Economic analysis for the most important obstacles to the production of orange crop in Diyala / a study for the season of 2018

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Abstract. The study of the production function of orange orchards in Diyala Governorate was conducted through a random sample of 44 farmers using a questionnaire prepared for this purpose. The multiple regression of the elements of the function was analyzed, including the amount of chemical fertilizer, animal manure, pesticide costs, fuel costs, labor costs and number of irrigation during the year and the costs of maintenance. The analysis showed that the effect of the amount of fertilizer, the amount of animal manure, the cost of fuel, the number of irrigation and the cost of maintenance have a positive effect on the quantity of production. The labor costs and the costs of pesticide had a negative effect on the quantity of production where the elasticity was negative. The descriptive aspect of the research included a questionnaire of farmers about the problems facing orange production in Diyala Governorate, where it became clear that the main obstacles facing orange production are the lack of government support for production inputs and the opening of imports followed by problems of high input costs, low crop prices, and the problem of rising wages and lack of experience and then the problem of neglect orchards and problems of non-regular agriculture and non-renewal of trees, respectively. It was recommended to prepare programs for the fertilization of trees and pest control based on the results of scientific research and the introduction of drip irrigation technology to reduce water losses and reduce the fungal diseases and support prices of inputs and prices of the crop and reduce the import of citrus and to awareness the farmers the importance of organization and specialization of field work and achieve the optimal combination of input to reach productive efficiency.

Keywords: orange orchards . Orange production. Obstacles. Productive inputs

1. Introduction:

The orange trees are of particular importance to Iraq for a number of reasons, the most important of which is the large number them (12 million) orange trees and there are a large number of Iraqi families depends on cultivation and circulation in addition to the appropriate climatic conditions and the possibility of expanding the cultivation of citrus, especially orange in Iraq. Self-sufficiency and export.
Native habitat: The tropics in north-east of India and China are the original home of various citrus trees where wild plants are found in these areas, but citrus cultivation has spread to many other regions of the world. Citrus cultivation is spread over tropical and subtropical regions, 40 kilometers north and south of the equator, mainly Brazil, America, Japan, Italy and Spain. In Iraq, it spreads in the provinces of Diyala, Salah al-Din, Karbala and Basra.

The importance of the food: The importance of orange primarily compared to other types of citrus, where the production of 70% of the world production of citrus because of the excellent taste and free fruits of bitterness and high acidity, the oranges contain 70-90% water depending on the prevailing climatic conditions and soluble solid materials The most important of which is sugar, which is 80-90% of the total soluble solids, and is an important source of vitamin C, with a concentration of 40-70 mg per 100 ml of juice and the amount of vitamin C in the fruit of orange per 90 mg (General Authority for Guidance and Agricultural Cooperation -2012).

Research problem:

The problem of research is the low production of orange crop and the lack of service orchards and the control of imported crops on the local market, which led to study the productive side of this crop and a questionnaire producers to identify the obstacles facing farmers.

Search Goal:

Study the impact of productive input on the quantity of production and the questionnaire of producers on the obstacles facing production and hinder the efforts of the farmer in achieving productivity efficiency.

research importance:

Orange orchards occupy a large part of the agricultural sector in Iraq along with other agricultural riches, which is an important economic source for farmers' income and an indispensable source of food for the consumer, which led to study the costs and production of these orchards to benefit from future research results and address the obstacles that cause the low quantity of production.

2. Materials and Methods of Work:

1. The statistics of the number of orange trees in Diyala governorate were obtained from the Directorate of Diyala Agriculture, Department of Plant Production, the annual statistics of orchards for 2018.
2. In November, a number of orange farmers were interviewed in Diyala Governorate. They were selected randomly and obtained part of the data, including fertilizer quantities and other descriptive data such as age of trees, area, source of irrigation, number of trees, irrigation method and source.
3. The areas from which the data were taken were selected for the purpose of obtaining the remaining data. In December, the remaining data were obtained, including the cost of labor, the costs of pesticides, quantities of production, and the most important obstacles faced by the farmer during the production season.
4. The data were unloaded in the tables and tabulated and analyzed using the programs (Excel and Evieos) to obtain the results.
Characteristics of Orchards:

