A Comparative Economic Study Of The Role Of Farm Labor In Establishing And Producing (Fruitful) Fig Farms In Egypt

Dr. Hossam Hosny Abdul Aziz[1], Dr. Rania Rashad Abdul Nabiey[2],
Dr. Aziza Ebraheim Hussein[3]

[1]Senior Researcher, Agricultural Economics Research Institute, Agricultural Research Center, Egypt.
[2]Researcher, Agricultural Economics Research Institute, Agricultural Research Center, Egypt
[3]Researcher, Agricultural Economics Research Institute, Agricultural Research Center, Egypt

Abstract:
Fruit is considered one of the most important sectors, The value of fruit production reached about 111.87 million pounds, The value of fig production amounted to 0.704 million pounds in 2022, The research problem lies in: Does agricultural labor, both human and mechanical, have a significant impact on the costs of establishing and producing (fruitful) fig farms in new and old lands in Egypt?, The research aims to study the most important factors and variables affecting fig production and to study production costs, especially the costs of human agricultural labor and the machinery for its production on the new and old lands in Egypt, The research relied on descriptive and quantitative statistical analysis methods through the use of some statistical tools and statistical hypothesis tests, The research also relied mainly on secondary data, The results indicate that the cost of human labor wages and the cost of mechanical service changed significantly in establishing and producing (fruitful) farms in new and old lands in Egypt, The research recommends attention to the cultivation of figs to help find solutions to the problem of unemployment in the agricultural sector to reach the stage of full employment of the labor resource.
Keywords: (figs, human and mechanical labor, new and old lands, statistical hypothesis tests).

I.   Introduction

The agricultural sector is considered one of the most important economic sectors with an impact on the Egyptian national economy, as the value of agricultural production amounted to about 595.67 million pounds in 2020, compared to 1070.70 million pounds in 2022, an increase of 79.63%, The value of net agricultural income also increased by about 73.89%, reaching about 634.52 million pounds in 2022, compared to about 364.90 million pounds in the year 2020, The value of plant production comes in first relative importance to the total value of agricultural production, as the value of plant production amounted to about 603.76 million pounds, representing about 77.22% of the total value of agricultural production, which amounts to about 1070 million[6] pounds in 2022.

Fruit is considered one of the most important sectors that influence the value of agricultural production, and the fig crop is considered one of the components of fruit in Egypt, as the value of fruit production amounted to about 111.87 million pounds, representing about 18.53%, 10.46% of the total value of plant production and agricultural production, which amounts to about 603.76, 1070 million pounds respectively in 2022, and the value of fig production reached 0.704 million pounds, representing about 0.63%, 0.12% of the total value of fruit production, and the total value of plant production, respectively, for the same[6] year.

Fig production in Egypt had a high level of relative importance, as the total cultivated area of figs was estimated at about 71.59 thousand feddans across Egypt, and the total fruitful area amounted to about 68.79 thousand feddans, giving a total production estimated at about 206.63 thousand tons during[4] the year 2022.

Figs are also considered one of the most important fruit crops, as the fig tree is one of the trees that is suitable for cultivation on all types of lands, especially lands in which it is difficult to grow traditional crops, such as [1] calcareous lands and saline lands, It is also suitable for cultivation in sandy and yellow desert lands to combat desertification and work to combat desertification and adapting the dry desert environment, Figs are considered a rich fruit with a high nutritional value, as they contain most of the basic and necessary nutrients[3] for the human body.

II.   Research Problem

The research problem is centered on the high production costs of fig production, as fig cultivation needs to go through two stages: the field establishment stage and the production stage, and each of them requires high costs, which constitutes a burden on farmers, as the total costs increased from about 68.93 and 58.49 thousand pounds/feddan in 2020 to about 107.16, 77.51 thousand pounds/feddan in[7] 2022, with an increase rate estimated at about 55.46%, 32.52% respectively, Agricultural labor costs, both human and mechanical, are considered to be the most influential burden on the production costs of figs, whether at the level of field construction or at the production level, as they represent the largest proportion of the variable and total costs of its production, as they rose from about 28.12 and 22.23 thousand pounds/feddan to about 43.01, 30.48 thousand pounds/feddan[7] in 2022, with an increase rate estimated at about 52.59%, 37.11% respectively, This led to a lack of interest among many farmers in growing figs, even though it is one of the fruit crops that can be grown on all types of lands under difficult climatic conditions and in the presence of small amounts of irrigation water, which led to a decrease in the quantities produced from it from about 299.01 thousand tons in 2020 to About 206.63 thousand tons[5] in 2022, with a decrease rate estimated at about 30.90%, which It reduces the economic return of fig cultivation, Therefore, the research problem lies in: Does agricultural labor, both human and mechanical, have a fundamental impact on the costs of establishing and producing (fruitful) fig farms in new and old lands in Egypt?.

III.   Research Objectives

The research aims basically to study the most important factors and variables affecting fig production and to study production costs, especially the costs of human agricultural labor and the machinery for its production on the level of new and old lands in Egypt, through the following sub-objectives:
1 - The development of the current situation of fig production in the most important agricultural areas in Egypt.
2 - Measuring the impact of agricultural labor on the costs of establishing and producing (fruitful) fig farms in Egypt.
3 - Comparative economic analysis of the impact of using agricultural labor in establishing and producing (fruitful) fig farms in Egypt.

IV.   Research Method And Data Sources

The research relied on descriptive and quantitative statistical analysis methods through the use of some statistical tools such as percentages, index numbers, arithmetic averages, and simple regression methods to estimate general time trends, and tests of statistical hypotheses such as the paired samples t-test, Groups independent samples t-test, and two-way analysis of variance [8] (ANOVA) and other statistical methods that help achieve the research objectives.

The research also relied basically on published and unpublished secondary data that was obtained and collected from official and governmental agencies related to the subject of the research, such as the Economic Affairs Sector, the Central Administration for Agricultural Economics at the Ministry of Agriculture, the Central Agency for Public Mobilization and Statistics, in addition to relying on the results of other studies that were conducted in this field.

V.   Results And Discussion

First: The current status of fig production in Egypt during the period (2009-2024):

The development of the total quantity produced of the fig crop in the most important areas and governorates of its cultivation in both new and old lands during the study period (2009-2024) is studied through the following:

1 - The development of fig production in the new lands in Egypt during the period (2009-2024):

The data in Table (1) indicate that the total fig production in the new lands in Egypt fluctuated during the period (2009-2024), as it ranged between a minimum of about 159.35 thousand feddan in 2011, and a maximum of about 291.85 thousand feddan in 2020, The average production of figs in the new lands in Egypt during the study period was about 197.88 thousand feddan, and about 76.02% of the total average production of figs in the new lands in Egypt during the study period was concentrated in Matrouh Governorate, where the average production reached about 150.43 thousand feddan, with a limit The lowest amounted to about 123.92 thousand feddan in 2022, representing about 62.42% of the total production at the level of new lands in Egypt in the same year, and maximum of about 248.3 thousand feddan in 2009 represented about 88.34% of the total average production of figs in the New Lands in Egypt in the same year.

