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An economic study to estimate optimum sizes and economies of scale for cucumber farms in Kirkuk Governorate - Hawija district (model) for the productive season (2020)

ABSTRACT

The importance of research is highlighted in seeking to increase the dunumah of yield, which leads to providing indicators for decision-makers in drawing agricultural policy and managing production resources in an efficient manner. The research problem is focused on the lack of knowledge of cucumber growers in the Kirkuk Governorate - Hawija district to know the optimal size of farms, which leads to a decline. Production on the one hand and high production costs on the other hand, and given that Iraq is one of the developing countries, it suffers from many production obstacles, including the high elements of economic resources such as seeds, fertilizers, control materials and pesticides or importing them from outside the country, and based on the research problem, it aimed to: estimate the optimal volumes For areas and production of the option crop in the research sample, estimating the proportion of economies of scale achieved for the crop farmers by calculating the elasticity of the average cost function and the function coefficient. The optimum sizes of areas and production for the cucumber crop in Hawija district were extracted by drip irrigation method through the cost functions in the long run and the cost flexibility and function factor of the cucumber yield were extracted in the research sample.)15,517(tons, and the optimum areas of this crop reached (13,453) dunums, so the farmers of the cucumber crop by drip irrigation method do not achieve the optimum volume of production, and this means that there is a deviation from the optimal size of the yield of the research sample and in light of the results reached, the study recommended the adoption of The experiences of the owners of efficient farms and benefiting from them in employing their expertise in inefficient farms in order to reach full levels of efficiency, the need to activate the role of the agricultural extension apparatus in training and directing farmers to adopt modern techniques in irrigation.

INTRODUCTION

A number of developing countries, including Iraq, depend on importing many commodities and agricultural crops, whether food or others, in order to bridge the gap between the size of the increasing demand for agricultural crops and the contributions of local production from them, and this case will make continuous dependence on the external market to cover their needs of various Types of agricultural crops, despite the abundance of arable land, manpower and capital needed to cover the needs of local agricultural activities and operations. Developing countries, including Iraq, suffer from misuse of available resources, and this leads to a decline in the economic efficiency of farms, as agricultural production decreases with increasing costs in the event that farmers are

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ineffective in their management and practice of agricultural lands. The problem of this study is concentrated in the lack of cucumber growers in the governorate of Kirkuk - Hawija district to knowledge of the optimal size of farms and the level of efficiency of each farm and the reasons for this to the low efficiency, which leads to lower production on the one hand and higher production costs on the other hand, and based on the problem of the study, this is The study will aim to: Estimating the optimum sizes of areas and production for cucumber crops in Hawija district. and Estimating the proportion of economies of scale achieved for cucumber growers by calculating the elasticity of the average cost function and the coefficient of the function.

Research method

The research relied on descriptive and quantitative analysis that is based on the foundations, principles and concepts of economic theory and methods of mathematical, statistical and standard analysis in testing the hypotheses of the study and achieving its objectives by applying the method of marginal analysis where the optimal volumes of areas and production for the yield of cucumbers are extracted through cost functions in the long run and the extraction of cost elasticity And the function factor for cucumber farmers in Hawija district of Kirkuk governorate for the (2020) production season of the spring cycle, which numbered approximately (1500) farmers, and the research sample consisted of (75) farms, and due to the Corona pandemic and the health conditions of this epidemic and the difficulty of meeting with farmers, a percentage was taken that represented the limits of (7%) of the research community, and data were collected through frequent field visits to agricultural villages scattered in the suburbs of Hawija district.

Previous studies

Hasan in (2009) estimated the functions of production costs and the optimal size of the cultivation crop in Babil Governorate for the year (2008), and in light of a random sample of (50) farmers, and the results showed the estimation that the cubic cost function is the best estimated function, according to economic theory and statistical and standard tests. , And the value of the determination factor was (90%), and it reached to determine the optimal amount of civilian production for costs about (2613) tons, while the optimum area for producing this quantity is (26) dunums, and through analyzing the cost structure it was found that the variable costs constitute (75%). Of the total total costs, the reason is due to the high cost of seeds, which represent the first place among the variable production costs, which accounted for (65%). While fixed costs constituted (25%) of the total costs.