The research included (44) randomly selected orange products and included the areas of (Muqdadiya - Baquba - Khalis - Buhraz - Abu Saida - Kanaan - Alwajihip)

| S | Characteristics                        | The details                        |
|---|----------------------------------------|-----------------------------------|
| 1 | Total orange trees in Diyala           | 12,206.721 Orange trees           |
| 2 | Total number of sample trees           | 10192 A fruitful orange tree       |
| 3 | Total sample area                      | 194.5 Dunom                       |
| 4 | Irrigation method for sample           | 100 % irrigation by pump          |
|   |                                        | 9.09 % Mixed irrigation           |
| 5 | Source of irrigation water             | 100 % River                       |
|   |                                        | 0 % Well                          |
| 6 | Age of the trees for the sample        | 10 – 20 Year                      |
|   |                                        | 20 – 40 Year                      |
|   |                                        | 63.08 %                           |
|   |                                        | 36.92 %                           |

references: Director of Diyala Agri.- Dept.of Plant Production-Field statistics of fruit trees 2018.
- Work of the researcher by the questionnaire

3. Results and Discussion:

3.1. Quantitative Analysis of the Sample:

Production function: A mathematical relationship that describes the rate at which production resources are used to convert them into a product. The simplest forms of production functions that link a variable output element to output are the following form (Abu Shawer and others, 2011.p132)

\[ Y = f(X_1, X_2, X_3 ..., X_n) \]

The variable (Y) output was selected as dependent variable and (Xi) variables were independent factors and included the inputs used by the product during the season and were as follows:

\[ Y = \text{Total output during the season / ton} \]
\[ X_1 = \text{Quantity of Chemical Fertilizer / kg} \]
\[ X_2 = \text{Quantity of animal manure / kg} \]
\[ X_3 = \text{Costs of pesticides / dinars} \]
\[ X_4 = \text{Fuel costs / dinars} \]
\[ X_5 = \text{Labor costs / dinars} \]
\[ X_6 = \text{Number of riyals per year} \]
\[ X_7 = \text{maintenance costs / dinars} \]

Production (Y) tons included the total production of the orchard, variable X1 and means the amount of chemical fertilizer used during the season, measured in kg, Variable X2 means the
amount of animal manure used during the season measured in kg and the variable X3 means the costs of pesticide, the variable X4 means the cost of fuel consumed during the season. The variable X5 means labor costs and includes wages for family work and rented labor during the production season such as orchard cleaning, tree trim, fertilization, pest control, irrigation, harvest and managment, the variable X6 means the number of irrigations per year and the variable X7, which means maintenance costs.

The function was analyzed in several linear form, logarithmic, double logarithmic and inverse logarithmic models. The linear model was chosen as the best function. It was found that the model’s signals were consistent with the logic of the economic theory and the results were as shown in Table 2:

| Models function parameters | Estimated Linear function Y=F(X) | The function half log. LnY=F(X) | Double log. function Ln(LnY)=F(LnX) | The inverse log. function Y=F Ln(n(X)) |
|-----------------------------|----------------------------------|----------------------------------|-------------------------------------|---------------------------------------|
| Constant                    | 3.01363                          | 1.575108                         | 0.8113575                           | -4.98600                              |
| X1 = Quantity of chemical fertilizer (t) | (2.318228)                      | (11.93148)                       | (2.587980)                          | (-1.589918)                           |
| X2 = Quantity of animal manure (t) | 0.796394                         | 0.07537807                       | 0.4168286                           | 4.092168                              |
| X3 = Costs of pesticide (t) | (2.867845) *                     | (2.672953)                       | (2.189645)                          | (2.149032)                            |
| X4 = Fuel costs (t) | (2.872464)*                      | (2.442720)                       | (3.065937)                          | (3.361942)                            |
| X5 = Labor costs (t) | -0.15846                         | -0.0092322                       | -0.095308                           | -1.2895                               |
| X6 = Number of irrigation (t) | (-1.1891) **                     | (-0.682226)                      | (-1.430112)                         | (-1.934480)                           |
| X7 = Maintenance costs (t) | -0.082083                        | -0.0128357                       | 0.049429                            | 0.90859                               |
| R2                          | 0.261673                         | 0.0092322                       | 0.049429                            | 0.90859                               |
| Adjusted R                  | 0.9766                           | 0.976376                        | 0.976376                            | 0.971745                              |
| F                            | 258.17 *                         | 300.0716                        | 254.8781                            | 212.2637                              |
| D.W                         | 1.700 *                          | 1.786194                       | 1.737661                            | 1.620222                              |

* Significant level 0.05 ** Significant level 0.15
3.1.1. Linear function:

\[ Y = 3.01363 + 0.796394 \times X_1 + 0.689254 \times X_2 - 0.158461 \times X_3 - 0.0820838 \times X_4 - 0.394624 \times X_5 - 0.0415945 \times X_6 + 0.196463 \times X_7 \]

