



A FINANCIAL AND ECONOMIC EVALUATION OF THE ONION CROP PRODUCTION IN DIYALA GOVERNORATE, KANAKEEN : (AS CASE STUDY)

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Abstract

This research aims to analyze the items of income and costs and identify the economic merit of onion production by conducting a financial and economic assessment and calculating the efficiency and its components of the research sample. The data was collected by a questionnaire which was collected by the interview of the onion crop farmers in Diyala governorate, Khanakeen district in the agricultural season (2014-2015). The questionnaire included 12 farms ranging from (1-10) donums. a number of financial evaluation criteria were applied, including net cash income of (672.970) IQ.donum⁻¹, while the average economic profit reached (468.650) IQ.donum⁻¹. The sample farms achieved a positive profit except for the two farms (10 and 11). the return of the invested dinar was greater than one in the rest of the sample farms, which means that there is a financial and economic success of the production unit except the two farms mentioned above were less than one while appeared in the farms number (3 and 6) that the break-even point were negative as well as amount of the break-even point that was different from one farm to another, which represents the required revenue on the farm to be achieved at the point of break-even point. The efficiency of the fixed assets of the studied sample increased to 4.09 IQ for every dinar spent on fixed productive assets. The productivity of variable capital, which amounted to (5.14) for the sample, reflected the high efficiency of the use of the variable production factors. The criterion of productivity of the family work was the sample of the research about (4890) IQ dinars for worker and in terms of working hours of the family reached (9.79) Hour which was the highest in the farm (4), which reached (12800) IQ dinars and (25000) IQ dinar.hour⁻¹ for worker. The efficiency reached 0.91, 0.78, 0.45, 0.41 for technical efficiency, capacity, customization and cost, respectively. The research concluded increase the average cost of being grown in small areas, but overall the sample achieved economic profits and positive returns for most of the financial indicators applied. The study recommends the necessity of ending the fragmentation of property because of its positive effect on the results obtained from the studied criteria of the research sample and adopting a number of agricultural policies in support of onion farmers.

Keywords: Performance evaluation, economic profit, customization efficiency.

Introduction

The onion crop *Allium cepa* L. belongs to the Alliaceae family, is one of the most important crops in Iraq and the world, which is consumed by the human in large quantities and is characterized by its nutritional, medical and economic value. It contains good proportions of vitamins C and K, proteins, iron and calcium. its medicinal importance is in containing quercetin Which is of great importance as an antioxidant and anti-cancer compound (Patil). Therefore, different countries have sought to cultivate it and increase cultivated areas to raise the level of production (Al-Khafaji). Onion crop is one of the most important crops in Iraq in economic and consumer terms. Its consumption is daily in every Iraqi house (Al-Nuaimi). It contains important minerals. The percentage of minerals in the part that is eaten contains 0.32 calcium, 0.183 potassium, 0.068, 0.044, 0.015, 0.00005 Sulfur, phosphorus, sodium and magnesium respectively (Matloob). The onion crop is also a crop that must be provided throughout the year. The crop is marketed in the harvest season, which lasts from May to September and the abundance of yield during this period has a significant impact on its prices, while the surplus is damaged due to failure to follow proper methods in the storage process in addition to a decrease in nutritional value and loss of weight Sometimes up to 50% (Ghonaime). In 2011, Iraq needed (535,000) metric tons of onions annually. Onions for the consumption of vegetables in Iraq comes in the fourth place after tomatoes, potatoes and cucumbers. Imports from Iran and Syria currently account for about 65% of the country's consumed onions. Onions are clearly an excellent

opportunity to diversify crops for Iraqi farmers. On-field delivery prices of onions have shown an upward trend since 2009 after the change in agricultural policies in Iran and Syria, which significantly reduced onion subsidies (Inma program). The problem of research is that high levels of production are not achieved due to the low use of available economic resources and the difficulty of obtaining other economic resources. This has led to higher production costs and lower net returns resulting in economic efficiency away from the required level. The aim of the research is to analyze the income and cost items and to identify the economic merit of onion production through conducting financial and economic evaluation and calculating the efficiency and components of the research sample studied in Diyala Governorate. The research assumes that the farmers sample are experienced and efficient, but because of the small areas of the farms and the erroneous policies that have taken place, the farm productivity has decreased.

