1	2224.6
Secondary income (proceeds from the sale of secondary waste)	LE	8609	74.2	77.8
Total revenue	LE	265558.3	2289.3	2302.4
Net return	LE	243210.8	2096.6	1719.9
Gross Margin	LE	225663.3	1945.4	1137.4
Profitability of the spent pound	LE	10.88	10.88	2.95
total revenue/ variable costs	-	15.13	15.13	3.95
total revenue/ total costs	-	11.88	11.88	3.95
Average price per ton	LE	7260	7260	8405
Average production cost per ton	LE/ton	657.7	657.7	2065.6
Net yield per ton	LE	6602.3	6602.3	6339.4
Product motivation	%	90.94	90.94	75.42
Break-even point for quantity	ton	3.08	3.08	0.07

Source: Data of the questionnaire form for the study sample in 2022.

Patterns of sale of the main product of date palm for date sample study sample:

It is clear In table (11) the relative importance of the patterns of sale of the main product of date palms in the study sample in Sharkia Governorate in 2022 that in the case of an feddan of collected palms, the main product, dates, is sold through only two patterns of sale, namely contracting with a wholesaler from the beginning of the season and represents about 90%, while participation by half represents about 10% of the patterns of sale of the resulting dates, while the calculation pattern is not used in one go due

to the large number of Palms per feddan, which makes it difficult to apply this pattern when selling the main product of date palms.

As for the case of a single dispersed palm, the sale patterns for the resulting dates are divided into three patterns, the first pattern comes first, which is the calculation by the date for the date palm and represents about 60%, followed by participation by half and represents about 35%, and finally contracting with the wholesaler from the beginning of the season and represents about 5%. It turns out that the third pattern is the most common in the case of a single dispersed Palm, due to the ease of calculation in this way and a greater profit is achieved for the farmer. While there is a difficulty in hiring a wholesaler to buy only one palm product.

Table (11): The relative importance of the patterns of sale of the main product of date palms in the study sample in Sharkiya Governorate in 2022.

Statement	Collected palms (%)	Scattered palms (%)
The wholesaler has contracted from the beginning of the season	90	5
Participation by half	10	35
Calculation by sortie	0	60
Percentage	100	100

Source: Data of the questionnaire form for the study sample in 2022.

Methods of disposal of the by-product of date palms with a study sample:

Table (12) shows that there are many by-products of date palms in the study sample for 2022 that can be benefited from, represented by paper, fiber and palm media, in the case of an feddan of collected palm, the resulting inventory is disposed of by selling for manufacturing and represents 100%, but in the case of fiber, it is disposed of by selling for manufacturing by 60%, home use by 40%. Finally, it is disposed of by selling it with the aim of manufacturing by 70%, and sometimes it is thrown or burned by 20% if it cannot be sold, and finally it is used at home by 10%, especially in primitive rural areas that sweep the streets in front of houses, among other ways to dispose of the byproduct of date palms in the case of the collected feddan.

In the case of a single dispersed palm, the resulting inventory is disposed of in several ways, the foremost of which is the home use of the inventory and represents about 60%, followed by a throw or a burn and represents about 30%, and finally the sale for manufacturing or giving it free of charge to the worker and represents both of them 5% separately, but in the case of fiber, 100% is thrown or burned, and finally the palm media is given to the worker free of charge and represents 60%, and sometimes it is sold for the purpose of manufacturing and represents 20%, and finally the home use or throwing and burning and each of them separately represents 10%. Perhaps the lack of benefit from the by-product per palm is due to the low quantity produced, which makes it difficult to sell to a merchant who needs an expensive means of transportation.

Table (12): The relative importance of methods of disposal of date palm by-product in the study sample in Sharkiya Governorate in 2022.

Statement	Collected palms			Scattered palms		
	Grass (%)	Spikelet (%)	Fiber (%)	Grass (%)	Spikelet (%)	Fiber (%)
Selling to manufacturing	100	70	60	5	0	20
Home use	0	10	40	60	0	10
Giving it free of charge to the worker	0	0	0	5	0	60
Throw it or burn it	0	20	0	30	0	10
Percentage	100	100	100	100	100	100

Source: Data of the questionnaire form for the study sample in 2022.

