Article

Economic Analysis and Evaluation of the Vegetable Farm in the Village of Qara Kharab, Wana District, Tel Kayf District, Nineveh Governorate, for the Agricultural Season 2019

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Abstract: The study of economic evaluation is one of the important topics, whether on the level of production units or on the level of the agricultural sector. It represents a prerequisite in how to direct and coordinate the various activities and is one of the important indicators by which the efficiency and direction of available economic resources can be recognized. The main goal of the agricultural policy is to maximize agricultural output using the available agricultural resources, as working to promote economic efficiency is of great importance being a tool to search for the best ways to use the available economic resources to achieve optimal productivity. The study aims to conduct an economic evaluation of the vegetable farm in greenhouses and to see if this farm achieves a remunerative economic profit margin and encouraging for others to enter into such projects. The results of the economic evaluation showed the high workers' wages costs represented by one worker per greenhouse, and this constitutes 38.52% of the total costs. The turnover rate of variable assets reached 3.75, and this means that the return of the invested dinar achieves a profit of 3.75 dinars, and that the returns of the farm management are 133740000 Dinars. This farm has achieved technical efficiency of 81% and economic efficiency of 78%, and this means that it is well managed.

Key words: Economic evaluation, vegetables, greenhouses, Nineveh Governorate.

Introduction

Protected cultivation is one of the important and advanced means of production in terms of the use of scientific methods and technological equipment that secure the provision of climatic conditions appropriate for crops growth and development out of their production times, as the increased demand for vegetable crops requires providing crops in off-season time; large areas are cultivated in protected cultivation, in addition to cultivation in open fields in order to provide crops throughout the year. Seedlings were produced in some southern regions of Iraq in the areas of Safwan, Zubair and Madinah in Basra Governorate; work began in 1973 to grow tomato crop and some other vegetable crops as

preliminary experiments in Al- Za'afaraniya farm, and in the year 1976, 40 plastic houses were constructed with an area of 180 square meters per house (36 x 5 m) under the supervision of the General Horticulture Directorate, distributed over the Ishaqi Agricultural Authority, Al-Khalis Agricultural Authority and Al Wahda Project, in addition to the used greenhouses in Al- Za'afaraniya farm itself. In 1978, the number of greenhouses reached 860 houses, and then the number of greenhouses in Iraq became more than 10,000 plastic greenhouses. At the present time, there are some main reasons [1] related to the negligence of the agricultural process as a whole by the state institutions, represented by the absence of the process of agricultural lands' reclamation and development, the maintenance and expansion of irrigation projects and the construction of drainage drains, the thing that led to a high rate of soil and groundwater salinity. With regard to the reasons that relate to neglecting the agricultural sector, this has caused a regress in the production of these crops, due to the farmer's reliance on his experiences away from agricultural science, techniques and state of the art methods that modern science has reached, along with other reasons such as poor agricultural production's requirements including seeds, fertilizers, methods of irrigation and control of plant diseases, insects, weeds and others. Below are the most important studies that tackled this topic.

In **Calatrava and Canero (2001)** published a study entitled "Production function for plastic covered pepper and tomato in the Coastline of Almeria: an Analysis of Productive Efficiency" using data from a sample consisting of 78 plastic greenhouses from the Almeria coast region for the year 1996-1997. It showed analysis of the production function of both tomato and pepper crops, which gave sufficient specifications to clarify the production of both crops, the total output (kg / ha) was estimated and a dependant variable was used to estimate the regression model along with the independent variables, namely the greenhouse cover, expenditure on pesticides, water, fertilizers, work, seeds, and other expenses. The dependent variable was the lifetime of some fixed assets (the watering system and the greenhouse structure included in the sample). Continuing to analyse the economic productive structures of the crops, efficiency indicators for greenhouses were estimated by means of analysing the production function. And the last study tackled the relationships between efficiency and some variables related to greenhouses management, levels of education and training of farmers, marketing capacity, and well-known strategies that allow for greater efficiency of horticultural production in the region.