Al-Samarrai in (2011) studied an economic analysis of the efficiency of producing the onion crop in the Samarra district for the 2008 productive season. The cost function in the long term of the onion crop was estimated based on sample data from the crop farmers in the Samarra district in order to identify economies of scale and the optimal level of production was determined. About (7771) k /dunum, and the optimum area was (14.68) dunums, and the economic efficiency reached 78% of the number of farms and achieved volume savings amounted to 60%.

Waqf and Nasser in (2016) studied the estimation of the cost functions and economies of scale for the irrigated tomato crop in the Qamishli region (Al-Hasakah governorate). The research aimed to estimate the cost functions and economies of scale for the irrigated tomato crop in the Qamishli region for an average of two seasons 2012/2013 and 2013/2014, and the research was adopted. The method of the questionnaire was for a random sample that included 15 villages for 100 farmers, and the results showed that the volume of the ideal cost-reducing production amounted to about 41,697 tons / farm, and the volume of the bulk of profit production was 98.65 tons / farm, and it was found that 65% of farmers achieve capacity savings.

Materials and methods of work

Costs Theory

Wherever production appears to be associated with costs in a world of scarcity, enterprises must pay the production requirements they use, and successful enterprises pay attention to this simple fact when they design their production policy with great care. (Mandour et al., 2007: 210) The term cost includes different meanings and connotations of the farm in the form of wages and

salaries paid to workers, payments for the purchase and maintenance of machinery and equipment, and payments in the form of taxes (Al-Sarti et al., 2019: 268)

Cost function

The cost function is nothing but an expression of production costs as a function of the amount of output. The cost functions are divided according to their relationship in time into:
• Short _ run cost faction
• Long _ run cost faction

By the short term we mean the period that allows the producer to change the amount of production through changing the variable productive resources, i.e. the period that does not allow the amount of fixed costs to change, while the long term is the period that allows the producer to change the amount of production and the size of the production unit, that is, the period that allows the amount to change Fixed and variable costs Hence all costs borne by the producer in this period are variable costs. (Nicholson & Snyder, 2008: 324).

The optimum size of farm

The level of production at which the average total costs are the lowest is that which determines the optimal size of the project in the long run, and at this size the marginal costs are equal to the average total costs, and the unit's share of average costs is less than what is possible. Defining the optimum size as that which achieves the largest savings in capacity, the lowest possible cost, or the highest net return per unit of production. The long-run cost function can be derived by adopting the short-run cost functions with the following general formula: (David. 2019: 276).

$$SRTC = b0 + b_1Q - b_2Q^2 + b_3Q^3 - b_4QA + b_5A^2 + Ui \dots (1)$$

Q , $A > 0$

As:

TC = represents the total costs (thousand dinars).

Q = represents the quantity of total production per farm (kg).

A = represents the area or size of the farm (acres).

bi = represent the regression coefficients.

Ui = represent the random variable.

Excluding the constant term b0, which represents fixed costs, the long-run cost function form is as follows:

$$LRTC = b_1Q + b_2Q^2 - b_3Q^3 + b_4QA - b_5A^2 - Ui = 0 \dots (2)$$

Write equation (2) in its implicit form, as TC is an implicit function of Q, A.

$$V = LRTC - b_1Q + b_2Q^2 - b_3Q^3 + b_4QA - b_5A^2 - Ui = 0 \dots (3)$$

Taking the first derivative of the implicit function in terms of area (A) and setting it equal to zero, we get:

$$\frac{\partial v}{\partial A} = b_4Q - 2b_5A = 0 \text{ --(4)}$$

$$A = \frac{1}{2} \frac{b_4}{b_5} Q \text{ --(5)}$$

Since A is obtained in terms of Q.

