Economic and Econometrics Analysis of the Most Important Constraints of the Production of Dates in the Province of Diyala for the Production Season 2018

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ABSTRACT

The study examined the production function of a random sample of date palm farms in Diyala Governorate. The sample included (53) farms with (8374) fruitful palm trees from the study population of (22943) palm trees. The multiple regression of the elements of the function was analyzed. This included labor costs, fertilizer costs, pesticide costs, The analysis showed that the effect of fertilizer costs, pesticide costs and labor costs on the quantity of production was positive ,The number of irrigation during the year had a negative effect on the quantity of production where its elasticity was negative, the study showed that weak government support, high production input prices, neglect of control programs, lack of awareness of palm tree service operations, soil service and the spread of poor varieties are among the main reasons for the decline in production, the decline of new palm trees, the increase in labor wages, the low labor experience, the low price of local dates and the competition of imported dates ,The reasons for the decline in production were , and it was recommended that government support for palm farms and programs to fertilize and control date palms and provide good varieties of production, especially support for textile agriculture, which provides excellent varieties and with good productivity.

INTRODUCTION:

The date palm tree (*Phoenix dactylifera* L.) belongs to the Palmaceae family, a date palm of single-stemmed plants consisting of a single trunk at its top with a large terminal bronchial that is responsible for elongating the stem and isolating it and responsible for leaf growth. The original home of the palm tree was the first recorded palm tree in the world in the far south of Iraq before 4000 years before BC. In 1999, two cobblestones were discovered on the island of Dalma in the Emirate of Abu Dabi during archaeological excavations, dating back to 5110 BC. (Kaake. 2004.Pp.19-23).The nutritional and economic importance: Dates has nutritional elements and benefits are not counted It contains vitamin (A), which strengthens the nerves of sight and combat night blindness also has a role in calming the moods, in addition to containing vitamin (B), which softens the blood vessels and nerves and useful for athletes and has cracked the lips and break nails, has been proved by recent research that the date palm contains sugar cane by the presence of sugar . Dates also contain a high percentage of sugars, which account for more than 85% of its dry weight . Hence, it can be considered one of the richest fruits in terms of thermal energy. Palm leaves are also used as feed in the composition of milking cows. Palm leaves are used in different industries Cages also use cores to form cattle rations (Ibrahim and Khalif, 2003). Dates contain a small amount of fat and proteins

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important to the human body. It is an important source of the rare amino acid (Bebo colic). Dates are involved in many manufacturing and food industries such as dried foods, liquid sugar, vinegar, and concentrated proteins (Wahiba and Omari 2007). In addition to its food use, palm trees are one of the sources of combating desertification. They bear drought and soil salinity and do not need much irrigation. They are considered strategic food security crops. They are characterized by easy transportation of fruits and storage for long periods and at low costs.(Al zubairi.2008.P.3)

Research problem:

The decline in the number of date palm trees, date production and fluctuation in prices as well as continuous cutting of palm trees without renewal, which led to study the problems of date production and palm cultivation in Diyala governorate.

Research Goal:

The aim of the research is to find out the effect of production inputs on the quantity of production as well as to identify the most important problems facing palm farmers in Diyala governorate and to classify these problems.

Research importance:

The palm groves occupy a large part of the agricultural sector in Iraq along with other agricultural resources, which is an important economic source of income of the farmer and an indispensable source of food for the consumer, which led to study the costs and production of these orchards to benefit from the results of future research.

MATERIALS AND METHODS OF WORK:

1- The statistics of the number of palm 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 August, a number of palm growers were interviewed in Diyala Governorate. They were selected randomly and obtained part of the data, including fertilizer costs 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 the beginning of October, the remaining data were obtained. These included the cost of family and lessor labor , the costs of pesticides, quantities of production, household consumption and the most important problems faced by the farmer during the productive 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 the studied research sample :

The research included (53) palm farms randomly selected, and studied the orchards planted with palms only, and included areas (Balldrooz- Muqdadiya - Baquba- Khalis - Buhraz- Habhab- Abu Saida-Kanaan- Khranabat-Wajihia) The characteristics of the sample studied as shown in table (1).