3.1.2. Statistical Analysis of Production Function:

The t-test showed the significance of the estimated parameters, where it was found that its calculated value was greater than its tabular value at acceptable levels. Where the statistical analysis proved the significance of the variables X1 means the amount of chemical fertilizer and X2 and the amount of animal manure at the level of (0.05) and their effect is positive on the amount of production, the significance of variable X3 proved the costs of pesticides and X5 and mean labor costs at level (0.15) and their effect is negative on the quantity of production, and the variable X7 maintenance costs proved to have a positive effect on the production quantity at a significant (0.15), as for the variable X4 and mean the costs of fuel and variable X6 and mean the number of irrigation did not prove their significance at any statistical level and may be due to the overlap of the factors of the function with each other, where these factors proved their significance when estimating the simple regression equation with the quantity produced, Their importance for the production process as shown in the following:

\[ Y = 1.2788369 + 1.2115456 \times X_4 + 0.34699552 \times X_6 \]
\[ T = (1.034682) \quad (3.344144) \quad (1.339722) \]
\[ R^2 = 0.930 \quad F = (273.08) \quad D.W = 0.694 \]

The test of (F) showed the significance of the whole function at a significant level (0.05) with a value of (258.17). The \( R^2 \) showed that 98% of the changes in production were caused by the production inputs. The remaining 2% were due to other factors that were not measured by the function.

3.1.3. Economimetrics analysis of the estimated productivity function:

The model showed that there was no problem of outo correlation by the D.W test which reached (1.700) at the level of 0.05 and the degrees of freedom (K= 3) and its value is limited between (dl = 1.3> DW = 1.700> du = 1.6), We conclude that there is no problem of outo correlation between the residues, as showed by (the Park test) which included estimation the regression equation of the error square as a dependent variable and the production (Y) as an independent variable. There is no heterogeneousasticity phenomenon. The function is as follows:

\[ \log(e) = -0.379865256 + 0.0718336329 \times \log(Y) \]
\[ t = (-0.344494) \quad (0.595677) \]
\[ R^2 = 0.008378 \quad F = (0.554588) \]

It was found that the parameters of the estimated function are not significant at acceptable levels. This indicates that there is no problem of heterogeneity of the variation that usually appears in the cross section data.

3.1.4. Economic analysis of the estimated productivity function:

Elasticity Production: It is a concept that measures the degree of responsiveness between production and quantities of production resources. This Elasticity changes by increasing the use
of production resources and therefore the production stage can be determined by the value of production Elasticity. (Abu Shawar and others, 2011. p. 139). The estimated parameters of the function indicate the elasticities of the productive resources. The statistical analysis of the function shows that the variable X1, which means the amount of chemical fertilizer and variable X2, means the amount of animal manure and the variable X7, and the maintenance costs were positive. This means that these resources were produced in the second stage of the law of decreasing yield and is the stage of increasing production and at this stage there is a possibility of profit for the product as long as the total production in the state of growing (Abu Shawr and others.2011.P.137 - 138). The X3 variable means the cost of pesticides and variable X5 labor costs, whose elasticities were negative. This means that their production is at the third stage of the law of decreasing yields, which is the period of decreasing production and inefficient use of resources.In the third stage of the law of decreasing yields, total production increases at a decreasing rate, which is due to the factors created by the irrational use of one of the production resources (Al-Makassoui, 2007, p. 41). It was also found that the variable X4 fuel costs and variable X6 number of irrigation were positively positive when analyzed separately with production, which means that there is a response between the quantity of production and the efficiency of the use for these resources in a manner that achieves production covering variable costs and gives profits. In order to achieve the economic efficiency of the production, the questionnaire shows lack experience, lack labor and high wages, Little (Debertin.2012.Pp.203-204) that increasing production resources should be accompanied by decrease in the other resource.Where the optimal combination of resources is selected to reach the lowest cost through the price ratio of the production input.

3.2. Descriptive Analysis of the Sample:

A number of obstacles faced by orange farmers in Diyala governorate were presented to experts in the plant production department at the Diyala Agriculture Directorate and the Agricultural Extension Center. They agreed on the nature of these obstacles and the extent of the impact of orange orchards. The sample farmers were questioned about these obstacles and the results were as in Table (3):

| S | The field | Problems facing date production | % farmers affected by the problem |
|---|-----------|---------------------------------|----------------------------------|
| 1 | Orchards Service and Soil Service | • Neglect of Orchards and lack of fertilization programs  
• Lack of experience of orange orchards  
• Irregular irrigation | 64.32 %  
Of the sample |
| 2 | Prices and costs | • High input production prices such as fertilizers and fuels  
• Low crop prices | 88.39 %  
Of the sample |
| 3 | Diseases and agricultural pests | • High prices of pesticides and wages of control orange orchards  
• Lack of government support to control orange orchards | 53.43 %  
Of the sample |
| 4 | Natural environmental factors | • Temperature and humidity changes  
• Length of production season  
• Lack windbreaks | 30.11 %  
Of the sample |
| 5 | Labor and experience | • High wages and low labor in orchards  
• Lack of specialization in labor  
• Irregular agriculture  
• Pruning is wrong and do not replace pyramid trees | 69.66 %  
Of the sample |
| 6 | Problems of orange trees | | 51.21 %  
Of the sample |
There is more than one type in the orchard