Substituting the value of A into the original function (2), we obtain the long-run cost function:

$$LRTC = b_1Q - b_2Q^2 + b_3Q^3 \qquad \textbf{The long-run total cost function}$$
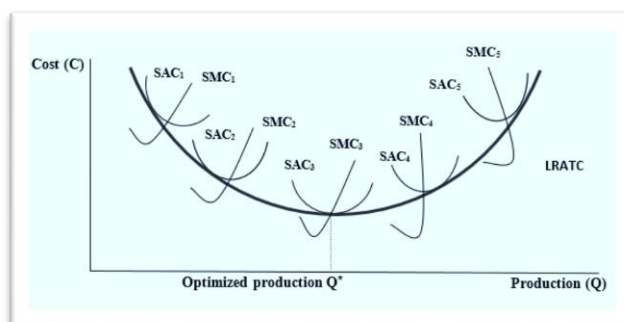
Figure (1): Long-term and short-run cost curves
Source: Doll, 1979: 205

Economic of Scale

Economies of the optimum volume of production is one of the main determinants and tools of production policy at the enterprise level, and economic theory believes that the rule of equal marginal revenue with marginal cost, at which the optimum volume of production is achieved, is applied in the four markets, perfect competition, monopolistic competition, oligopoly, and complete monopoly, that is, it applies whatever The conditions prevailing in the market (Abdel-Hamid, 2003: 144). Economies of scale can be quantified according to the following formula:

$$Economies = \frac{LRACm - LRACi}{LRACm - LRACo} \qquad \text{(Melemore, etal, 1983)}$$

As:

Econ = ratio of realized economies (s) of scale.

LACm = long-run average total cost at low level of output achieved.

LACi = long-run average total cost at level of output i.

LACo = long-run average total cost at the optimum output level.

Cost elasticity: Elasticity of Cost (E)

Cost elasticity expresses the degree of response of total costs to the change in the volume of production, i.e. the relative increase in costs as a result of the increase in the volume of production, and it is calculated according to the following formula:

$$Elasticity = \frac{\Delta LATC}{\Delta Q} \cdot \frac{Q}{LATC} \qquad \text{(Forguson, eatl, 1975)}$$

As:

Elasticity: elasticity.

ΔLATCi: the amount of change in the long-run average total cost.

Δ Qi: the amount of change in the quantity produced.

LATCi: long-run average total cost.

Qi: Quantity produced.

Function Coefficient (R)

he concept of the function coefficient (R), which means the yield of volume, which is the relative response to production as a result of an equal change in the factors of production, must be explained.

$$E = \frac{LMC}{LAC}$$

$$R = \frac{LAC}{LMA} \quad \text{or} \quad E = \frac{1}{R} \quad \text{or} \quad R = \frac{1}{E}$$

As:

R: parameter of the function.

LAC: long-run average cost.

LMC: long-run marginal cost.

The values of R (E) are equal to 1 true at the lowest point on the LAC curve the optimum size of production, which achieves savings of 100% capacity and its value is the inverse of the value of the modulus of elasticity and is positive whenever the elasticity is positive and they are equal at the optimum size only when the savings are 100%.

The structure of production costs items for cucumber growers

The costs in the short-term period can be divided into fixed costs and variable costs, and fixed costs include all aspects of costs related to fixed resources per unit time, and as a result, the farm is unable to change the used quantities of fixed resources. The costs of these resources regardless of the quantity produced in each unit of time, and therefore fixed costs are independent of the volume of output, while variable costs include the costs of variable resources in the short run, and thus they increase with the increase in the quantity produced because the increase in output requires more variable resources. In order to identify and analyze the structure of production costs items for option crop growers, the structure of fixed costs will be identified and constructed, the ratio of the contribution of fixed cost items to the total fixed costs, the variable costs and their items, and the percentage of the variable cost items 'contribution to the total variable costs. Total costs of production and the ratio of the contribution of variable and fixed costs to total costs as follows:

Table (1) Items of fixed costs and their relative importance by drip irrigation method for cucumbers

Costs items	Costs value / thousand dinars	Relative importance %
Rent the land	500	0.15%
Fractures	118755	34.4%
Family business	225611	65%
Total fixed costs	344866	%100

Source: Calculated by the researcher based on the questionnaire data

Table (2) Items of variable costs and their relative importance by drip irrigation method for cucumbers