Table (1) shows that the majority of sample farms are irrigated with pumps and this increases the variable costs, Most of the sample farms were aged 30-50 years, which means that the farms are old and there is no renewal and the cultivation of new fluids ,the survey also showed that the distance between the palm and the other is irregular,(Erhim ,2002) confirmed that the optimal agricultural distances for date palm growing is (6x6 m) between palm and other in agriculture in sandy soils and (8 x 8 m) in case of cultivation in heavy clay soil.Where the cultivation of palm trees irregular distances to the tangle of trees and the difficulty of the necessary service operations and the use of production inputs, which leads to the lack of quality of the crop in terms of quantity and quality.

Table (1) Characteristics of the sample

S	characteristics	The details		
1	Total palm trees in Diyala	22943 athousand trees		
2	Total number of sample trees	8374 a fruitful palm tree		
3	Total sample area	361 Dunom		
4	Irrigation method for sample	30.77% Surface irrigation		
		69.23% irrigation by pump		
5	Source of irrigation water	89.46% River		
		10.54 % Well		
6	The age of the trees for the sample	30-50 Year	73.08 %	
		60 – 80 Year	26.92 %	
7	Average productivity of one tree	47.5 Kg		
8	The item studied	Different varieties		

Source : • Directorate of Diyala Agri. – Dept. of Plant Production-Field statistics of fruit trees 2018.
• Work of the researcher by the questionnaire.

RESULTS AND DISCUSSION:

First: 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)

$$Y = f(X1, X2, X3 .... Xn)$$

(Y) was selected as a dependent variable and the variables (Xi) were independent resources , included the main production inputs used by the producer in the palm orchard during the same season. These were as follows:

Y = Production during season / kg (minus household consumption)

X1 = Labor costs / thousand dinars

X2 = Purchase costs of fertilizers / thousand dinars

X3 = Number of irrigation during the year

X4 = Purchase costs of pesticides / thousand dinars

Production (Y\ kg) included the total production minus the amount of household consumption, the variable X1 means labor costs and includes the cost of horticultural service (palm- cleaning , stabilize dates, palm plantations , pollination , soil preparation, soil rotation , weeding, fertilization, watering and pest control cocts) ,Variable X2 included the cost of the purchase of chemical fertilizer and animal manure, while the variable X3 means the number of irrigation during the year, varying from one orchard to ano ther and according to the availability of water source, The variable X4 means the cost of purchasing pesticides. The function was analyzed in several linear form,semi- logarithmic , double logarithmic, and logarithmic models. The logarithmic half model was chosen as the best function. It was found that the model's signals were consistent with the logic of economic theory and the results were as shown in Table 2:

Statistical analysis of the estimated productivity 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. The statistical analysis proved the significance of variable X1 which means labor costs at level 0.05, has a positive effect on the quantity of production. The significance of variable X2, which means fertilizer costs at the level of 0.05, has a positive effect on the quantity of production. The variable X3, which means the number of irrigation during the year, was significant at 0.05, put has a negative effect on the quantity of production. The value of the variable X4, which means the costs of pesticides, was also found at (0.05) and its effect was positive on the quantity of production. The test of (F) showed the significance of the whole function at a significant level (0.05) with a value (400.01), The coefficient of identification (R^2) to showed that 87% of the changes in the dependent factor (production) were caused by the independent factors (the production inputs) and the remaining 13% were due to other

factors that were not measured in the function, this fulfills requirement $(0 < R^2 < 1)$. (Bakhit and Fathallah, 2006).

Table (2) Estimated production Function of dates crop in Diyala Governorate\2018

Models function / Estimated parameters	Linear function $Y=F(X)$	The function half log. $Ln(Y)=F(X)$	Double log. function $Ln(Y)=F\ Ln(X)$	The inverse log. function $Y=F\ Ln(X)$
Constant	-8.578381	0.3061955	-1.300896	-22.4905
t	(-7.8224)	(2.4826)	(-6.1767)	(-11.467)
X1= labor costs	1.038881	0.10919078	0.371362	2.59145
t	(4.36809)	(4.0822) *	(2.302310)	(1.72532)
X2= fertilizers costs	0.5796141	0.05642868	0.360777	3.64565
t	(3.02057)	(2.61477) *	(2.59062)	(2.81127)
X3= number of irrigation	-1.0145628	-0.0866185	- 0.17473	1.83882
t	(-7.02049)	(-5.32947) *	(-7.165310)	(-8.09743)
X4= pesticides costs	1.424168	0.14821000	1.188405	11.3070
t	(4.547801)	(4.20825) *	(4.87453)	(4.980566)
R^2	0.968015	0.8708	0.968056	0.961525
Adjusted R	0.965349	0.8684	0.965394	0.958319
F	363.1740	400.01 *	363.6620	299.8938
D.W **K =4 (4 - du = 2.28)du =1.72**	1.753135	1.862 *	1.962704	1.775081