Popescu (2003), the Central European Journal of Agriculture published a study entitled (Economic efficiency in tomato production in greenhouses). The study aimed to assess the development of economic efficiency of tomato production in greenhouses in a private farm located next to the capital in Romania. The farm has (4) hectares of greenhouses and the percentage of tomato yield in the cultivated area is only 38.75% during the last three years, and the cultivated area of tomato decreased in flower production. Scientific Production Management kept total production at the same level from year to year by increasing the average cultivated area by 53.33%. The continuous rise in the price of the resource doubled the cost per unit area and increased the cost of tomato kilogram by 33%, and the increase in demand for tomato in the market price by 31% had a positive impact on farm income which doubled during the last three years.

In the year 2000, the company earned an income of 41,818 $/ ha, and by subtracting the cost of production, we obtain a profit of 4,815 $/ ha. The farm profit rate was 13% for the period 2000-2002. It was concluded from the study that the production of tomato in greenhouses guarantees a high economic efficiency when there is a decrease in the cultivated area, so farmers increase the rate of tomato production using a high technical basis on the value of a high economic hybrid. By **Sait, 2007** published a study entitled, "Economic Analysis of Processing Tomato Growing: The Case Study of Torbali, West Turkey". In light of analysing the area, price, and cost data in the tomato production process for determining the profit from the production process, and based on the results of this study and with the increase in tomato production fields, the average tomato production area used was 5.55 and 2.48 hectares and the tomato production was 75.915 and 71.971 kg / hectare. The average cost of tomato production was 3.510 and 3.245 dollars / ha and the total marginal cost was 2.829 and 3.575 dollars / ha. The net profit was 1.804 and 2.513 dollars / ha. The effect of production and market risks on profit and economic

growth from the production process were determined, and the study recommended that farmers must collect all data on tomato production and market conditions before making production decisions.

In **2007, Al-Jumaily** conducted an analytical study of the economics of cucumber crop production in Al- Sharqat district of Salah al-Din Governorate for the production season 2006. The research aimed to estimate and analyse the production of cucumber crop farms in light of analysing the relationships between inputs and outputs, then determining the technical and economic efficiency of using resources of production, labour and capital in light of determining the optimal combinations for each of them. The demand function for labour and capital resources has also been calculated. Cross-sectional data were approved for 40 farms out of a total of 162 farms in the district, representing the volume of production, capital, and labour used for the 2006 production season. Through the results of statistical analysis, the significance of the variables of the Cobb-Douglas function in expressing the relationship between inputs and outputs was noticed, accordingly, it appeared that the farms operate under the decreasing returns to scale, as the production elasticity reached 0.547, and the rate of production per donum in the farm was 2685 kg, and the optimum combination of work is 87 working days and a capital of 226697 dinars.

Importance of the Research

Given that the tomato, green pepper and cucumber crops are of the main vegetables in the country due to their nutritional and economic importance, their short life span and the abundance of their profits because they give more revenue compared to other crops grown in the same area of land and within a short period of time, and since there is an increasing demand for these crops throughout the year that requires an increase in their production, therefore, there is a need for recognizing the results of the economic evaluation of these crops as well as recognizing the economic and productive efficiency of cultivating these crops.

Problem of the research

Vegetable cultivation process is witnessing a remarkable production decline in recent years represented by the lack of the commodity supply of local production and the large invasion of local markets by their counterparts imported from neighbouring countries; Syria, Jordan and Iran. This situation is an economic devastation and a dangerous shift in the economic agricultural structure to change Iraq from a productive agricultural country that leads the countries of the region in the agricultural production process, to a country that imports its basic agricultural products.

Research hypothesis

The research is based on the premise that greenhouse projects at present are among the investment projects that benefits the investor with a rewarding economic return which allows him to invest and expand in other production projects.

Aim of the research

The research aims to conduct an economic evaluation of a greenhouse vegetable farm, and to learn whether this farm achieves a profitable economic margin that encourages others to enter such projects.

Methodology of the research

The researcher, in his methodology, depended on survey to collect information and data from a farm that produces vegetable crops (Tomato, green pepper, and cucumber) by means of a questionnaire form. The farm is located in the village of Qara Kharab in the district of Wana, the province of Telkif. Some criteria of economic evaluation of agricultural projects were used in addition to the descriptive theoretical side that relied on previous studies of the topic.