The Nubaria region came in second place with an average of about 33.26 thousand feddan, representing about 16.81% of the average total production of figs in the new lands of Egypt during the study period, with a minimum of about 14.67 thousand feddan in 2011, representing about 9.21% of the total

production. For figs in the new lands in Egypt in the same year, and maximum of about 57.3 thousand feddans in 2024 represents about 28.84% of the total fig production across the new lands in Egypt in the same year, while Alexandria Governorate came in third place with an average of about 5.59 thousand feddans, representing about 2.82% of the average total fig production of new lands in Egypt during the study period, and a minimum of about 2.14 thousand feddan in 2021, representing about 1.05% of the total production of figs on new lands in Egypt in the same year, and a maximum of about 7.04 thousand feddan in 2018, representing about 3.3% of the total production of figs on new lands in Egypt, in the same year.

Table (1): Fig production in the most important fig-growing governorates in the new lands in Egypt for the period (2009-2024): (Thousand tons)

| Years | Fig production in the most important fig-growing governorates in the new lands | | | | | | New lands Total Production |
| | Matrouh | | Alexandria | | Nubaria | | |
	quantity	%	quantity	%	quantity	%	quantity
2009	248.30	88.34	5.93	2.11	19.69	7.00	281.07
2010	152.10	85.04	6.12	3.42	14.97	8.37	178.86
2011	132.85	83.37	5.72	3.59	14.67	9.21	159.35
2012	136.76	83.43	5.14	3.13	15.99	9.75	163.92
2013	141.94	83.84	5.44	3.22	16.14	9.53	169.29
2014	140.26	82.59	5.70	3.36	17.76	10.46	169.81
2015	136.41	82.20	5.92	3.57	18.39	11.08	165.94
2016	146.18	82.31	6.58	3.70	17.64	9.93	177.58
2017	150.14	80.07	6.47	3.45	19.17	10.23	187.51
2018	142.27	66.64	7.04	3.30	51.91	24.31	213.50
2019	143.68	69.09	6.90	3.32	51.32	24.68	207.97
2020	226.99	77.77	6.71	2.30	51.32	17.58	291.85
2021	136.98	67.29	2.14	1.05	51.32	25.21	203.58
2022	123.92	62.42	4.07	2.05	57.24	28.83	198.53
2023	124.07	62.46	4.58	2.30	57.26	28.83	198.62
2024	124.10	62.46	4.96	2.50	57.30	28.84	198.70
Average	150.43	76.02	5.59	2.83	33.26	16.81	197.88
Min	123.92	---	2.144	---	14.67	---	159.35
Max	248.30	---	7.04	---	57.30	---	291.85

Where:
% = (quantity in year x / total quantity of new lands in year x) x 100.
Source: Ministry of Agriculture and Land Reclamation, Economic Affairs Sector, Agricultural Statistics Bulletin, various issues.

By estimating the general time trend equations for the total production of figs in the most important areas of its cultivation in the new lands across Egypt during the period (2009-2024), It is clear from Table (2) that it took a general decreasing, statistically significant trend at the level of 0.05 in both the total Republic and Matrouh Governorate, while the values of the determination coefficients (R^2) of about 0.53 and 0.61 indicate that the changes Whose effect reflects the time factor are explained, respectively, about 53% and 61%. Of the changes occurring in the total production of figs during the period (2009-2024), in both the total republic and Matrouh Governorate, it was taken a general decreasing trend that is not statistically significant in Alexandria Governorate, While it is clear from Table (2) that it took a general, statistically significant increasing trend at a significance level of 0.01 in the Nubaria region, where the annual increase amounted to about 3.55 thousand feddans, representing about 10.68% of the annual average of about 33.26 thousand feddans, While the values of the determination coefficients (R2) of about 0.79 indicate that changes whose effect reflects the time factor explain about 79% of the changes occurring in the total production of figs in the Nubaria region during the period (2009-2024).

2 - The development of fig production in the old lands of Egypt during the period (2009-2024):
The data in Table (3) indicate a fluctuation in the total production of figs in the old lands of Egypt during the period (2009-2024), as it ranged between a minimum of about 5.61 thousand tons in 2009, and a maximum of about 8.69 thousand tons in 2024, The average production of figs in the old lands of Egypt during the study period was about 705 thousand tons, and about 44.54% of the total average production of figs in the old lands of Egypt during the study period was concentrated in Minya Governorate, where the average production was about 3.14 thousand tons, with a minimum, It reached about 1.94 thousand tons in 2009, representing about 34.56% of the total production in the old lands of Egypt in the same year, and a maximum of about 4.52 thousand tons in 2024 represents about 52.00% of the total average production of figs in the old lands of Egypt in the same year. Qena Governorate came in second place with an average of about 0.38 thousand tons, representing about 5.45% of the average total production of figs in the lands. Old Egypt during the study period, with a minimum of about 0.24 thousand tons in 2021, representing about 2.99% of the total

production of figs in old land in the same year, and maximum of about 0.61 thousand tons in 2009, representing about 10.84% of the total average production of figs in the old lands of Egypt in

Table (2): General time trend equations for the production development of the fig crop in the new lands in Egypt during the period (2009-2024):　　　　　(Thousand tons)

No	Governorate	Function	Average	Annual change Amount	Annual Change rate %	R^2	F Value Sig
1	Matrouh	$\hat{y} = 269.745 - 58.38\ x_t + 7.53\ x_t^2 - 0.283 x_t^3$ (7.73)** (-3.39)** (3.25)** (-3.15)**	150.43	– 44.17	29.36	0.53	4.52 *
2	Alexandria	$\hat{y} = 6.358 - 0.091\ x_t$ (10.04)** (-1.38)	5.59	– 0.091	1.63	n.s	n.s
3	Nubaria	$\hat{y} = 3.052 + 3.553\ x_t$ (0.65) (7.32)**	33.26	3.55	10.68	0.79	53.58 **
4	New lands Total production	$\hat{y} = 314.815 - 70.93\ x_t + 9.615\ x_t^2 - 0.357 x_t^3$ (9.18)** (-4.19)** (4.22)** (-4.04)**	197.88	– 52.77	26.67	0.61	6.49 *

Where:
- Ŷ: refers to the production of figs in the new lands of Egypt, respectively.
- X: refers to the time factor, t: 1, 2,........ 16.　　R^2: determination coefficient.
- F: Calculated F value.　(**): Significant at a significance level of 0.01.
- (*): Significant at a significance level of 0.05.
- (n.s): not significant at any significance level (0.05, 0.01).
- The amount of annual change: It is the first derivative of the function when x
(The arithmetic average of the length of the time series) (136/16 = 8.5).
- Annual rate of change (%): (Amount of annual change / Annual average of the
Variable) x 100.
Source: Collected and calculated from Table (1) of the research.

Table (3): Fig production in the most important fig-growing governorates in the old lands in Egypt for the period (2009-2024):　　　　　(Thousand tons)

Years	Fig production in the most important fig-growing governorates in the old lands						Old lands Total Production
	Minya		Sharkia		Qena		
	quantity	%	quantity	%	quantity	%	quantity
2009	1.94	34.56	0.47	8.41	0.61	10.84	5.61
2010	2.59	42.26	0.27	4.40	0.52	8.48	6.12
2011	2.76	44.92	0.31	5.07	0.49	8.04	6.13
2012	2.66	37.17	0.39	5.39	0.51	7.08	7.14
2013	2.54	34.76	0.35	4.79	0.49	6.65	7.30
2014	2.02	32.14	0.24	3.81	0.46	7.38	6.29
2015	2.50	38.23	0.25	3.77	0.44	6.75	6.53
2016	2.63	42.40	0.29	4.64	0.44	7.12	6.21
2017	2.80	41.74	0.53	7.88	0.32	4.82	6.70
2018	2.97	37.78	0.56	7.17	0.32	4.03	7.87
2019	3.70	55.95	0.25	3.70	0.31	4.67	6.62
2020	4.06	56.72	0.20	2.78	0.25	3.42	7.16
2021	3.63	46.22	0.14	1.76	0.24	2.99	7.86
2022	4.47	55.21	0.10	1.27	0.25	3.04	8.10
2023	4.50	53.12	0.11	1.31	0.26	3.03	8.48
2024	4.52	52.00	0.12	1.38	0.26	3.02	8.69
Average	3.14	44.54	0.29	4.05	0.38	5.45	7.05
Min	1.94	---	0.103	---	0.24	---	5.61
Max	4.52	---	0.56	---	0.61	---	8.69

Where:
% = (quantity in year x / total quantity of new lands in year x) x 100.
Source: Ministry of Agriculture and Land Reclamation, Economic Affairs Sector, Agricultural Statistics Bulletin, various issues.