* Significant level 0.05

The semi- logarithmic model:
Ln (Y) = 0.3061955+ 0.10919078X1 + 0.056428681X2 - 0.086618595X3 + 0.148210009X4

Standard analysis of the estimated productivity function:
The model showed the absence of outo correlation problem by means of the Drben Wattsen test(D.W) which reached (1.862) at the level of (0.05) and the degrees of freedom (K=4) , where it became clear (du < DW < 4-du) (1.72< 1.86 < 2.28) When this rule is achieved, there is no problem of outo correlation between the residues (Bakheet and Fathallah, 2006), as showed by (the Park test) which included estimation the regression equation of the error squar as a dependent variable and the production (Y) as an independent variable. There is no (heterogeneousasticity) phenomenon. The function is as follows:

Log (ei)^2 = 0.0017187462995 + 0.000234922769541 Log(Y)
t   (0.248930)   (0.286990)
R^2 (0.001612)   F   (0.082363)

It was found that the parameters of the estimated function are not significant at the accepted levels by the value of (t) calculated less than their tabular value , this indicates that there is no problem of heterogeneousasticity of variation that usually appears in the cross section data. (Bakheet and Fathallah, 2006).

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 function parameters refer to the elasticities of the productive resources. The statistical analysis of the function shows that the variable X1, which means labor costs and the variable X2, means fertilizer costs , and variable X4 the costs of insecticides, their elasticity was positive , less than one. 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 variable X3, which means the number of irrigation during the year, was elastic with a negative sign, which means the production of this resource in the third stage of the law of decreasing yield. 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-Maksosi, 2007, p. 41),(Ibrahim and Khalif.2004, p. 278) that the availability of a permanent water source for trees growing in the orchard has an important role in increasing the crop and delay palm irrigation leads to the early holding of fruits and the decrease in the amount of production.

Second: Descriptive Analysis of the Sample:

A number of obstacles faced by palm growers in Diyala governorate were presented to experts in the plant production department at Diyala Agriculture Directorate. They agreed on the nature of these obstacles and the extent to which palm orchards were affected. The sample farmers were asked whether they were affected by these problems or not.

Table (3) shows that:

1- The most problems faced by producers are weak government support for production inputs, competition of imported dates and the absence of plants for date products.

2 - followed by the problem of rising prices of inputs such as fertilizer and the lack of programs of fertilization and control in addition to the decline in prices of local dates.

3 – followed by the problem of lack of experience of workers in the field of technical services for palms such as pollination, Carpentry and removal of the fiber and soil service and high wages and lack of employment in this field.

4 - then the problems of irregular agriculture and the age of trees affected by strong winds and the cultivation of non-commercial varieties and the spread of seed varieties.

5 - Finally problems of natural factors and the environment and the most important length of production and high winds that cause the fall of fruit and the rain is not appropriate.

(Ibrahim and Khalif.2004.p - 67 68. Previous source) The interest in fertilizing palm trees has a significant impact on the improvement of growth and increase of yield and that palm trees that give good growth is evidenced by giving the tree 20-30 sheets per year and give a large harvest , And that the high winds lead to impeding the process of pollination, which causes the lack of yield is also low quality as a result of the fruit is made without seeds. Little (Khatib and Dinnar.2002.P88) The fruit of palm trees fails if temperatures fall below 25 ° C and are especially affected by trees aged 1-3 years and for all varieties . (Agriculture Research Center.2004.P4) finds that the moisture resulting from the high level of the ground water and the presence of soil-forming layers inhibit the growth of the roots, which affects the mother tree. As mentioned (Arab Organization for Agricultural Development, 2012, p. 23). The disease is the most common diseases that crush the floral nourettes . This disease usually occurs on the same tree year after year. It is easy to spread, especially when the pollination process is carried out using an infected male pollen. Damage in the case of severe palm infection is estimated to be 30-40 kg of the single tree crop. The researchers concluded (kashash and Obaid . 2016) that the age of trees and irregular agriculture and lack of government support and the weak role of agricultural circles and lack of knowledge of technical operations to serve the tree of the problems facing palm growers. In order to achieve the economic efficiency of the production, the questionnaire shows low experience, low labor and high wages. (Debertin.2012.Pp.203-204) Little 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 .