Descriptive and economic analysis of the farm

The vegetable crops production farm of (tomato, green pepper, cucumber) is one of the typical farms specialized in the production of vegetable crops and is managed by a successful administration

represented by the owner of the farm (the owner and administrator). The farm is located in the province of Telkif, Nineveh Governorate and it contains 40 plastic houses with dimensions of 9 x 56.5 meters, each house is equipped with drip devices and pipes for the irrigation of crops, with heating devices for each house that gives hot air in the winter in order to provide a suitable climate for growing crops in their season. The farm contains an artesian well with a basin to collect water via a submersible pump, two tractors, two 2 ton trucks, a 4 tons truck and two 100 KVA generators as well as a shed for equipment and office.

Table (1). Items of investment cost for the farm in 2019

	Item	Total cost (Dinar)
1	Complete plastic houses including steel, P.V.C sheets, and irrigation system (no.= 40)	275000000
2	Installation cost for the plastic houses	20000000
3	Administration building and its annexes	30000000
4	Artesian well	8000000
5	Project's perimeter fence	40000000
6	Metal shed	8000000
7	Two small trucks, 2ton each	37500000
8	Two power generators	24000000
9	Complete heating system for each greenhouse	60000000
10	Water supply pipes+ 40 water tanks	7000000
11	Truck, 4 ton	26500000
12	2 tractors with their equipment	71000000
	Total	607000000

Source: prepared by the researchers based on personal interview with farmers and on the prices as per 2019.

Fixed expenditures

Fixed expenditures constituted 53% of the farm's production total costs, and according to the annual depreciation portion of the fixed assets based on the productive age which varies between 10 years for machines and equipment, 20 years for sheds and halls, and 15 years for transportation means.

Table (2). Fixed cost items

	Item	Total Cost (Dinar)
1	Depreciation	81850000
2	Interest on capital	24280000
3	Administrative work	900000
	Total	107030000

Source: Calculated by the researchers based on the questionnaire form
*** Annual portion= total cost/economic life

Variable costs

Variable costs constituted about 47% of the total overall costs and this includes the costs of seeds (43%) of the overall variable costs and the cost of labour wages (18%) of the overall variable costs in addition to other costs as shown in table (3).

Table (3). Items of variable costs

	Details	Quantity	Price/ thousand dinars	Total cost (year)/million dinars
1	Seeds	1.5 envelopes/house	260000	41580000
2	Chemical fertilizers	Various packs/house	450000	18000000
3	Animal- based fertilizers	----------------	--------------	3200000
4	Labour wages, 1 worker/house	10000	30000	12000000
5	Pesticides	20 cans or envelopes	225000	9000000
6	Cork container with peat moss	8 containers with 10 peat moss	30000	1200000
7	Engineering supervision costs	-----------	240000	9600000
8	Oil cost (gas and diesel)	-----------	----------	17250000
9	Packing sacks	-----------	-----------	1200000
10	Marketing costs	------------	14000000	14000000
	Total			95850000

Calculated by the researchers based on the questionnaire form

Overall costs: overall costs include fixed costs which are represented by yearly depreciation of buildings, machines, devices, interest on the invested capital, and administrative and family work, and variable costs represented by the consumed requirements of the production process. The summation of the fixed and variable costs represents the overall costs as shown in table (4)

Table (4). Items of annual overall costs

	Item	Value (dinar)	Relative importance
1	Fixed costs	107030000	53
2	Variable costs	95850000	47
	Overall costs	202880000	100

Overall income

It includes one-loop revenue and total annual revenue, knowing that the production of one house is 9000 kg at a rate of 500 dinars / kg.

Table (5). Items of overall annual income

	Item	Total value/ Dinar
1	Revenue of one house	4500000
2	Revenue of one loop	180000000
3	Two loops revenue	360000000
4	Total annual revenue	360000000
5	Net annual profit	157120000

Source: calculated by the researchers based on the questionnaire form

Economic evaluation of the farm

The project evaluation process has become an important activity in the management of any project, and many opinions of project owners, decision makers, and project funding bodies emphasize the importance of the benefit that the project evaluation process offers them. Among the most important reasons of lagging of some projects, is some managers lack of sufficient knowledge of the evaluation process; what does it mean and how to be conducted practically. In the end, the aim of the evaluation is to provide managers and researchers with all the information and knowledge about the evaluation of projects, and provide a working guide for how to do this. There are multiple concepts of projects evaluation, the most important of which is the process of making comparisons in order to improve decision-making; it is the issuance of judgments about a program or a project based on specific criteria, or it is a comparison of what has been achieved (index) with what was targeted or what should have been achieved (criterion) **(Al-Banna, 2011)**.