The same year, while the Sharkia Governorate came in third place with an average of about 0.29 thousand tons, representing about 4.05% of the average total production of figs in the old lands of Egypt during the study period, and a minimum of about 0.103 thousand tons in 2022, representing about 1.27% of the total production of figs in the old lands in Egypt in the same year, and a maximum of about 0.56 thousand tons in 2018, representing about 7.17% of the total production of figs in the old lands in Egypt in Same year.

By estimating the time trend equations for fig production in the most important areas of cultivation in the old lands in Egypt during the period (2009-2024), it is clear from Table (4) that it took a general, statistically significant increasing trend at the 0.01 level in both the total production of Minya Governorate and the total production in Old lands, where the amount of annual increase for each of them, respectively, was about 0.164 and 0.162 thousand tons, representing About 5.22% and 2.29% of the annual average for each of them, which amounts to about 3.14 and 7.05, respectively, While the values of the determination coefficients (R^2) of about 0.78 and 0.67 indicate changes whose effect reflects the time factor, they explain, respectively, about 78% and 67% of the changes occurring in the total production of figs during the period (2009-2024), in both the total production of Minya Governorate and the total production of figs in old lands, respectively.

While it is clear from Table (4) that it took a general, statistically significant decreasing trend at the significance level of 0.05 in the Sharkia Governorate, and at the significance level of 0.01 in the Qena Governorate, where the amount of annual decrease for each of them, respectively, was about 0.017, 0.024 thousand tons, representing about 5.8 6.3% and 6.3% of the annual average for each of them, which amounts to about 0.29 and 0.38, respectively, While the values of the determination coefficients (R^2) of about 0.32 and 0.91 indicate changes whose effect reflects the time factor, they explain, respectively, about 32% and 91% of the changes occurring in the total production of figs during the period (2009-2024) in both the total production of the Sharkia Governorate and the total production in Qena Governorate.

Table (4): General time trend equations for the production development of the fig crop in the old lands in Egypt during the period (2009-2024): (Thousand tons)

No	Governorate	Function	Average	Annual change Amount	Annual Change rate %	R^2	F Value
							Sig
1	Minya	$\hat{y} = 1.74 + 0.164\ x_t$ (8.22)** (7.47)**	3.14	0.164	5.22	0.78	55.92 **
2	Sharkia	$\hat{y} = 0.433 - 0.017\ x_t$ (6.74)** (-2.59)*	0.29	- 0.017	5.8-	0.32	6.74 *
3	Qena	$\hat{y} = 0.593 - 0.024\ x_t$ (31.43)** (−12.51)**	0.38	- 0.024	6.3-	0.91	156.63 **
4	Old lands Total production	$\hat{y} = 5.73 + 0.162\ x_t$ (20.33)** (5.61)**	7.05	0.162	2.29	0.67	31.55 **

Where:
- $\hat{Y}$: refers to the production of figs in the old lands of Egypt, respectively.
- X: refers to the time factor, t: 1, 2,........ 16.   R2: determination coefficient.
- F: Calculated F value.   (**): Significant at a significance level of 0.01.
- (*): Significant at a significance level of 0.05.
- (n.s): not significant at any significance level (0.05, 0.01).
- The amount of annual change: It is the first derivative of the function when x
(The arithmetic average of the length of the time series) (136/16 = 8.5).
- Annual rate of change (%): (Amount of annual change / Annual average of the Variable) x 100.
Source: Collected and calculated from Table (3) of the research.

3 - Variation analysis (ANOVA) of fig production in the most important fig-growing governorates in the new lands in Egypt for the period (2009-2024):

The result of a two-way analysis of variance (ANOVA) for the average fig production in the most important fig-growing governorates during the period (2009-2024) in the new lands, shown in Table (5), indicates that there are highly significant differences between the governorates at a significance level of 0.01, while significance was not established between years at any of the levels, Familiar significance (0.05, 0.01).

The results of applying the least significant difference (LSD) method, shown in Table (6), to test the significance of the differences between the average fig production between the governorates in the new lands during the research period indicate the presence of highly significant differences at a significance level of 0.01 between the average fig production in all the governorates and the regions in which they are the most important fig-growing governorates in the new lands (Matrouh, Alexandria, Nubaria).

4 - Variation analysis (ANOVA) of fig production in the most important fig-growing governorates in the old lands in Egypt for the period (2009-2024):

The result of a two-way analysis of variance (ANOVA) for the average fig production in the most important fig-growing governorates during the period (2009-2024) in old lands, shown in Table (7), indicates the presence of highly significant differences between the governorates at a significance level of 0.01, while significance was not established between years at any level of Familiar morale levels.

Table (5): Results of variance analysis (ANOVA) for fig production in the most important fig-growing governorates in the new lands in Egypt for the period (2009-2024):

Statement	Sum square errors (S.S.E)	Degrees of freedom (d.f)	Mean square errors (M.S.E)	(F) Value
				sig
Between governorates	189208.38	2	94604.19	168.37
				**
Between years	7294.64	15	486.31	0.866
				n.s
Experimental error	16856.19	30	561.587	---
Total	213359.21	47	---	---

Where:
- (**): Significant at a significance level of 0.01.
- (n.s)**:** Not significant at any significance level (0.05, 0.01).
Source: Collected and calculated from Table (1) of the research.

Table (6): The results of the least significant difference (L.S.D) test to test the significance of differences between the productions averages of the most important fig-growing governorates in the new lands in Egypt during the period (2009-2024):

Governorate	production Average (thousand tons)	Nubaria	Alexandria	Matrouh
Matrouh	150.43	117.17**	144.84**	---
Alexandria	5.59	27.67**	---	
Nubaria	33.26	---		

Where:
(**): Significant at a significance level of 0.01**.**
Source: Collected and calculated from Table (1) of the research.

Table (7): Results of variance analysis (ANOVA) for fig production in the most important fig-growing governorates in the old lands in Egypt for the period (2009-2024):

Statement	Sum square errors (S.S.E)	Degrees of freedom (d.f)	Mean square errors (M.S.E)	(F) Value
				sig
Between governorates	84.14	2	42.07	130.48
				**
Between years	2.33	15	0.155	0.481
				n.s
Experimental error	9.67	30	0.322	---
Total	96.14	47	---	---

Where:
- (**): Significant at a significance level of 0.01.
- (n.s): Not significant at any significance level (0.05, 0.01).
Source: Collected and calculated from Table (3) of the research.