Problems hindering the productive efficiency of Palms and the means to promote them:

In table (13) it turned out that the problems of date palm production according to palm farmers in the study sample in 2022 increased to a maximum in the infection of trees with palm weevil, which affects palm trees and may eliminate them by up to 28.57%, followed by the presence of wind during the pollination process and therefore takes place in three or more stages instead of only two stages, thus increasing the cost, and the efficiency of pollination may decrease, and thus the average productivity of

the palm by up to 23.81%, followed by rainfall during the pruning process, which may also reduce the efficiency of fruiting by up to 28.57%, followed by 19.05%. The inefficiency of palm weevil pesticides decreased to the lowest level by 4.77%, which is one of total problems facing the efficiency of palm production in the study.

By studying the most important means of promoting palm production according to palm farmers, the study sample showed that it increased to a maximum in the interest in fast-producing new varieties to get fruits faster by 40.58%, followed by attention to short varieties to facilitate production processes and reduce production costs by 29.05%, followed by the state's interest in eliminating palm weevil by providing the necessary pesticides at low prices by 20.62%. It decreased to the lowest in the presence of state control over pesticides to combat Palm diseases by 10.33% of total means of promoting palm production in the study sample.

Table (13): The relative importance of palm production problems and the most important means of promoting them in the study sample in Sharkiya Governorate in 2022.

	Problem	%		Means of promotion	%
1	The spread of Palm mite disease destroys the palm	28.57	1	Cultivation of modern fast-yielding varieties	40.58
2	The presence of wind during pollination	23.81	2	Cultivation of short varieties to facilitate production processes and reduce production costs	29.05
3	Rainfall during pollination	19.05			
4	Rotation of palm production	14.28	3	The state's interest in eliminating Palm mites	20.12
5	Most of the palms have been planted for decades and this leads to the fall of the palms	9.52	4	The presence of state control over pesticides to fight Palm diseases	10.23
6	Inefficiency of pesticides used for the Prevention of palm weevil	4.77			
	percentage	100		Percentage	100

Source: Data of the questionnaire form for the study sample in 2022.

Problems hindering the efficiency of the manufacture of palm by-products and the means of their advancement:

In table (14) it turned out that the problems hindering the high manufacturing efficiency of palm by-products according to the opinions of manufacturers in the study sample in 2022 increased to a maximum in the low demand for palm leaf products due to the presence of many alternatives at lower prices such as plastic cages, particleboard and others by 22.23%, followed by an increase in the price of one grass compared to the same in previous years by 17.44%, followed by higher transportation costs and thus higher manufacturing costs by 15.67%. The rudimentary tools used in manufacturing among most workers in this field decreased to the lowest by 3.58%, one of total problems facing manufacturers of palm by-products in the study sample.

Table (14): The relative importance of the problems hindering the manufacture of date palms in the study sample in Sharkiya Governorate in 2022.

	Problems	%
1	Low demand for grass products because there are many alternatives at lower prices	22.23
2	The increase in the price of one grass compared to the same in previous years	17.44
3	Higher transportation costs and therefore higher manufacturing costs	15.67
4	The lack of the number of technical workers in that craft and the high wages in the case of its existence	14.55
5	The seasonality of work and therefore the low income and its unavailability throughout the year	12.11
6	Most of the work is done at home, not in dedicated workshops	8.08
7	In the case of working at home and the lack of specialized workshops does not give big profits	6.34
8	The tools used in manufacturing by most workers in this field are primitive tools	3.58
	Percentage	100

Source: Data of the questionnaire form for the study sample in 2022.

Photos of the manufacture of date palm by-products with a study sample:

1- Manufacturing of grass:

Grass is used in several industries of high economic importance, including the manufacture of wood panels, which competes with natural wood and particleboard in some industries for its cheap price, and the manufacture of chairs and tables that are used in gardens, parks and tourist hotels, as well as making cages of multiple images and sizes that are used to pack vegetables and fruits and those used to transport birds also from one place to another through various means of transportation, as well as making bread cages that are used to spread bread on them immediately after leaving the bakery or home ovens.

It is clear In table (15) that the manufacture of chairs accounts for about 60%, followed by the manufacture of dishes, representing about 20%, followed by the manufacture of tables, representing about 10%, and finally the manufacture of both bird cages and fruit, each of which represents 5% separately of total manufacturing of the sheet produced from the date palm in the study sample. Thus, it is clear that the manufacture of chairs from the grass occupies the first place and represents the largest percentage of manufacturing images due to the increased demand for them. The sample did not show the manufacture of wood panels due to high manufacturing costs and lack of consumer demand for them.