Costs items	Costs value / thousand dinars	Relative importance %
Fertilisers	30000	%9
Seeds	40000	%11
Fuel and maintenance	30000	%9
Mechanical work	35000	%10
Pesticides	21000	%6
Leased work	150000	%43
Marketing costs	43000	%12
Total variable costs	349000	%100

Source: Calculated by the researcher based on the questionnaire dat

Results and discussion

The short-term total cost function was estimated by the drip irrigation method of the cucumber crop and it was consistent with the economic logic in terms of statistical, standard and economic tests as follows:

$$SRTC = 54812.013 + 93785.301Q - 6.531Q^2 + 0.00021401Q^3 - 0.0685AQ + 0.0395A^2$$

Table (3) the function of the total cost of the option crop in the short run

Independent variables	Estimated parameters	Statistical parameters
Q	93785.301 (2.942)	$R^2 = 0.87$
Q^2	- 6.531 (- 2.766)	$R^{-2} = 0.86$
Q^3	0.00021401 (3.001)	F = 95.271
AQ	- 0.0685 (-4.452)	D.W = 1.856
A^2	0.0395 (3.783)	

Source: Calculated according to the SPSS program, depending on the questionnaire data

And when writing the function in its implicit form, we get:

$$V = C - 93785.301Q + 6.531Q^2 - 0.00021401Q^3 + 0.0685AQ - 0.0395A^2$$

By taking its first partial derivative with respect to the cultivated area (A) and setting it equal to zero, we get:

$$\frac{\partial V}{\partial A} = 0.0685Q - 0.079 A = 0$$

$$A = 0.867 Q$$

Substituting the value of A into the original function and summing the limits of Q2, we obtain the cost function of yielding the option for drip irrigation in the long run:

$$LRTC = 93785.301 Q - 6.5607 Q^2 + 0.00021401 Q^3$$

The long-term cost function of cucumber yield in Hawija district, by drip irrigation method

statistical analysis

After confirming the validity of the estimates for the parameters of the estimated models for the option yield for drip irrigation from an economic point of view, the statistical standards come into play, and the estimated parameters were statistically significant as the (t) test shows the significance of the estimated parameters, and the (F) test proved the significance of the function as a whole at a significant level (5%).). The results showed that the value of the coefficient of determination (R2) amounted to (87%) of the fluctuations in the total output of the option crop was caused by the independent variables included in the model, while the remaining percentage (13%) of those fluctuations were due to other variables not included in the estimated model.

Econometrical analysis

In order for the model to be acceptable and reliable in the interpretation of the studied phenomenon, it is necessary to perform the necessary standard tests related to the standard problems, as the (D.w) test showed that the model was free from the problem of autocorrelation between the random variables because the value of (DW) was located in the acceptance area of the null hypothesis(Attia, 2004: 448), i.e. that DW It is equal to (1.856) and from the table DW for the level of significance of 5% and degrees of freedom (5) we find that DW lies between
$1.77 < 1.856 < 2.23$ Any that   du < D.W < 4 -du

From this we conclude that there is no positive or negative self-correlation for the first-order random variable. The model also fulfilled the assumption that there is no multiple linear relationship between the independent variables (Multicollinearity), because the model is non-linear as the variables Q2 (the square of the output) and Q3 (the cubic of the result) are related in evidence to the variable Q, but the relationship is non-linear(Al-Azary, 2010: 89). Given the study's reliance on cross section data, in which this phenomenon can be more prevalent than time series data, it must be disclosed, and the Park test was adopted, which includes estimating the error square regression equation being a dependent variable and the result as an independent variable according to the following formula.

Log (ei)^2 = a + bLog (Q)

The relationship estimated in logarithmic form of cucumber yield for drip irrigation was as follows:

$$log\ e_i^2 = 8.351 + 0.193\ logQ$$

t = (0.715)   (0.200)

R^2 = 0.231   F= 0.662   D.W= 1.844

It is evident that the estimated function is not significant below the 5% level of significance according to the F-test, and the t value calculated for the slope of the error regression coefficients is less than the tabular t value with the 5% significant level of significance. This indicates that there is no problem of unevenness of the homogeneity of variance.