The results of applying the least significant difference (LSD) method, shown in Table (8), to test the significance of the differences between the average production of figs between the governorates in the old lands during the research period indicate the presence of highly significant differences at a significance level of 0.01 between the average production of figs in Minya Governorate and the average production in the two governorates, Qena and Sharqia, as well as between the average fig production in Qena Governorate and the average fig production in Minya Governorate, While the significance of the difference between the average production of figs in Sharkia Governorate and the average production of figs in Qena Governorate was not proven at any of the usual levels of significance.

Second: An economic analysis of the efficiency of using agricultural labor to produce the fig crop in Egypt

The research in this part deals with the economic analysis of the efficiency of using agricultural labor to produce figs in Egypt by studying the impact of the role of human and mechanical agricultural labor on the costs of establishing and producing (fruitful) figs in Egypt in new and old lands during the period (2009-2024) through:

A -An economic analysis of the impact of agricultural labor on the production costs of establishing fig farms in Egypt during the period (2009-2024):

An economic analytical study is conducted of the impact of human and mechanical agricultural labor on the costs of establishing fig farms in new and old lands in Egypt during the period (2009-2024) by studying

the crop budget for establishing these farms and the relative importance of each item of the total variable costs and total costs, with an analysis of the role of farm work and its impact on those costs, through the following:

Table (8): The results of the least significant difference (L.S.D) test to test the significance of differences between the productions averages of the most important fig-growing governorates in the old lands in Egypt during the period (2009-2024):

Governorate	production Average (thousand tons)	Qena	Sharkia	Minya
Minya	3.14	2.76**	2.85**	---
Sharkia	0.29	0.09n.s	---	
Qena	0.38	---		

Where:
- (**): Significant at a significance level of 0.01.
-(n.s): Not significant at any significance level (0.05, 0.01).
Source: Collected and calculated from Table (3) of the research.

1 -An economic analysis of the impact of agricultural labor on the costs of establishing fig farms in new lands (outside the valley) in Egypt during the period (2015-2024):

       Table (9) shows the items of the total production costs per feddan of figs, distributed for agricultural labor wages and production requirements in the new lands (outside the valley) in Egypt for the period (2015-2024), where the average variable production costs per feddan of establishing figs farms in Egypt for the period (2015- 2024) at new lands, about 37.06 thousand pounds/feddan,The average fixed costs (annual rent) were about 5.28 thousand pounds/feddan, each representing about 87.54% and 12.46%, respectively, of the average total costs per feddan during the study period (2015-2024), which amounted to about 42.34 thousand pounds/feddan.

Table (9): Total production costs per feddan of establishing figs farms distributed to agricultural labor wages and production requirements in new lands (outside the valley) in Egypt for the period (2015-2024):

(Thousand pounds/feddan)

Years	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	Average	(%)*	(%)**
Human labor wages	6.27	7.70	8.94	9.63	10.11	11.47	12.11	16.50	19.25	22.12	12.41	33.48	29.31
Mechanical labor cost	1.33	1.25	1.89	2.70	2.56	3.39	4.51	6.25	8.16	9.75	4.18	11.27	9.87
Total agricultural labor cost	7.60	8.95	10.83	12.33	12.66	14.86	16.62	22.75	27.41	31.87	16.59	44.75	39.18
Seedlings value	0.63	0.72	1.44	1.44	1.60	1.60	1.80	3.57	6.80	9.40	2.90	7.82	6.85
Chemical fertilizers value	1.33	1.07	1.47	1.60	2.27	2.09	2.25	4.04	6.14	8.75	3.10	8.36	7.32
Organic fertilizer	0.48	0.75	1.25	1.50	1.75	2.00	2.00	2.50	3.10	3.60	1.89	5.11	4.47
Pesticides value	0.92	1.10	1.45	1.50	1.00	1.70	1.80	1.85	1.90	2.10	1.53	4.13	3.62
Expendable tools Value	0.30	0.30	0.40	0.40	0.40	0.40	0.50	0.70	0.90	1.10	0.54	1.46	1.28
Irrigation networks value	5.50	3.50	4.50	5.00	6.00	6.00	6.00	8.00	10.00	12.50	6.70	18.08	15.83
Administrative expenses	0.20	0.19	0.24	0.27	0.30	0.33	0.37	0.50	0.70	0.86	0.40	1.07	0.94
Annual consumption	1.68	1.64	2.13	2.38	2.57	2.87	2.78	4.34	6.50	7.25	3.41	9.21	8.06
Total production requirements costs	11.03	9.27	12.89	14.09	15.89	16.98	17.50	25.50	36.04	45.56	20.48	55.25	48.36
Total variable costs	18.63	18.22	23.71	26.42	28.55	31.84	34.12	48.25	63.45	77.43	37.06	100.00	87.54
Total fixed costs (rent)	3.50	3.00	3.00	3.50	4.00	4.00	6.00	7.00	8.50	10.25	5.28	---	12.46
Total costs	22.13	21.22	26.71	29.92	32.55	35.84	40.12	55.25	71.95	87.68	42.34	---	100.00

Where:
1- Total agricultural labor cost = human labor wages + mechanical labor cost.
2- The total cost of production requirements = seedlings value + chemical fertilizers value + Organic fertilizer value + pesticides value + Expendable tools Value + irrigation networks value + administrative expenses + annual consumption.
3- Total variable costs = total cost of agricultural labor + total cost of production
Requirements.
4- Total costs = total fixed costs (rent) + total variable costs.
(%)* = (cost in year x / variable cost in year x) x 100.
(%)** = (cost in year x total cost in year x) x 100.
Source: Ministry of Agriculture and Land Reclamation, Economic Affairs Sector, Annual Bulletin of Cost and Net Return Statistics, various issues.

       Table (9) shows also that the item of total agricultural labor cost comes in first place with an average value of about 16.59 thousand pounds/feedan, which represents about 44.75%, 39.18% of the average variable costs and the average total productive costs per feddan, respectively, and the part of human labor wages and the cost of mechanical labor represents about 33.48%, 11.27. % of the average variable costs, and 29.31%, 9.87 of the average total production costs per feddan, respectively during the period (2015-2024).

It is clear from the above that the total cost of agricultural labor, both human and mechanical, is the highest item in the production costs per feddan of figs grown in the new lands, which means that these fig crops are an intensive use of the farm labor resource in the new lands.

2 – An economic analysis of the impact of agricultural labor on the costs of establishing fig farms in old lands (inside the valley) in Egypt during the period (2015-2024):

Table (10) shows the items of the total production costs per feddan of figs, distributed for agricultural labor wages and production requirements on old lands (inside the valley) in Egypt for the period (2015-2024), where the average variable production costs per feddan of figs originated in Egypt for the period (2015- 2024) at the old lands, about 31.18 thousand pounds/feddan, The average fixed costs (annual rent) amounted to about 5.79 thousand pounds/feddan, each representing about 84.35% and 15.65%, respectively, of the average total costs per feddan during the study period (2015-2024), which amounted to about 36.96 thousand pounds/feddan.

The item of total agricultural labor cost comes in first place with an average estimated at about 14.82 thousand pounds/feddan, which represents about 47.53%, 40.09% of the average variable costs and the average total productive costs per feddan, respectively, and the part of human labor wages and the cost of mechanical labor represents about 37.44%, 10.09. % of average variable costs, and 31.58%, 8.51% of average total production costs per feddan, respectively during the period (2015-2024).

It is clear from the above that the total cost of agricultural labor, both human and mechanical, is the highest item in the production costs per feddan of figs grown in old lands, which means that these fig crops are an intensive use of the farm labor resource in old lands.