7 Lack of government support
- Lack of support for input production prices
- Lack of support for crop prices
- Open import without restrictions
- Cutting and razing trees without restriction
- Lack of factories benefiting from local agricultural crops
94.32 % Of the sample

4. **Work of the researcher by the questionnaire**

The low level of government support, which included the problems of lack of support for the prices of inputs of production and the lack of support for crop prices and the opening of imports without restrictions and discouraging the construction of food factories to accommodate the local crop topped the obstacles facing the production of orange crop, followed by the problem of rising input costs and low prices of the crop, followed by the problems of high wages and lack of experience of workers in orchards, followed by problems of neglect of orchards, irrigated irrigation and the absence of fertilization programs and the problem of non-regular agriculture and non-identification of the type and natural factors, respectively.

(Al-Shabini, 2005, Pp. 166-66) recommends adding phosphate fertilizers during the winter service of fruit trees until these fertilizers are distributed in the root zone. Studies have shown that phosphate fertilizers are less effective over time and become insoluble. The use of irrigation systems modern and economically advanced has a significant impact in the development of ways to add fertilizer to agricultural land and plants where the injection of fertilizers with irrigation water is to harmonize the distribution of fertilizer and benefit directly, which is reflected in the increase in productivity of the unit area.

(Horticulture Research Center, Bulletin No.850.2003. Pp 14-19) recommends the fertilization plays a big role in increasing the productivity of the crop and improving its quality. There are several precautions to take full advantage of fertilizers, the most important of which is the addition of fertilizers with the appropriate dates, the best way and the recommended quantities. Irrigated and irrigated irrigation leads to the deterioration of trees and the decline of crops and physiological damage to fruits such as cracking fruits, especially heavy mud land, as well as the service of pruning trees, which leads to the penetration of light and air into the tree, which improves the growth of vegetative and fruit.

Conclude (B.Ozkan, H.Akcaoz, F.Karadeniz.2004.1821-1830) a study conducted to determine the extent to which production inputs were used to determine the extent of the use of production inputs was found orange crop to be the highest yield for producers compared to lemons and tangerines in terms of the use of inputs such as nitrogen fertilizer and irrigation pump fuel.

Confirmed (Dawood.2011.Pp.2-4) The removal of weak branches leads to the penetration of light into the tree and thus encourage the growth of buds, which increases the proportion of total vegetative and root total and thus increase fruiting, and the restructuring reduces some diseases and improve the size of fruits and increase the amount of crop.

Also confirmed (Erheem.2002.Pp.26-27) the treatment of animal manure with the addition of lime by 8% with stirring from time to time before use is beneficial to some insects that feed on the humus by fertilizing the soil, and the elimination of weeds and work on soil ventilation. It also reduces the diseases that affect fruit trees, including citrus.
5. Conclusions:

1. the irrational use of part of production inputs such as labor where the lack of regulation of working hours lead to wage increases and thus increase costs and lack of efficiency.

2. The increase in the prices of production inputs such as pesticides and fertilizers, which increases the variable costs and thus the farmer's reluctance to develop the agricultural production.

3. Lack of support to government agencies for farmers and this is illustrated by the opening of imports without determinants and the decline and fluctuation of the prices of the local crop.

4. Lack of fertilization and control programs and non-compliance with fertilizer quantities and dates of addition and that help to achieve the optimal combination of resources to achieve the highest production at the lowest cost.

5. Lack of agricultural management component and lack of specialization in the agricultural work and the absence of seminars and leaflets awareness of the guidance of farmers, which causes waste of time and waste part of the productive inputs and thus the rule of risk Capital.

6. Recommendations:

1. Preparing fertilization and control programs for farmers based on the results of scientific research in addition to training courses for workers in the orchards. The agricultural extension services will also deploy drip irrigation technology, which will reduce water losses and reduce the growth of fungi and weeds.

2. Support the prices of production inputs, especially chemical fertilizers and pesticides, support the prices of local production and reduce imports to encourage the farmers.

3. The application of the results of scientific research in the orchards in terms of how to use and mix productive input and the allocation and organization of agricultural work and farm management, helping the farmer to reduce the variable costs and efficiency of work.

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