Table (15): Photos of the manufacture of some date palm by-products in the study sample in 2022

	Statement	%		Statement	%		Statement	%
Grass manufacturing photos	Chairs	60	Palm leaf manufacturing photos	Wicker dishes	34	Fiber manufacturing photos	Walkers in front of houses	30
	Tables	10		Wicker capacity	35		Dust haze	50
	Bread cages	10		Home decorations	20		The ropes	10
	Bird cages	5		Handbags	11			
	Fruit cages	5						
	percentage	100		percentage	100		percentage	100

Source: Data of the questionnaire form for the study sample in 2022.

2- Manufacture of fronds:

Palm fronds are used in many industries, including wicker dishes of various shapes and sizes, which are used in markets - especially rural markets – to display vegetables and fruits, and are also used in rural homes for many purposes, and palm fronds are also used for umbrellas used in clubs and on beaches, especially in tourist places such as Sharm el-Sheikh, as well as boaters used by men and women to protect against the sun, especially in various resorts during the summer. Fronds are also used in the manufacture of women's handmade bags, in home decoration and other important industries. It is clear In table (16) that the energy industry represents about 35% of the manufacturing images in the study sample for 2022, followed by the bread crate industry, representing about 34%, followed by the home decoration industry, representing about 20%, and finally the handmade bags industry, representing about 11%. It is clear from the above that the most widespread of these images in the study sample are the energy industry and bread crate.

3- Fiber manufacturing images:

The fiber produced from the date palm is used in several industries that are commonly used in the Egyptian countryside, such as dust flaps, which are often used to clean high walls in mosques and old houses with high walls, and also ropes and deaf walkers of various sizes are made from it, which are placed in front of houses. It is clear In table (18) of the images of the manufacture of fiber produced from the palm in the study sample in 2022 that the dust fin industry represents about 50%, followed by the manufacture of walkers in front of the House, representing about 30%, and finally the rope industry, representing about 20% of total images of the manufacture of fiber produced from date palm. It is clear from the images of fiber manufacturing that the most widespread of these images is the dust flapper.

Indicators of economic efficiency for the manufacture of the most important by-products of date palm by the study sample:

1- Factories from the grass:

It is clear in table (17) the costs of manufacturing the grass in different forms with a sample of the study in 2022 that the average number of grass produced from the feddan of Palm amounted

to about 2088 grass/feddan, and the following will explain the costs of manufacturing each of the different images of the grass:

Making chairs:

The average number of units produced from chairs in the case of directing the grass produced from the palm feddan amounted to 38 chairs, the average cost of buying the grass was about 1.4 thousand LE/feddan, and the average cost of transportation from agricultural land to the workplace was about 1.48 thousand LE/feddan using the tricycle on several times and depending on the workplace, while the average cost of manufacturing labor for the grass by peeling and cutting its first about 522 LE/feddan, and finally the cost of human labor required to manufacture the grass into chairs about 1.91 thousand LE, and the total manufacturing cost of the grass in the form of chairs is about 5.31 thousand LE/feddan. The average main income of the grass in the case of the production of chairs was about 10.46 thousand LE/feddan, and the secondary income of the grass-which is the waste resulting from cutting the grass (grass base) and used in municipal furnaces - Its value is 300 LE in addition to the secondary revenue represented by palm leaves, the value of which is about 522 LE, and therefore the total revenue of the inventory resulting from the feddan of palm and manufacturing into chairs is about 11.28 thousand LE/feddan, and accordingly the net return for manufacturing an feddan of date palm inventory is about 5.97 thousand LE/feddan, with an average cost of production per unit, which is about 140 LE, and the average sale of the chair is about 280 LE a fairy. Accordingly, the net return for the manufacture of one chair amounted to 140 LE.