Materials and Methods

The research data were collected based on a questionnaire prepared for this purpose, which was collected by the interview of the farmers of the onion crop in Diyala governorate-Khanakeen district in the agricultural season (2014-2015). The questionnaire included 12 farms ranging in area from 1-10 donums. Cost, total income, average and net income were calculated and applying a set of financial indicators and criteria appropriate to the nature of the research using excel prog. and finding cost efficiency and technical and specialized components under the changes in

capacity returns using the Deap program in achieving the search requirements. As explained below:

Net cash income criterion: To measure the net income and change in it must take into account changes in the prices of some productive activities that may decline and then return to the normal level according to the annual change in productivity (Fresh). It is calculated by the following equation (Keske).

$$\text{Net cash income} = \text{cash revenue} - \text{cash costs}$$

The economic profit criterion: Economic profit is the difference between total revenues and economic costs (apparent and implicit) (Al-Hasnawi). Which is the difference between total farm revenues and farm costs (Kay).

Return of the invested dinar: Calculated by dividing the annual returns of the project on the annual costs all this is evaluated at present value, both in terms of returns or costs (Singh).

The break-even point: The break-even point is defined as the volume of production (or sales) in which the project does not achieve profit and does not fall in loss, usually calculated as a percentage of the maximum output capacity of the project, the process of comparison of projects based on the level of break-even point, The best is the level that achieves the lowest break-even point. (Al-Akayly). In order to give a clear picture of the mechanism of the work of the break-even point in the analysis of the relationship between the volume of production or revenue and costs and profits must be used the law of the proportion of profits to the volume or so-called marginal income to be the law used to calculate the break-even point (Barbaz).

$$\text{break - even point (as unit)} = \frac{\text{Fixed production costs}}{\text{ton price} - \text{variable cost average}}$$

$$\text{break - even point (as unit)} = \frac{\text{Fixed production costs}}{\text{Marginal income}}$$

Productivity standards

These standards are considered an important economic standard, especially in developing countries that suffer from a large deficit in the amount of production due to the low level of productivity and the loss of a good part of the resources used in the production process (Al-Izzi).

Two types of productivity can be observed:

A - Total productivity: The productivity of all production factors used in the production process can be expressed as follows:

$$\text{Total productivity} = \frac{\text{outputs}}{\text{inputs}} \text{ or } \frac{\text{quantity or value of production}}{\text{total of production factors}}$$

$$\text{or } \frac{\text{quantity or value of production}}{\text{labour} + \text{capital} + \text{Materials}}$$

B - Partial productivity: The productivity of one factor of the production and can be expressed as follows: (Al-Issawi).

$$\text{Partial productivity} = \frac{\text{outputs}}{\text{inputs}} = \frac{\text{outputs}}{\text{one factor of production factors}} =$$

$$\text{or } \frac{\text{outputs}}{\text{labour or capital or Materials}}$$

Fixed capital productivity: This criterion expresses the value of production in exchange for every one dinar of the value of fixed assets and the increase of value leads to increase of the efficiency of the use these assets. This criterion can be used to evaluate the efficiency of fixed assets for each farm or in a single productive branch within the farm. It is also possible to compare between different farms with similar production conditions. (Al-Haboobi).

Variable capital productivity: Calculated by dividing the total revenue by the total variable costs (Ahmed). This criterion can evaluate the efficiency of the use of variable assets for each farm, the efficiency of the use of these resources largely determines the profitability of the production process and, therefore, the use of economic incentives in the use of these assets will ensure optimum utilization. (Kader).

Labor productivity: The criterion of work productivity is one of the most common and used standards, especially when the goal is performance evaluation, this criterion does not reflect the efficiency of the use of the work element, but extends to include the expression of the efficiency of the elements of production used. The productivity of labor is the relationship between the quantity of production and the labor component and can be expressed as follows:

$$\text{Labor productivity} = \frac{\text{quantity or value of production}}{\text{number of worker}} = \frac{\text{quantity or value of production}}{\text{work hours}}$$

This criterion shows the amount of production achieved by one unit of the work component and is measured either by (worker / hour) or (worker/day) (Al-Issawi).