The criteria are as follows

1- Return of invested dinar: It is the value of the return generated by a single dinar invested being used in the investment project and is produced from the sum of the total revenues divided by the total costs.

2- The rate of return on investment: it represents the annual income of each dinar of the capital costs, and is calculated by way of dividing the profits by the invested capital X 100 **(Hameed, 2011).**

3- Gross and net added value: It is the increase or addition in the value that occurs during the production process to the original value of the production requirements of raw materials and others. It represents the increase in the national income achieved by the project, and it represents the value of the product at the market price minus the cost of production requirements. As for the net added value, it represents the gross added value minus depreciations, it includes labour and management returns (wages and salaries), capital returns (interest) and land returns (rent or revenue).

4- Capital recovery period: It is the needed period for the project to recover the invested capital. The shorter this period is, the more efficient and lucrative the project is. This period is calculated by dividing the total investment by the value of profits and depreciations.

5- The gross and net economic surplus: The gross surplus represents the gross added value minus wages and salaries. As for the net economic surplus, it represents the gross economic surplus minus the depreciations and it represents the source of self-financing for the project.

6- Returns of farm work: It is an important criterion for measuring the economic efficiency in general and the efficiency of the farm manager in particular, and is seen as a reward for the manager or farmer for his services, and it represents the returns of the farm management in the event that there is no work for family members in the activity concerned; its value is calculated as follows: The net return of farm work minus the interest on the capital, whereas the returns of the farm management are equal to the net income from the farm work minus (the interest on the capital + the work of family members), **(Majla, 2002).**

7- The cost of one kilogram of output: It is the value of what one kilogram of the final product costs regarding its production requirements, and it is calculated by dividing the total variable costs by the final market weight.

8- The turnover rate of variable assets = the value of the gross product / the value of variable costs.

9- The turnover time of variable assets (days) = 365 / turnover of variable assets.

10- Economic Efficiency = the value of the gross product / value of the overall costs.

11- Farm productive efficiency = value of total output / value of variable costs + value of annual depreciation.

Table (6). Economic evaluation of the farm

	Criterion	Value/dinar
1	Return of invested dinar	1.77
2	Net farm profit	157120000
3	Average return on the investment	25.88%
4	Gross added value	264150000
5	Net added value	182300000
6	Capital recovery period	2 years and 5 months
7	Gross economic surplus	251250000
8	Net economic surplus	182300000
9	Farm work returns	132840000
10	Farm management returns	133740000
11	Cost of 1kg	267
12	Variable assets turnover rate	3.75
13	Economic efficiency	78%
14	Variable assets turnover period	3 months and 8 days
15	Productive efficiency	81%

Source: calculated by the researchers based on the questionnaire form

Table (6) shows that the return of the invested dinar is equal to (1.77) dinars. This means that each dinar invested achieves a return of (1.77) dinars, and the more this value gets than the figure one, the more efficient the farm is. The net farm profit shows the level of net profits. The rate of return on investment reached (25.88%), i.e. the return on invested capital during the 2019 production season, also as the percentage of this criterion increases, the economic efficiency of farm increases as well. As for the criterion of the capital recovery period, it was (2.5), i.e. the farm needs a period of two-years plus five months to recover its invested capital on the farm, and the returns of the farm work are the same of the farm management because there is no work for family members in this farm. Finally, the cost of one kilogram of vegetable production was (267) dinars and this is considered acceptable and suitable to the level of prices to achieve an acceptable profit margin for the farmer.

Conclusions and suggestions

1- By conducting economic analysis and evaluation, we conclude that the total profit in the research sample for the production season 2019 reached an average of 157120000 dinars

2- With regard to the turnover rate of variable assets, which is one of the criteria of productive efficiency, it reached a total of 3.75, and the value of this number resulting from this standard is considered good, and this indicates an increase in the efficiency of using the variable assets used in the research sample.