Economic analysis

It includes the application importance of the cost function in the long term represented by the calculation and estimation of optimal volumes of production and cultivated areas for cucumber crops for urban drip irrigation of costs, marginal costs, cost elasticity and function coefficient.
Determining the cost-optimized civilian production volume for cucumber crops by drip irrigation method

In order to calculate the optimum volume that reduces costs (economies of scale) in producing the option crop, it is necessary to first find the equation for the average total cost for the long run LRATC, as all production costs are variable costs in the long run. The size of the output Q and the equation of the average total cost in the long run was as follows:

$LRATC = 93785.301 - 6.5607\,Q + 0.00021401\,Q^2$

In order to determine the optimal size of production that reduces costs, the first necessary condition must be applied to the minimization of the cost function, which is to take the first derivative of the average total cost function with respect to the product and equal it to zero, and then solve the equation with respect to Q, so we get:

$\dfrac{\partial LRATC}{\partial Q} = -6.5607 + 0.0004228\,Q = 0$

$Q = 15517.265\,kg/don$
$Q = 15.517\,Ton$

The optimum volume of production that minimizes costs and maximizes the profits of cucumber for drip irrigation in Hawija district.

Determining the optimum areas for cucumber crop by drip irrigation method

In order to obtain the optimal areas cultivated with the cucumber crop in Hawija district, we substitute the Q value of each crop into the value of A, we obtain:

$A = 0.867\,Q$
$A = 0.867\,(15.517) = 13.453\,don$

It is the optimum area that can be cultivated by cucumber growers to obtain the optimum volume of production that lowers the long-term average cost and yields the best net income in the long run (the greatest profit).

The proportion of economies of scale and the achieved elasticities of cucumber yield in the study sample by drip irrigation method

It is evident from Table (4 and 5) that the average total cost expected at the lowest level of production achieved amounted to (49579.301) thousand dinars for the crop of option by drip irrigation method, while the average total cost expected at the optimum production level reached (43511,687) thousand dinars after the optimum production level The average total cost starts to rise as the size of the product increases and then continues to rise when continuing to expand production, as the economies of scale start to increase as the average total cost curve decreases until the economies of scale reach (100%), which is the phase (stability of yield) at the optimum volume of production. The results showed that the elasticity of the cost function takes a negative sign at production levels that are less than the optimum volume, indicating the inverse relationship between output and average cost, which means that the average total cost decreases with increasing volume. Whereas, the elasticities of the cost function take a positive signal at production levels that exceed the optimum level, thus reinforcing the positive relationship between output and average cost for production levels that exceed the optimum volume, meaning that the average total cost increases with the increase in the volume of output that exceeds the optimum volume.

The function factor showed that its positive value is greater than the correct one for levels of production less than the optimum size, as its value increases with the increase in the volume of production, meaning that the rate of increase in the volume of production exceeds the rate of increase in costs that shows the first stage of production (the stage of increasing yield). Through knowing the marginal cost, we infer the economies of scale achieved. In the area of savings, the marginal cost function is below the average total cost function, and when the two (marginal and average) cost curves intersect, the optimal size of production is achieved, and the value of the

average total cost is equal to the marginal cost. After this volume, the marginal cost curve is higher than the average total cost curve, achieving a region of no capacity savings. Thus, economies of scale of 100% are achieved when the marginal cost curve is equal to the average total cost curve, i.e. at the optimal size of production, and each of the function coefficients is equal to the correct one and the elasticity of the cost function is equal to zero, which is achieved at about (15%) of the cucumber farmers in Hawija district in a manner. Drip irrigation, which means that these farms have achieved capacity savings (100%), and the rest of the farmers who work within the categories less than the optimum sizes must expand their size categories until they reach the optimal area that achieves the optimum size of (13,453) dunums because they have the ability To reduce their production costs in line with the optimum volume reached by this study. As for farms whose area is higher than the optimum area, farmers are required to reduce the areas of their farms to the area that achieves the optimum volume of production for this crop. The farms operating within the area of savings accounted for (29%) of the percentage of farms that yielded cucumbers in the study sample for drip irrigation, while the percentage of farms operating within the area of savings amounted to (71%), while the percentage of farms operating within the area of capacity savings was (100%). Upon optimum production, it reached (15%) of the cucumber crop in Hawija district, according to the drip irrigation method.