Results and Discussion

Includes financial and economic analysis and identification of onion production efficiency as follows:

First: - Costs and revenues

Costs: the results of table 1. shows the fixed and variable cost items and their average, that the total cost reached (16325.05) thousand IQ dinars and the total variable costs (7233) thousand IQ dinars and fixed costs (9092.05) thousand IQ dinars, while the average of total costs per donums reached (366.8551) IQ dinars. And the value cost of production per ton reached its highest value in the farm number (9) which reached (793.25) thousand IQ dinars, where the production of one donum in this farm to about (0.67) ton. , While it reached its lowest value in the farm number (4) which reached (53.78) thousand IQ dinars, where the production of one donum in this farm reached about (5) tons. While at the sample level, the cost average of tons reached (132.72) thousand IQ dinars, noting that 33 % of the sample cost is less than average.

Table 1 : Cost items of the research sample and its averages

Farm number	Area (donum)	variable cost (1000 IQ dinars)	variable cost average (1000 IQ dinars .donum ⁻¹)	Fixed Cost 1000 IQ dinars	Fixed cost average (1000 IQ dinars .donum ⁻¹)	Total Cost (1000 IQ dinars)	total cost average (1000 IQ dinars .donum ⁻¹)	Cost of ton production (1000 IQ dinar.ton ⁻¹)
1	8	796	99.5	1232	154	2028	253.5	253.5
2	3	486	162	929.5	309.83	1415.5	471.83	108.88
3	1.5	464	309.33	332.75	221.83	796.75	531.17	159.35
4	10	1424	142.4	1265	126.5	2689	268.9	53.78
5	5	891	178.2	911.9	182.38	1802.9	360.58	257.56
6	1	397	397	401.5	401.5	798.5	798.5	159.7
7	4	481	120.25	972.4	243.1	1453.4	363.35	121.12
8	2	316	158	913	456.5	1229	614.5	204.83
9	3	503	167.67	1083.5	361.17	1586.5	528.83	793.25
10	3	640	213.33	542.3	180.77	1182.3	394.1	295.58
11	1	176	176	188.1	188.1	364.1	364.1	364.1
12	3	659	219.67	320.1	106.7	979.1	326.37	97.91
Total	44.5	7233	162.54	9092.05	204.32	16325.05	366.86	132.72

Reference: Collected and calculated by the researcher based on the questionnaire

Revenues:

The results in Table 2. show total and average revenues. With a total revenue reached (37180) thousand IQ dinars, which reached the highest value in the fourth farm (12500) IQ dinars due to the large area which planted with the crop, which amounted to (10) donums, while the lowest value in the farm number (11), which amounting to (300) thousand IQ dinars because of small cultivated area compared to the rest of the farms, which amounted to one donum. The revenue average per donam was highest the farm number (12) which gave the highest value of one donum productivity reached (1833.33) IQ dinars.donum⁻¹, while the lowest value was in the farms number (1) and (11) which reached (300) thousand IQ dinars.donum⁻¹, due to the productivity of one donum in this farm (12) per donum reached (3.33) ton.donum⁻¹. In addition, the price of selling of one ton was the highest among the sample farms, reaching (550) thousand IQ dinar.ton⁻¹ and vice versa for the two farms (1) and (11) which its productivity in one donum (1) ton.donum⁻¹. And the price was (300) thousand IQ dinar.ton⁻¹.

Table 2 : Total and average revenue of the sample

Farm number	Total revenues (1000IQ dinar)	Revenues Average (1000 IQ dinar.donum ⁻¹)
1	2400	300
2	3250	1083.33
3	1250	833.33
4	12500	1250
5	2800	560
6	1250	1250
7	3600	900
8	1500	750
9	1750	583.33
10	1080	360
11	300	300
12	5500	1833.33
Total	37180	835.51

Reference: - Collected and calculated by the researcher based on the questionnaire

Second: Results of the financial evaluation criteria:

After studying the costs, their divisions and their averages, and calculating the revenues for a random sample of the farms group for onion production, it is possible to use the set of financial evaluation criteria, as the results of these criteria were found in Table 3. and (4). The total net profit of the sample farms reached about 29947 thousand IQ dinars, while the average net cash income per donum reached (672.97) thousand IQ dinar.donum⁻¹. The total economic profit reached (20854.95) thousand IQ dinars. The average of economic profit reached (468.65) thousand IQ dinars per donum. The sample farms achieved a positive profit except the two farms (10 and 11) where they were negative due to the increase in the cost of one donum of these farms compared to their revenue. the return of the invested dinar was greater than one in the rest of the sample farms, which means that there is financial and economic success of the production unit except for the two farms mentioned above were less than the one, as mentioned above due to increase the total cost compared to revenues obtained and not invest resources available with high efficiency. The sample farms needed different quantities of production (tons) to be the economic profit equal to zero, which represents the amount of onions to be produced to be in the case of non-profit or loss, while appeared in the farms number (3 and 6) that the amount of the equivalent were negative due to increase variable costs per donum compared to the sale price per ton. In addition, the value of the amount of the break-even point was different from farm to another, which represents the required revenue on the farm to be achieved at the break-even point. The efficiency of the fixed assets of the studied sample increased to 4.09 IQ dinar for every IQ dinar which is spent on fixed productive assets. The productivity of variable capital, which amounted to (5.14) for the sample, reflected the high efficiency of the use of the variable production factors. While the criterion of productivity of the family labor of the research sample reached (4.89) thousand IQ dinars per worker and in terms of working hours of the family reached (9.79) Hour which was the highest in the farm number (4) that amounted to (12.8) thousand IQ dinars and (25) thousand IQ dinar.hour⁻¹ per worker, due to the large area of the farm which reached (10) donums.

Table 3 : Results of calculating the studied criteria in the sample research farms.

Farm number	Total net cash income (1000 IQ dinar)	Average of net cash income (1000 IQ dinar.donum ⁻¹)	Total economic profit (1000 IQ dinar)	Average of economic profit (1000 IQ dinar.donum ⁻¹)	Return of ted dinar	break-even point (unit)	break-even point (value)	Fixed capital productivity	Variable capital productivity	Productivity of family labor (1000 IQ dinar)	Productivity of family labor of family labor IQ 1000) dinar.hour ⁻¹)
1	1604	200.5	372	46.5	1.18	6.14	611.39	1.95	3.02	2.4	4.8
2	2764	921.33	1834.5	611.5	2.30	10.56	163.44	3.50	6.69	4.06	8.13
3	786	524	453.25	302.17	1.57	-5.61	196.43	3.76	2.69	4.46	8.93
4	11076	1107.6	9811	981.1	4.65	11.76	162.64	9.88	8.78	12.5	25
5	1909	381.8	997.1	199.42	1.55	4.11	425.62	3.07	3.14	3.714	7.43
6	853	853	451.5	451.5	1.57	-2.73	186.86	3.11	3.15	3.57	7.14
7	3119	779.75	2146.6	536.65	2.48	5.41	149.96	3.70	7.48	4.37	8.74
8	1184	592	271	135.5	1.22	9.92	243.67	1.64	4.75	1.88	3.75
9	1247	415.67	163.5	54.5	1.10	13.16	437.05	1.62	3.48	1.86	3.72
10	440	146.67	-102.3	-34.1	0.91	9.57	788.8	1.99	1.69	2.41	4.82
11	124	124	-64.1	-64.1	0.82	1.52	266.98	1.59	1.70	1.92	3.85
12	4841	1613.67	4520.9	1506.967	5.62	0.97	43.57	17.18	8.34	22.36	44.72
Total	29947 95	672.97	20854.95	468.65	2.28			4.09	5.14	4.89	9.79

Reference: - Collected and calculated by the researcher based on the questionnaire

Third: Technical efficiency, efficiency of scale, allocative efficiency and cost efficiency:

The Data Envelopment Analysis. (DEA) method was used, which gives an objective assessment of efficiency, which is based on linear programming methods. Technical competence (TE) depends on the appropriate selection of the production function among all those functions that can be used in the agricultural sector or in the productive units within the agricultural sector. Technical efficiency is measured by the ratio of output to resources. When this ratio increases, the technical efficiency level increases (Rajab). The results of table 4. shows that the average efficiency is 0.91. This means that its production can be increased by 9% or achieve the same level of current production using 91%. This means that there is a waste of resources by (9%). while scale efficiency, it was estimated by dividing the technical efficiency with the stability of the return on capacity on the

its counterparty in light of the change in scale returns, which averaged 0.78. This means that most farms operate with decreasing returns. this means that the increase in the total production volume is less than the increase in the production component used in the production process. Also the allocative efficiency and cost efficiency were also assessed in light of resource prices, production costs and technology. The average of allocative efficiency is 0.45. This means that the redistribution of resources will provide 55% of the cost of production while maintaining the current level of production. The cost efficiency, which is a reflection of the levels of technical and allocative efficiency because it results from the value of multiplying their values of the average (0.41), indicating that farmers pay an additional cost by (59%) and that it is possible to reduce costs by the same percentage and achieve the same level of production.