Table (10): Total production costs per feddan of establishing figs farms distributed to agricultural labor wages and production requirements on old lands (inside the valley) in Egypt for the period (2015-2024):

(Thousand pounds/feddan)

Years	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	Average	(%)*	(%)**
Human labor wages	6.89	8.24	8.83	10.32	9.88	10.56	11.04	15.39	17.13	18.46	11.67	37.44	31.58
Mechanical labor cost	1.34	1.48	1.80	2.58	2.44	2.70	3.50	4.87	5.03	5.72	3.15	10.09	8.51
Total agricultural labor cost	8.23	9.72	10.63	12.90	12.32	13.26	14.54	20.26	22.15	24.18	14.82	47.53	40.09
Seedlings value	0.64	0.64	0.96	1.28	1.60	1.60	1.60	3.40	3.60	3.90	1.92	6.16	5.20
Chemical fertilizers value	1.14	1.29	1.39	1.52	1.63	1.87	1.93	3.49	3.65	3.86	2.18	6.98	5.89
Organic fertilizer	0.54	0.75	1.25	1.50	1.30	2.00	2.00	2.25	2.50	2.85	1.69	5.43	4.58
Pesticides value	0.27	0.31	0.84	1.04	0.70	1.04	1.24	1.45	1.66	1.89	1.04	3.35	2.82
Expendable tools Value	0.30	0.30	0.40	0.30	0.40	0.40	0.50	0.70	0.90	1.10	0.53	1.70	1.43
Irrigation networks value	0.50	0.70	5.00	5.00	6.00	6.00	6.00	8.00	9.50	10.25	5.70	18.27	15.41
Administrative expenses	0.16	0.17	0.24	0.28	0.28	0.30	0.35	0.40	0.51	0.65	0.33	1.07	0.90
Annual consumption	1.16	1.37	2.05	2.35	2.40	2.62	2.78	3.96	4.85	6.12	2.97	9.51	8.02
Total production requirements costs	4.71	5.53	12.13	13.27	14.30	15.83	16.40	23.65	27.17	30.62	16.36	52.47	44.26
Total variable costs	12.93	15.25	22.76	26.17	26.62	29.09	30.94	43.91	49.32	54.80	31.18	100.00	84.35
Total fixed costs (rent)	4.00	3.50	3.50	4.00	4.00	4.00	7.00	8.00	9.50	10.35	5.79	---	15.65
Total costs	16.93	18.75	26.26	30.17	30.62	33.09	37.94	51.91	58.82	65.15	36.96	---	100.00

Where:

1- Total agricultural labor cost = human labor wages + mechanical labor cost.

2- The total cost of production requirements = seedlings value + chemical fertilizers value + Organic fertilizer value + pesticides value + Expendable tools Value + irrigation networks value + administrative expenses + annual consumption.

3- Total variable costs = total cost of agricultural labor + total cost of production Requirements.

4- Total costs = total fixed costs (rent) + total variable costs.

(%)* = (cost in year x / variable cost in year x) x 100.

(%)** = (cost in year x total cost in year x) x 100.

Source: Ministry of Agriculture and Land Reclamation, Economic Affairs Sector, Annual Bulletin of Cost and Net Return Statistics, various issues.

B -An economic analysis of the impact of agricultural labor on the production costs of producing (fruitful) figs farms in Egypt during the period (2009-2024):

An economic analytical study is being conducted of the impact of human and mechanical agricultural labor on the production costs of farms producing (fruitful) fig farms crops in new and old lands in Egypt during the period (2009-2024) by studying the crop budget for establishing these farms and the relative importance of each item of the total variable and total costs, with an analysis of the role of farm work and its impact on those costs, through the following:

1 -An economic analysis of the impact of agricultural labor on the production costs of producing (fruitful) figs farms in new lands (outside the valley) in Egypt during the period (2015-2024):

Table (11) shows the items of the total production costs per feddan of fruitful (producing) figs farms, distributed for agricultural labor wages and production requirements in the new lands (outside the valley) in

Egypt for the period (2015-2024), where the average variable production costs per feddan of fruitful (producing) figs farms in Egypt for the period (2015 - 2024) at the new lands, about 23.9 thousand pounds/feddan.

The average fixed costs (annual rent) were about 6.02 thousand pounds/feddan, each representing about 79.9% and 20.1%, respectively, of the average total costs per feddan during the study period (2015-2024), which amounted to about 29.92 thousand pounds/feddan.

The item of total agricultural labor cost comes in first place, with an average estimated at about 11.8 thousand pounds/feddan, which represents about 49.38% and 39.45% of the average variable costs and the average total production costs per feddan, respectively, and the part of human labor wages and the cost of mechanical labor Represents about 40.67%, 8.71%. Of the average variable costs, 32.49%, 6.96% of the average total production costs feddans, respectively, during the period (2015-2024), It is clear from the above that the total cost of agricultural labor, both human and mechanical, is the highest item in the production costs per feddan of figs in the new lands, which means that these fig crops are an intensive use of the farm labor resource in the new lands.

Table (11): Total production costs per feddan of producing (fruitful) figs farms distributed to agricultural labor wages and production requirements on new lands (outside the valley) in Egypt for the period (2015-2024):

(Thousand pounds/feddan)

Years	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	Average	(%)*	(%)**
Human labor wages	5.84	7.42	6.51	7.63	7.48	8.40	9.28	12.90	14.85	16.92	9.72	40.67	32.49
Mechanical labor cost	1.03	1.05	1.35	1.39	1.73	2.36	2.40	2.89	3.18	3.45	2.08	8.71	6.96
Total agricultural labor cost	6.87	8.47	7.86	9.02	9.21	10.76	11.68	15.79	18.03	20.37	11.80	49.38	39.45
Chemical fertilizers value	1.64	1.51	1.95	2.30	2.37	2.98	3.04	4.12	5.60	6.15	3.17	13.24	10.58
Organic fertilizer	0.90	1.00	1.25	1.20	2.10	2.00	2.00	2.00	2.35	2.60	1.74	7.28	5.82
Pesticides value	1.13	1.20	0.60	3.12	0.90	2.30	2.55	2.70	3.10	3.60	2.12	8.87	7.08
Expendable tools Value	0.30	0.30	0.40	0.40	0.40	0.50	0.50	0.60	0.75	0.92	0.51	2.12	1.69
Irrigation networks value	1.00	1.00	1.00	1.00	1.50	1.50	2.00	3.00	3.95	4.80	2.08	8.68	6.94
Administrative expenses	0.16	0.18	0.17	0.21	0.21	0.25	0.30	0.36	0.52	0.64	0.30	1.25	1.00
Annual consumption	1.18	1.35	1.31	1.70	1.65	2.00	2.18	2.82	3.50	4.25	2.19	9.18	7.33
Total production requirements costs	6.31	6.53	6.68	9.93	9.12	11.53	12.57	15.60	19.77	22.96	12.10	50.62	40.44
Total variable costs	13.18	15.00	14.54	18.95	18.33	22.29	24.25	31.39	37.80	43.33	23.90	100.00	79.90
Total fixed costs (rent)	4.20	4.00	4.00	4.00	4.00	5.00	8.00	7.50	9.25	10.20	6.02	---	20.10
Total costs	17.38	19.00	18.54	22.95	22.33	27.29	32.25	38.89	47.05	53.53	29.92	---	100.00

Where:
1- Total agricultural labor cost = human labor wages + mechanical labor cost.
2- The total cost of production requirements = chemical fertilizers value + Organic fertilizer value + pesticides value + Expendable tools Value + irrigation networks value + administrative expenses + annual consumption.
3- Total variable costs = total cost of agricultural labor + total cost of production
Requirements.
4- Total costs = total fixed costs (rent) + total variable costs.
(%)* = (cost in year x / variable cost in year x) x 100.
(%)** = (cost in year x total cost in year x) x 100.
Source: Ministry of Agriculture and Land Reclamation, Economic Affairs Sector, Annual Bulletin of Cost and Net Return Statistics, various issues.