Table (3) the obstacles to face the palm farmers in Diyala for season 2018

S	The field	Problems facing date production	% farmers affected by the problem
1	Horticultural services and soil service	● Neglect of orchards and lack of flocculation and soil fertilization processes ●Lack of cleaning and rearing of palm trees	44.91 % from sample
2	Prices and costs	●High input production prices such as fertilizers and fuels ●Low crop prices	92.31 % from sample
3	Diseases and agricultural pests	●High pesticide prices and control wages ●Lack of government support to fight palm orchards	51.92 % from sample
4	Environmental and natural factors	●High wind and bad rain ● Thematurity of the crop is delayed ●Length of production season	59.62 % from sample
5	Labor and experience	●High wages and low labor in this field ●Weak experience of workers in pollination, cleaning and dewatering of fruits	89.66 % from sample
6	Problems of palm trees	●Growing age of trees and irregular farming ●Cultivation of non- commercial cultivars ●The spread of seed varieties and the non-planting of new trees ●Cutting and dredging due to expansion of construction	82.69 % from sample
7	Lack of government support	●Lack of support input production prices ●Lack of support for crop prices ●Competition of imported dates ●Failure to account for logging ●There are no factories for date production	94.23 % from sample

Source: Researcher based on questionnaire

CONCLUSIONS:

1 - irrational use of irrigation water and insufficient knowledge of the number of irrigation during the year and the absence of programs of control and fertilization, and the absence of agricultural management that regulate the process of mixing resources production.

2 - The sovereignty of the problem of lack of government support and high prices of input production and lack of specialization in the labor in palm groves in addition to the decline in prices of dates and competition dates imported.

3 - Weakness of the role of the agricultural departments in raising awareness of the importance of the technical operations of trees such as carpentry and cleaning of the palm of waste and control and regulation of irrigation and cleaning the land and fertilization, which led to neglect of some farmers for these services in addition to the weakness of experience in the available labor.

RECOMMENDATIONS:

1 - Prepare programs to show the farms time of irrigation and the number of irrigation and soil fertilization and cleaning programs and leaflets explaining to the farmer technical processes of the Palm, such as cleaning the remnants of the previous season to get rid of diseases.

2 - The need for government support for the prices of productive inputs such as fertilizers and pesticides and the activation of   control programs for orchards.

3 - Support the prices of local dates and reduce the importer in support of palm growers and the need to establish centers of textile agriculture to improve the varieties and disposal of bad varieties.

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تحليل اقتصادي وقياسي لأهم معوقات انتاج التمور في محافظة ديالى للموسم الإنتاجي 2018

عباس عبد احمد حميد التميمي

كلية الزراعة/ جامعة ديالى / وزارة التعليم العالي والبحث العلمي/ جمهورية العراق

المستخلص

تناول البحث دراسة دالة الانتاج لعينة عشوائية من مزارع نخيل التمر في محافظة ديالى شملت العينة (53) مزرعة بواقع (8374) شجرة نخيل مثمرة من مجتمع الدراسة البالغ (22943) نخلة، وتم تحليل الانحدار المتعدد لعناصر الدالة وشملت تكاليف العمالة وتكاليف الاسمدة وتكاليف المبيدات الحشرية وعدد الريات خلال السنة واتضح من خلال التحليل ان تأثير كل من تكاليف الاسمدة وتكاليف المبيدات الحشرية وتكاليف العمالة على كمية الانتاج كان ايجابياً اما عدد الريات خلال السنة كان تأثيره سلبي على كمية الانتاج حيث كانت مرونته سالبة ،وبينت الدراسة ان ضعف الدعم الحكومي وارتفاع اسعار المدخلات الانتاجية واهمال برامج المكافحة وعدم التوعية بعمليات خدمة اشجار النخيل وخدمة التربة وانتشار اصناف رديئة من اهم اسباب تردي الانتاج وتراجع زراعة اشجار جديدة من فسائل النخيل وارتفاع اجور العمل وضعف خبرة اليد العاملة وانخفاض سعر التمور المحلية ومنافسة التمور المستوردة لها كانت من اسباب تراجع الانتاج ،وتمت التوصية بضرورة الدعم الحكومي لمزارع النخيل واعداد برامج لتسميد ومكافحة اشجار النخيل وتوفير اصناف جيدة الانتاج لا سيما دعم الزراعة النسيجية التي توفر اصناف ممتازة وذات انتاجية جيدة.

الكلمات المفتاحية: مزارع النخيل، انتاج التمور، معوقات، موارد الانتاج.