Manufacture of tables:

The average number of units produced from tables in the case of directing the sheet produced from the feddan of Palm dates is about 60 tables, the average number of sheets required for the manufacture of one table is about 35 grasses per table. The average cost of human labor required to manufacture the sheet to the trapezes was about 1.37 thousand LE, and therefore the total manufacturing cost was about 4.77 thousand LE. The average main revenue of the grass in the case of the production of tables was about 12 thousand LE, and the total revenue was about 12.82 thousand LE, and the net return for manufacturing an feddan of date palm grass was about 8.05 thousand LE, the average cost of producing one unit, which is the table is about 80 LE, and the average sale of the table is about 200 LE. Accordingly, the net return for the manufacture of one table amounted to 120 LE

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Production of living cages:

In the case of directing the amount of grass produced in the production of living cages, the quantity amounted to about 835 cages, the average number of grasses needed to manufacture the cage was about 3 grasses per living cage. The average cost of human labor required to manufacture the grass into living cages was about 1.61 thousand LE, and therefore the total manufacturing cost was about 5.01 thousand LE. The average main revenue of the inventory in the case of the production of living cages was about 12.5 thousand LE, and the total revenue was about 13.35 thousand LE, and the net return for manufacturing an feddan of date palm inventory was about 8.33 thousand LE, with the average cost of producing one unit, which is a living Cage about 6 LE, and the average sale of one living Cage about 15 LE. Accordingly, the net return of the living cage industry amounted to about 9 LE.

Making bird cages:

In the case of directing the amount of paper produced in the bird industry, the quantity amounted to about 418 cages, the average number of sheets needed to make one cage was 5 grasses. The average cost of the human labor required to manufacture the grass into bird cages was 772.50 LE, so the total manufacturing cost was 4.18 thousand LE. The average main revenue of the grass in the case of the production of bird cages amounted to 8.36 thousand LE, and the total revenue amounted to 9.18 thousand LE, and the net return for manufacturing an feddan of date palm inventory amounted to about 5 thousand LE, with the average cost of producing one unit, which is a bird cage 10 LE, and the average sale of one cage was 20 LE. Accordingly, the net return for the bird cage industry reached 10 LE.

Manufacture of fruit cages:

If the resulting inventory is directed in the manufacture of fruit cages, the quantity reached 696 cages, the average number of sheets required for the manufacture of one cage reached 3 grasses. The average cost of human labor required to manufacture the grass into fruit cages was 1.47 thousand LE, so the total manufacturing cost was 4.87 thousand LE. The average main revenue of the grass in the case of the production of fruit cages was 10.44 thousand LE, the total revenue was 11.26 thousand LE, and the net return for manufacturing an feddan of date palm inventory was 6.39 LE, the average cost of producing one unit, which is a fruit cage is 7 LE, and the average sale of one cage is 15 LE. Accordingly, the net return for the fruit cage industry reached 8 LE.

Table (17): Indicators of the economic efficiency of grass manufacturing in various forms with a sample of the simple study in 2022

Statement	unit	Chair	Table	Bread crate	Bird cage	Fruit cage
Average number of grasses produced per feddan	Grass/ feddan	2088				
Average number of units produced	Unit	38	60	835	418	696
Average number of sheets needed per unit	Grass	55	35	3	5	3
Average purchase price per feddan of Palm	LE/feddan	1402.5				
The average cost of transporting the inventory to the workplace	LE/feddan	1479				
The average cost of cleaning labor for the inventory	LE/feddan	522				
Average manufacturing labor cost for inventory	LE/feddan	1911.41	1369.07	1607.7	772.5	1468.5
Total manufacturing cost of inventory	LE/feddan	5314.91	4772.57	5011.2	4176	4872
The main income of the grass	LE/feddan	10460	12000	12525	8360	10440
Secondary revenue of the grass	LE	300				
Secondary revenue of the grass	LE	522				
Total revenue per share	LE	11282	12822	13347	9182	11262
Net earnings per share	LE	5967.09	8049.43	8335.8	5006	6390
The average cost of manufacturing one unit	LE/unit	140	80	6	10	7
Average selling price per unit LE	LE/unit	280	200	15	20	15
Net yield per unit manufactured	LE/unit	140	120	9	10	

All costs are calculated for the number of sheets produced per feddan, (1) the main revenue is the average unit price of the product multiplied by the number of units of sheets produced per feddan of Palm (2) the secondary revenue is the waste resulting from cutting the sheet and used in rural ovens, (3) the secondary revenue is palm fronds.