2 -An economic analysis of the impact of agricultural labor on the production costs of producing (fruitful) figs farms in old lands (inside the valley) in Egypt during the period (2015-2024):

Table (12) shows the items of the total production costs per feddan of fruitful (producing) figs farms, distributed for agricultural labor wages and production requirements on old lands (inside the valley) in Egypt for the period (2015-2024), where the average variable production costs per feddan of fruitful (producing) figs farms in Egypt for the period (2015- 2024) at the level of old lands, about 29.40 thousand pounds/feddan, The average fixed costs (annual rent) were about 5.96 thousand pounds/feddan, each representing about 79.9% and 20.1%, respectively, of the average total costs per feddan during the study period (2015-2024), which amounted to about 29.40 thousand pounds/feddan.

The item of total agricultural labor cost comes in first place with an average estimated at about 11.32 thousand pounds/feddan, which represents about 49.38%, 39.45% of the average variable costs and the average total production costs per feddan, respectively, and the part of human labor wages and the cost of mechanical labor represents about 40.67%, 8.71%. Of the average variable costs, and about 32.49%, 6.96% of the average total production costs feddans, respectively, during the period (2015-2024).

It is clear from the above that the total cost of agricultural labor, both human and mechanical, is the highest item in the production costs per feddan of figs in the old lands, which means that these fig crops are an intensive use of the farm labor resource in the old lands.

Table (12): Total production costs per feddan of producing (fruitful) figs farms distributed to agricultural labor wages and production requirements on old lands (inside the valley) in Egypt for the period (2015-2024):

(Thousand pounds/feddan)

Years	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	Average	(%)*	(%)**
Human labor wages	5.90	7.60	6.71	7.16	6.53	8.96	8.96	12.16	14.35	16.82	9.51	40.67	32.49
Mechanical labor cost	0.43	0.45	0.78	1.49	1.74	2.52	2.60	2.53	2.69	2.86	1.81	8.71	6.96
Total agricultural labor cost	6.32	8.05	7.49	8.65	8.27	11.48	11.56	14.69	17.04	19.68	11.32	49.38	39.45
Chemical fertilizers value	1.04	1.13	1.00	2.85	2.90	3.18	3.22	3.72	3.85	4.10	2.70	13.24	10.58
Organic fertilizer	0.40	0.50	1.81	1.50	1.50	1.75	2.00	2.00	2.15	2.36	1.60	7.28	5.82
Pesticides value	0.60	0.68	2.67	2.10	3.90	4.65	4.65	3.50	3.66	3.89	3.03	8.87	7.08
Expendable tools Value	0.30	0.30	0.40	0.40	0.40	0.50	0.50	0.60	0.75	0.91	0.51	2.12	1.69
Irrigation networks value	0.50	0.70	1.00	1.00	2.00	2.00	2.00	3.00	3.45	3.78	1.94	8.68	6.94
Administrative expenses	0.14	0.16	0.19	0.21	0.23	0.29	0.29	0.36	0.41	0.49	0.28	1.25	1.00
Annual consumption	0.92	1.14	1.44	1.65	1.90	2.36	2.39	2.75	2.98	3.25	2.08	9.18	7.33
Total production requirements costs	3.89	4.61	8.51	9.71	12.83	14.72	15.05	15.93	17.25	18.77	12.13	50.62	40.44
Total variable costs	10.21	12.66	16.00	18.36	21.09	26.20	26.61	30.62	34.29	38.45	23.45	100.00	79.90
Total fixed costs (rent)	4.50	4.50	4.50	4.50	4.00	5.00	5.00	8.00	9.25	10.30	5.96	---	20.10
Total costs	14.71	17.16	20.50	22.86	25.09	31.20	31.61	38.62	43.54	48.75	29.40	---	100.00

Where:

1- Total agricultural labor cost = human labor wages + mechanical labor cost.

2- The total cost of production requirements = chemical fertilizers value + Organic fertilizer value + pesticides value + Expendable tools Value + irrigation networks value + administrative expenses + annual consumption.

3- Total variable costs = total cost of agricultural labor + total cost of production Requirements.

4- Total costs = total fixed costs (rent) + total variable costs.

(%)* = (cost in year x / variable cost in year x) x 100.

(%)** = (cost in year x total cost in year x) x 100.

Source: Ministry of Agriculture and Land Reclamation, Economic Affairs Sector, Annual Bulletin of Cost and Net Return Statistics, various issues.

Third: Comparative economic analysis of the impact of using agricultural labor in establishing and producing (fruitful) fig farms in Egypt during the period (2015-2024):

This part of the research deals with the comparative economic analysis of the impact of using the agricultural labor resource, both human labor and mechanical labor, in establishing and producing (fruitful) fig farms in new and old lands in Egypt, through the following:

1 - A Comparative economic analysis of the impact of the use of agricultural labor per feddan of establishing fig farms in new and old lands in Egypt during the period (2015-2024):

It is clear from Table (13) that human labor wages per feddan of establishing fig farms in new lands in Egypt during the period (2015-2024) began to fluctuate and ranged between a minimum of about 6.27 thousand pounds/feddan in 2015, with a relative number of about 100%. Compared to the base year (2015=100), and a maximum of about 22.12 thousand pounds/feddan in 2024, with a relative number estimated at about 352.79% compared to the base year, with an annual average of about 12.41 thousand pounds/feddan, While it is clear that the cost of mechanical work per feddan of establishing figs farms in new lands in Egypt during the same period began to fluctuate and ranged between a minimum of about 1.25 thousand pounds/feddan in 2016, with a relative number about 93.98% compared to the base year (2015 = 100). A maximum of 9.75 thousand pounds/feddan in 2024, a relative number estimated at 733.08% compared to the base year, An annual average of about 4.18 thousand pounds/feddan.

It is also clear from Table (13) that human labor wages per feddan of establishing figs farms in old lands in Egypt during the period (2015-2024) began to fluctuate and ranged between a minimum amounting to about 6.89 thousand pounds/feddan in 2015 to a relative number estimated at 100% compared to the base year (2015=100), and a maximum of about 18.46 thousand pounds/feddan in 2024, with a relative number estimated at 267.92% compared to the base year, with an annual average of about 11.67 thousand pounds/feddan, While it is clear that the cost of mechanical work per feddan of establishing figs farms in old lands in Egypt during the same period began to fluctuate and ranged between a minimum amounting to about 1.34 thousand pounds/feddan in 2015, with a relative number estimated at 100% compared to the base year (2015 = 100), and a maximum amounting to 5.72 thousand pounds/feddan in 2024, a relative number estimated at 426.87% compared to the base year and an annual average. It amounted to about 3.15 thousand pounds/feddan.