3- Using the turnover rate of the variable assets, the turnover period of the variable assets was calculated for a full cycle during one year for the research sample, which reached a total of 308 days, while the farm productivity efficiency reached a total average of 0.81 i.e. the capital returns to the farmer with an increase of 81%, hence, the efficiency of using farm assets is considered good.

4- Regarding economic efficiency or profitability index, it reached 1.78%, therefore, the production process of the crop in the research sample is considered profitable.

5- The criterion of gross added value reached 264,150,000 dinars, the thing that expresses its contribution to the national income, and the net added value criterion approaches the gross added value as it amounted to 182.300,000 dinars, and this indicates a decrease in investment expenditure for such farms, and this provides an opportunity to create many of them by the public and private sectors to provide an item necessary for the consumer.

6- The fixed costs used in the production of vegetable crops under study constituted the largest percentage of the gross total costs, and it amounted to 53% of the gross total costs.

Suggestions

1 – To make the utmost benefit from the amount of surplus achieved in economic resources, seeds, amount of fertilizers and pesticides, in the production of various vegetable crops to establish good production projects.

2 – To focus on investing in large productive farms because they participate with a large financial abundance that contributes to increasing national income, and thus achieving self-sufficiency in this product.

3- To exempt imported agricultural production inputs from customs, especially those that constitute a burden for farmers in improving their production.

4- To impose customs duties on the imported product, because dumping the market with the imported product will hinder the development of the local product. Also to benefit from the customs duties in supporting local production, provided that we do not forget the importance of competition and the purchasing power of the consumer who prefers the local product, and to support the production elements for local farmers in order for them to achieve remunerative profits and raise their production capacities, along with new producers entering the production process and thus imports can be reduced.

5- Working to increase production to achieve sustainable self-sufficiency by means of investing production factors to improve the rate of return on costs and increase farmers' income, which in turn improves their living conditions.

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التحليل والتقييم الاقتصادي لمزرعة الخضر في قرية قرة خراب ناحية وانة قضاء تلكيف في محافظة نينوى للموسم الزراعي 2019

قيس ناظم غزال ـ عماد عبد العزيز احمد

الخلاصة

تعتبر دراسة التقييم الاقتصادي من المواضيع المهمة سواء على مستوى الوحدات الإنتاجية أولى مستوى القطاع الزراعي. ويمثل شرطا أساسيا في كيفية توجيه وتنسيق الأنشطة المختلفة، وهو أحد المؤشرات الهامة التي يمكن من خلالها التعرف على كفاءة وتوجيه الموارد الاقتصادية المتاحة. والهدف الرئيسي للسياسة الزراعية هو تعظيم الإنتاج الزراعي باستخدام الموارد لزراعية المتاحة، حيث أن العمل على تعزيز الكفاءة الاقتصادية له أهمية كبيرة كونه أداة للبحث عن أفضل السبل لاستخدام الموارد الاقتصادية المتاحة لتحقيق الإنتاجية المثلى. تهدف الدراسة إلى إجراء تقييم اقتصادي لمزرعة الخضروات في البيوت المحمية ومعرفة ما إذا كانت هذه المزرعة تحقق هامش ربح اقتصادي مجزٍ وتشجيع الآخرين للدخول في مثل هذه المشاريع. وأظهرت نتائج التقييم الاقتصادي ارتفاع تكاليف أجور العمال ممثلة بعاملٍ واحد لكل دفيئة، وهو ما يشكل 38.52% من إجمالي التكاليف. وبلغ معدل دوران الأصول المتغيرة 3.75، وهذا يعني أن عائد الدينار المستثمر يحقق ربحا قدره 3.75 دينار، وأن عوائد إدارة المزرعة تبلغ 133740000 دينار. وقد حققت هذه المزرعة كفاءة فنية بلغت 81% وكفاءة اقتصادية 78%، مما يعني حسن إدارته.

الكلمات المفتاحية: التقييم الاقتصادي – الخضروات ـ البيوت المحمية ـ محافظة نينوى.