Source: Data of the questionnaire form for the study sample in 2022

2- Manufacture of fronds (Wicker) by study sample:

It is clear In table (18) the costs of manufacturing fronds (Wicker) in various forms in the study sample in 2022 that the average purchase price of fronds (Wicker) resulting from the inventory for an feddan of date palm in the study sample was 522 LE/feddan, and the average transportation price was 453 LE/feddan, which is the transportation from the field to a place three times in a row by Tricycle, and after that they are manufactured to machineries, booms, home decorations and handmade bags and each industry will be referred to with a kind of brevity:

- **Manufacture of Wicker dishes:** In the case of Manufacture of Wicker dishes, manufacturing labor costs are added to the units, which amount to 29.4 thousand LE, and thus the total costs for the quantity becomes 30.38 thousand LE, while the total revenue for the quantity reached 50.4 thousand LE, and the net return for the quantity produced reached 20.03 thousand LE. The number of units produced from the Mishnah reached about 420 units, the average total cost of the unit was 72.32 LE and the average selling price of one unit was 120 LE, thus the net return of the Mishnah unit was 48 LE
- **Boaters industry:** Manufacturing labor costs for the units amounted to 31.3 thousand LE, thus the total costs for the quantity becomes 32.3 thousand LE, the total revenue for the quantity reached 52.2 thousand LE, and the net return for the quantity produced reached 19.9 thousand LE. The number of units produced from boaters reached 1044 units, with the average total cost of the unit 30.93 LE and the average selling price of one unit was 50 LE, so the net return of the power unit is 19 LE.
- **Home decoration industry:** In the case of home decoration industry, manufacturing labor costs are added to the units, which amount to 41.8 thousand LE, and the total costs for the quantity amounted to 42.7 thousand LE, while the total revenue for the quantity amounted to 71 thousand LE, and therefore the net return for the quantity produced amounted to 28.3 thousand LE. The number of units reached 417.6 units, with an average total cost of 102.3 LE per unit and an average selling price of 170 LE per unit, so the net return per unit is 68 LE.

- **Making handmade bags:** The manufacturing labor costs for the units amounted to 27.8 thousand LE, the total costs for the quantity amounted to 28.8 thousand LE, the total revenue for the quantity amounted to 48.7 thousand LE, and the net return for the quantity produced amounted to 19.9 thousand LE. The number of units produced from handmade bags reached 696 units, with an average total cost of 41.40 LE, and the average selling price of one unit was 70 LE, so the net return for a unit of handmade bags is 29 LE.

Table (18): Manufacturing costs of fronds (Wicker) produced from different types of paper (in LE) in the study sample in 2022

Statement	Wicker dishes	Wicker baskets	Decorations for houses	Handbags
Average purchase price of palm leaves	522			
Transportation costs for fronds	453			
Manufacturing labor costs	29400	31320	41760	27840
Total costs per quantity	30375	32395	42735	28815
Total quantity revenue	50400	52200	70992	48720
Net yield per produced quantity	20025	19905	28257	19905
Number of units produced	420	1044	417.6	696
The cost of manufacturing one unit	70	30	100	40
Average total unit cost	72.32	30.92	102.33	41.40
Average unit selling price	120	50	170	70
Net return per unit	48	19	68	29

Source: Data of the questionnaire form for the study sample in 2022

3- Fiber industry with study sample:

It is clear in table (19) costs of manufacturing fiber in various forms with a sample of the study in 2022, represented by walks in front of houses, or dust fins, or ropes, that the average purchase price of fiber produced from an acre of date palm amounted to 3025 LE, and the average transportation costs were 300 LE for the resulting quantity.in the case of manufacturing dust fins, inches and thread are used, and the cost is 600 LE. Below the manufacturing costs for each individual image will be presented.

Manufacture of walkers in front of houses:

The average cost of manufacturing labor to produce walkers in front of the house was 10.9 thousand LE, and the total cost of the quantity produced was 14.2 thousand LE. The total revenue of the quantity reached 21 thousand LE and the net return of the produced quantity reached 6.8 thousand LE. The number of units produced reached 420 walkers, and the average total cost of the unit was 33.92 LE, and therefore the net return of the unit reached 16.08 LE.