2 - A Comparative economic analysis of the impact of using agricultural labor per feddan of producing (fruitful) fig farms in new and old lands in Egypt during the period (2015-2024):

Table (14) also shows that human labor wages per feddan of producing (fruitful) fig farms in new lands in Egypt during the period (2015-2024) began to fluctuate and ranged between a minimum of about 5.84

thousand pounds/feddan in 2015, with a a relative number estimated at 100% compared to the base ratio (2015 = 100) and a maximum of about 16.92 in 2024 with a relative number estimated at 289.73% compared to the base rate (2015=100), with an average of about 9.72 thousand pounds/feddan. While it is clear that the cost of mechanical work per feddan of producing (fruitful) fig farms in new lands in Egypt during the same period began to fluctuate and ranged between a minimum amounting to about 1.03 thousand pounds/feddan in 2015, with a relative number estimated at 100% compared to the base year (2015 = 100), and a maximum, It reached about 3.45 thousand pounds/feddan in 2024, a relative number estimated at 334.95% compared to the base year with an annual average of about 2.08 thousand pounds/feddan.

Table (13): Agricultural labor costs for establishing and producing (fruitful) fig farms on new lands in Egypt for the period (2015-2024): (Thousand pounds/feddan)

Years	establishing fig farms				producing (fruitful) fig farms			
	Human labor wages	Relative number (%)	Mechanical labor cost	Relative number (%)	Human labor wages	Relative number (%)	Mechanical labor cost	Relative number (%)
2015	6.27	100.00	1.33	100.00	5.84	100.00	1.03	100.00
2016	7.7	122.81	1.25	93.98	7.42	127.05	1.05	101.94
2017	8.94	142.58	1.89	142.11	6.51	111.47	1.35	131.07
2018	9.63	153.59	2.7	203.01	7.63	130.65	1.39	134.95
2019	10.11	161.24	2.56	192.48	7.48	128.08	1.73	167.96
2020	11.47	182.93	3.39	254.89	8.4	143.84	2.36	229.13
2021	12.11	193.14	4.51	339.10	9.28	158.90	2.4	233.01
2022	16.5	263.16	6.25	469.92	12.9	220.89	2.89	280.58
2023	19.25	307.02	8.16	613.53	14.85	254.28	3.18	308.74
2024	22.12	352.79	9.75	733.08	16.92	289.73	3.45	334.95
Average	12.41	---	4.18	---	9.72	---	2.08	---
Min	6.27	---	1.25	---	5.84	---	1.03	---
Max	22.12	---	9.75	---	16.92	---	3.45	---

Where:
- Relative number (%) = (agricultural labor costs in year x / the base year 2015) x 100.
- Collected and calculated from tables (9), (10), (11), (12) of the research.
Source:
1 - Ministry of Agriculture and Land Reclamation, Economic Affairs Sector, Annual Bulletin of Cost and Net Return Statistics, various issues.

Table (14) also shows that human labor wages per feddan of producing (fruitful) fig farms in old lands in Egypt during the period (2015-2024) began to fluctuate and ranged between a minimum of about 5.90 thousand pounds/feddan in 2015, with a relative number estimated at 100% compared to The base ratio (2015 = 100) and a maximum of about 16.82 in 2024 with a number A relative percentage of about 285.08% compared to the base percentage (2015=100), with an average of about 9.52 thousand pounds/feddan, While it is clear that the cost of mechanical work per feddan of producing (fruitful) fig farms in old lands in Egypt during the same period began to fluctuate and ranged between a minimum amounting to about 0.43 thousand pounds/feddan in 2015, with with a relative number estimated at 100% compared to the base year (2015 = 100), and a maximum. It reached about 2.86 thousand pounds/feddan in 2024, with with a relative number estimated at 665.12% compared to the base year, with an average annually, it reached about 1.81 thousand pounds/feddan.

3 - Results of the t-test analysis of the use of farm labor to establish and produce fig farms in new lands in Egypt during the period (2015-2024):
The results of Table (15) for applying the (Paired Samples Test) to test the significance of the difference between the average cost of human labor wages and the average cost of mechanical labor per feddan of establishing and producing (fruitful) fig farms in new lands during the period (2015-2024) indicate the presence of highly significant differences, The average of both the cost of human labor wages and the cost of mechanical labor per feddan of establishing and producing (fruitful) fig farms in new lands is at a significant level. 0.01, during the period (2015-2024).
From the above, we conclude that the cost of human labor wages and the cost of mechanical service changed significantly with respect to feddans in fig farms, whether at establishing and producing (fruitful) fig farms in new lands in Egypt during the period (2015-2024), which indicates a change in the cost of human labor wages and the cost of mechanical service, Before and during production, which shows the importance of the labor resource in growing figs.

Table (14): Agricultural labor costs for establishing and producing (fruitful) fig farms on old lands in Egypt for the period (2015-2024):   (Thousand pounds/feddan)

Years	establishing fig farms				producing (fruitful) fig farms			
	Human labor wages	Relative number (%)	Mechanical labor cost	Relative number (%)	Human labor wages	Relative number (%)	Mechanical labor cost	Relative number (%)
2015	6.89	100.00	1.34	100.00	5.90	100.00	0.43	100.00
2016	8.24	119.59	1.48	110.45	7.60	128.81	0.45	104.65
2017	8.83	128.16	1.80	134.33	6.71	113.73	0.78	181.40
2018	10.32	149.78	2.58	192.54	7.16	121.36	1.49	346.51
2019	9.88	143.40	2.44	182.09	6.53	110.68	1.74	404.65
2020	10.56	153.27	2.70	201.49	8.96	151.86	2.52	586.05
2021	11.04	160.23	3.50	261.19	8.96	151.86	2.60	604.65
2022	15.39	223.37	4.87	363.43	12.16	206.10	2.53	588.37
2023	17.13	248.62	5.03	375.37	14.35	243.22	2.69	625.58
2024	18.46	267.92	5.72	426.87	16.82	285.08	2.86	665.12
Average	11.67	---	3.15	---	9.52	---	1.81	---
Min	6.89	---	1.34	---	5.90	---	0.43	---
Max	18.46	---	5.72	---	16.82	---	2.86	---

Where:
- Relative number (%) = (agricultural labor costs in year x / the base year 2015) x 100.
- Collected and calculated from tables (9), (10), (11), (12) of the research.
Source:
1 - Ministry of Agriculture and Land Reclamation, Economic Affairs Sector, Annual Bulletin of Cost and Net Return Statistics, various issues.

Table (15): Results of the t-test to test the significance of the differences between the average cost of human labor wages and the average cost of mechanical labor per feddan of establishing and producing (fruitful) fig farms in new lands during the period (2015-2024):

Statement	Differences	standard deviation (S.D)	standard error (S.E)	degrees of freedom (D.F)	(T) Value
					sig
Human labor wages	2.69	1.55	0.491	9	5.48
					**
Mechanical labor cost	2.10	2.11	0.668	9	3.14
					**

Where:
- (**): Significant at a significance level of 0.01.
Source: Collected and calculated from Table (13) of the research.

4 - Results of the t-test analysis of the use of farm labor to establish and produce fig farms in old lands in Egypt during the period (2015-2024):

The results of Table (16) for applying the Paired Samples Test to test the significance of the difference between the average cost of human labor wages and the average cost of mechanical labor per feddan of establishing and producing (fruitful) fig farms in old lands during the period (2015-2024) indicate the presence of highly significant differences, The average of both the cost of human labor wages and the cost of mechanical labor per feddan of establishing and producing (fruitful) fig farms in old lands is at a significant level. 0.01, during the period (2015-2024).