Table 4 : Efficiency components

Farm number	Technical efficiency	Efficiency of scale	Allocative efficiency	Cost efficiency
1	0.476	0.84	0.526	0.25
2	1	0.867	0.399	0.399
3	1	0.714	0.237	0.237
4	1	1	1	1
5	0.55	0.757	0.441	0.243
6	1	1	0.284	0.284
7	0.902	0.972	0.379	0.342
8	1	1	0.27	0.27
9	1	0.4	0.181	0.181
10	1	0.8	0.45	0.45
11	1	0.22	1	1
12	1	0.813	0.254	0.254
Average	0.91	0.78	0.45	0.41

Reference: - Collected and calculated by the researcher using the DEAP program.

Notes of efficiency results from the results of financial indicators that the gestures of the non-gesture seed is highly used by technical efficiency, which are achieving good production levels on the opposite of the search problem, but due to the low price, some of them do not achieve profits and do not enjoy efficiency (cost and allocative) this explanation of interpreters and the profet may explain.

In order to determine the effect of some variables on efficiency, economic efficiency was correlated with some management variables such as size of family, age and experience, as noted in table 5. For family size, the value ranged between (0.82 - 1). This means that when the number of family members increases, the technical efficiency increases. while the expert, there is no difference between the

few years of experience and so much for the age of the farmers. The capacity efficiency was estimated by dividing the technical efficiency with the stability of the capacity return on its counterpart in light of the change in capacity return and their value ranged relative to family size between (0.75 - 0.81), it increases by increasing the size of the family as well as the age factor (0.74 - 0.82), while the opposite was for the factor of experience (0.75 - 0.83) This means that the more farm experience leads to decrease capacity efficient. As for the customization efficiency, which is directly exposed to costs, it fluctuated between (0.43 - 0.48). This means that the

smaller family gave the greater customization efficiency. As for the factor of experience (0.32 - 0.54) and the age factor (0.32 - 0.58), the more years of experience and age leads to increase of customization efficiency. Finally, in terms of cost efficiency, which is a reflection of the technical efficiency and customization efficiency because it is the result of their multiplication, its value regarding the size of the family varies between (0.39-0.43) In other words, when the family size increases, the cost efficiency increases. While the years of experience and age, the cost efficiency increases with their increase.

Table 5 : Calculation of cost efficiency and its components in the research sample

		Technical efficiency	efficiency of scale	Allocative efficiency	Cost efficiency
Family size	(9 - 1)	0.82	0.75	0.48	0.39
	10 and more	1	0.81	0.43	0.43
experience	(20 - 1)	0.91	0.83	0.32	0.28
	21 and more	0.91	0.75	0.54	0.50
age	(40 - 20)	0.91	0.74	0.32	0.28
	41 and more	0.91	0.82	0.58	0.53

Reference: - Collected and calculated by the researcher based on the questionnaire

The results of the applied standards indicate that onion cultivation in the governorate can be a good opportunity to diversify the crops because of its nutritional and economic importance. It is also possible to observe the increase in the average cost because it is grown in small areas. However, the sample generally achieved economic profits and positive returns for most of the applied financial indicators. The sample has an additional cost of (0.55) meaning that the current production capacity can be produced using 45% of the resources. The technical efficiency and economic efficiency were directly related to the size of the family while the custom efficiency was inversely linked with age factor. Therefore, the study recommends investing in large farms and ending the fragmentation of property because of its positive effect on the results obtained from the studied criteria of the research sample and adopting a number of agricultural policies in support of onion farmers to help them achieve a suitable level of subsistence and protect them from changes in production, prices and climatic conditions. and these policies encourage the expansion of agricultural production

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