Finning industry:

The average cost of manufacturing labor for the production of fins was 8.35 thousand LE, and therefore the total cost of the produced quantity was 11.7 thousand LE. The total revenue of the quantity reached 20.9 thousand LE and the net return of the produced quantity reached 9.2 thousand LE. The number of units produced reached 1.04 thousand fins, and the average total cost of the unit was 11.18 LE, and therefore the net return of the unit reached 8.82 LE.

Rope industry:

The average cost of manufacturing labor to produce ropes was 34.8 thousand LE, and the total cost of the produced quantity was 38.1 thousand LE. The total revenue of the quantity amounted to 69.6 thousand LE and the net return of the quantity produced was about 31.5 thousand LE. The number of units produced reached 232 ropes, and the average total cost of the unit was 164.33 LE, and therefore the net return of the unit reached 135.67 LE.

Table (19): Indicators of the economic efficiency of manufacturing fiber from palm trees in various forms with a sample of the study in 2022

Statement	unit	Walking in front of houses	Dust haze	Ropes
Average purchase price of fiber	LE	30225		
Average cost of Transportation	LE	300		
Other accessories (1)	LE	0	600	0
Manufacturing employment	LE	10920	8352	34800
Total costs for quantity	LE	14245	11677	38125
Total quantity revenue	LE	21000	20880	69600
Net yield per produced quantity	LE	6755	9203	31475
Number of units produced	unit	420	1044	232
The cost of manufacturing one unit	LE	26	8	150
Average total unit cost	LE	33.92	11.18	164.33
Average unit selling price	LE	50	20	300
Net return per unit	LE	16.08	8.82	135.67

(1) **Other supplies include linen and thread.**
Source: Data of the questionnaire form for the study sample in 2022

Indicators of economic efficiency of date production and manufacturing of palm tree by-products by the study sample:

In this part of the study, the weighted average of the arithmetic averages of the basic production (dates) was calculated (weighted by weights) as well as the products manufactured from the palm residues previously referred to collectively (weighted by number), where the average of each product differs from other products (because each stage of production and manufacturing for the palm acre in the study sample for 2022, which was calculated earlier, is characterized by different economic efficiency indicators, both for the Acre and for the unit) in order to calculate the indicators of economic efficiency for them combined. In table (20) an explanation of each stage:

Production stage:

The total production costs per acre reached 22.34 thousand LE, the total revenue reached 497.5 thousand LE, and the net return reached 475.2 thousand LE. As for the single palm, the total costs amounted to 192.65 LE, the total revenue amounted to 42.89 thousand LE and the net return amounted to 4096.34 LE/Palm.

The average stage of manufacturing fronds: reached 29.48 thousand LE per feddan planted with date palms, the total revenue reached 54 thousand LE, and the net yield reached 21.3 thousand LE. As for the single palm, the total costs amounted to 254.09 LE, the total revenues amounted to 465.61 LE and the net return amounted to 183.42 LE/Palm.

The average stage of fiber manufacturing: the total costs per acre reached 15.93 thousand LE, the total revenue reached 27.57 thousand LE, and the net return reached 11.64 thousand LE. As for one palm, the total costs amounted to 137.33 LE, and the total revenue amounted to 237.71 LE, and therefore the net return amounted to 100.37 LE/Palm.

The total of the previous stages:

The total costs per acre amounted to about 76.09 LE, the total revenue reached 590.84 thousand LE, and the net return reached 514.75 LE. As for the single palm, the total costs amounted to 655.96 LE, and the total revenue amounted to 5.09 LE and the net return amounted to 4.44 thousand LE/Palm.

Table (20): Manufacturing costs, revenues and net return for all stages of production and manufacturing of Palm

	Statement	Unit	Production stage	The average stage of manufacturing the grass(1)	The average stage of manufacturing fronds	Average stage of total fiber manufacturing	Total
Per feddan	Total costs	LE/ Feddan	22347.5	4791.97	29475.4	15930.83	76091.18
	Total revenue		497523	11734.59	54011.55	27574.25	590843.39
	Net return		475175.5	6942.62	21277.67	11643.42	514752.21
For the palm	Total costs	LE/ Palm	192.65	41.31	284.66	137.33	655.96
	Total revenue		4288.99	101.16	465.62	237.71	5093.48
	Net return		4096.34	59.85	180.95	100.37	4437.52

acres (in LE) in the study sample in 2022.

(1) all averages are phased by the number of units produced per plant

Source: Data of the questionnaire form for the study sample in 2022

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