From the above, we conclude that the cost of human labor wages and the cost of mechanical service changed significantly with respect to feddans in fig farms, whether at construction or in the case of production in old lands in Egypt during the period (2015-2024), which indicates a change in the cost of human labor wages and the cost of mechanical service, Before and during production, which shows the importance of the labor resource in growing figs.

Table (16): Results of the t-test analysis to test the significance of the differences between the average cost of human labor wages and the average cost of mechanical labor per feddan of establishing and producing (fruitful) fig farms in old lands during the period (2015-2024):

Statement	Differences	standard deviation (S.D)	standard error (S.E)	degrees of freedom (D.F)	(T) Value
					sig
Human labor wages	2.15	0.956	0.302	9	7.15
					**
Mechanical labor cost	1.34	0.863	0.273	9	4.90
					**

Where:
- (**): Significant at a significance level of 0.01.
Source: Collected and calculated from Table (14) of the research.

5 - Results of the t-test analysis of the use of farm labor to establish fig farms in new and old lands in Egypt during the period (2015-2024):

The data in Table (17) of the results of applying the independent samples test to test the difference between the average cost of human labor wages and the cost of mechanical service per feddan of establishing fig farms in both new and old lands during the period (2015-2024) indicates that it has not been proven that Significance value (F) at any of the usual levels of significance (0.05, 0.01),Which indicates that the values of the cost of human labor wages and the values of the cost of mechanical service are homogeneous (the variance is equal), that is, no significant difference between the variance of each of them in both new and old lands per feddan of establishing fig farms during the study period (2015-2025).

Also, the significance of the value of (T) was not proven at any of the usual levels of significance, which indicates that there is no difference between the average cost of human labor wages and the cost of mechanical service per feddan of establishing fig farms in the new lands compared to the old lands during the period (2015-2024), Which shows that there are no significant differences between the cost of human labor wages and the cost of mechanical service on new and old lands per feddan of establishing fig farms, during the period (2015-2024).

Table (17): Results of the T-test to test the significance of the differences between the average cost of human labor wages and the average cost of mechanical labor per feddan of establishing fig farms in both new and old lands during the period (2015-2024):

Statement	Variances assumed Equal	Equal Variances not assumed	
	(F) Value	(T) Value	degrees of freedom (D.F)
	Sig	sig	
Human labor wages	0.714	0.357	18
	n.s	n.s	
Mechanical labor cost	3.98	0.976	18
	n.s	n.s	

Where:
- (n.s): not significant at any significance level (0.05, 0.01).
Source: Collected and calculated from tables (13), (14) of the research.

6 - Results of the t-test analysis of the use of farm labor to produce fig farms in new and old lands in Egypt during the period (2015-2024):

The data in Table (18) of the results of applying the independent samples test to test the difference between the average cost of human labor wages and the cost of mechanical service per feddan of producing (fruitful) fig farms in both new and old lands during the period (2015-2024) indicates that it has not been proven that Significance value (F) at any of the usual levels of significance (0.05, 0.01),Which indicates that the values of the cost of human labor Wages and the values of the cost of mechanical service are homogeneous (the variance is equal), that is, no significant difference between the variance of each of them in both new and old lands per feddan of producing (fruitful) fig farms during the study period (2015-2025), Also, the significance of the value of (T) was not proven at any of the usual levels of significance, which indicates that there is no difference between the average cost of human labor wages and the cost of mechanical service per feddan of producing (fruitful) fig farms in the new lands compared to the old lands during the period (2015-2024). Which shows that there are no significant differences between the cost of human labor wages and the cost of mechanical service on new and old lands per feddan of producing (fruitful) fig farms during the period (2015-2024).

Table (18): Results of the T-test to test the significance of the differences between the average cost of human labor wages and the average cost of mechanical labor per feddan of producing (fruitful) fig farms in both new and old lands during the period (2015-2024):

Statement	Variances assumed Equal	Equal Variances not assumed	
	(F) Value	(T) Value	degrees of freedom (D.F)
	Sig	sig	
Human labor wages	0.026	0.124	18
	n.s	n.s	
Mechanical labor cost	0.109	0.657	18
	n.s	n.s	

Where:
- (n.s): not significant at any significance level (0.05, 0.01).
Source: Collected and calculated from tables (13), (14) of the research.

VI. Recommendations

Based on the importance of fruit crops in general and the fig crop in particular, as it is an important source for providing food security, the research recommends intensifying interest in fig cultivation to employ the agricultural labor force and work to help find solutions to the problem of unemployment in the agricultural sector and at the national level to reach the stage of full employment of the labor resource and obtain a balanced economic situation, Fig are considered one of the labor-intensive crops that require a large number of agricultural labor, whether in the establishing or producing (fruitful) stages of fig farms, whether in new or old lands, as proven by the research results, With the recommendation to rely more on mechanical labor and modern mechanized technology in all stages of establishing or producing (fruitful) fig farms to achieve optimal efficiency in producing (fruitful) the crop while working to reduce production costs, as it was found from the research results that they are the highest items in the total costs of the establishing or producing (fruitful) stages in the old and new lands, which achieves the highest economic return for fig farmers in Egypt, which encourages increased demand for its cultivation and increased cultivated area, With the necessity of expanding the cultivation of the crop in old lands, as most of the current areas are concentrated in new lands only, and working to develop food industries based on fig products while developing craft industries based on fig production, which contributes to employing the labor force and reduces the problem of unemployment, With attention to quality and improving post-harvest processes such as wrapping and packing, and developing appropriate mechanisms for shaping and processing fig in a way that suits the requirements and specifications of local and international markets.

The Reviewer

[1]   Hamdy Ibrahim Mahmoud (Doctor), Fruit Production In Desert Lands, Dar Al-Fajr For Publishing And Distribution, 2011.
[2]   Saber Sayed Ahmed Yassin (Doctor), Lectures On Sampling And Statistical Surveying, Department Of Agricultural Economics, Faculty Of Agriculture, Mashtohor, Zagazig University, 1997.
[3]   Ala'i Daoud Al-Bitar (Doctor), Fruit Trees, The Basics Of Their Cultivation, Care, And Production, Al-Quds Open University, Deanship Of Scientific Research And Postgraduate Studies, 2015.
[4]   Ministry Of Agriculture And Land Reclamation, Economic Affairs Sector, Agricultural Statistics Bulletin, Various Issues.
[5]   Ministry Of Agriculture And Land Reclamation, Economic Affairs Sector, Food Balance Bulletin, Various Issues.
[6]   Ministry Of Agriculture And Land Reclamation, Economic Affairs Sector, Agricultural Income Estimates Bulletin, Various Issues.
[7]   Ministry Of Agriculture And Land Reclamation, Economic Affairs Sector, Annual Bulletin Of Cost And Net Return Statistics, Various Issues.
[8]   Damodar Gujarati, Econometrics By Example, Basic Econometrics, Mcgraw – Hill, USA, 2012.
[9]   Emanuele Spada & Others, Economic Sustainability Assessment Of Mediterranean Crops: A Comparative Life Cycle Costing (LCC) Analysis, Orginal Research Article, Sec. Sustainable Food Processing, Volume 6, 21 December 2022.
[10]   M M Isa1 & Others, Cultivation Of Fig (Ficus Carica L.) As An Alternative High Value Crop In Malaysia: A Brief Review, 2nd Joint Conference On Green Engineering Technology & Applied Computing, Materials Science And Engineering, IOP Publishing, 2020.