Table (4) shows the size classes of cucumber growers by the drip irrigation method

The crop of cucumbers			
Yield stage	Contribution rate%	The number of farmers	Production level (kg / dunum)
increasing returns	11%	8	11000
increasing returns	11%	8	12000
increasing returns	13%	10	13000
increasing returns	21%	16	14000
The optimum size	15%	11	15517.265
Diminishing returns	16%	12	16000
Diminishing returns	8%	6	17000
Diminishing returns	4%	3	18000
Diminishing returns	%1	1	19000
	%100	75	Total

Source: Calculated by the researcher based on the questionnaire form

Table (5) the ratio of the achieved economies of scale, cost elasticity and the function factor at the level of production achieved by cucumber farmers (drip irrigation)

Returns capacitance	Percentage of economies of scale achieved%	Elasticity of the average cost function	Function parameter	The expected marginal cost at the level of production achieved (Thousand dinars)	The expected average total cost at the level of the achieved production (Thousand dinars)	The level of production achieved (Kg / dunum)
Economies	34.057	-0.379	1.851	27135.531	47512.811	11000
Economies	61.061	-0.316	1.751	28780.821	45874.341	12000
Economies	81.0105	-0.227	1.594	31710.171	44663.891	13000
Economies	93.905	-0.077	1.410	35923.581	43881.461	14000
Economies	100	0.0	1	44768.583	43511.687	15517.265
Diseconomies	98.533	0.184	0.904	48202.581	43600.661	16000
Diseconomies	90.266	0.358	0.784	56268.171	44102.291	17000
Diseconomies	74.944	0.542	0.686	65617.821	45031.941	18000
Diseconomies	52.569	0.731	0.632	76251.531	46389.611	19000

Source: It was calculated by the researcher based on the questionnaire form, the estimated cost function, the marginal cost function, the cost elasticity and the parameter of the function.
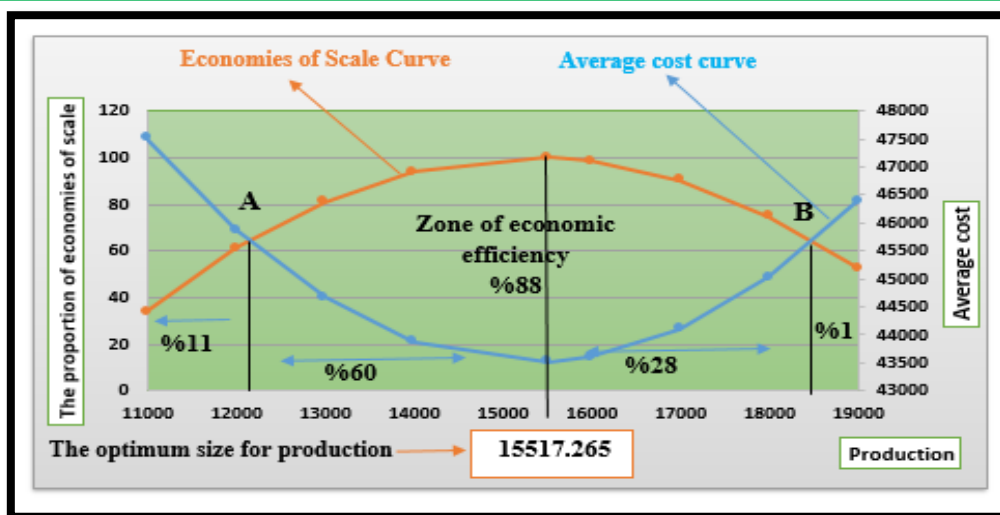
Figure (2): Production levels, average costs and the ratio of economies of scale to the cucumber crop
Source: prepared by the researcher based on the data of Table (5)

Figure (2) shows the relationship between the average total cost curve in the expected long term and the economies of scale curve at different levels of output as shown in Table (61), as the two curves intersect at point (A), which represents the level of production (12,000) kg, and point (B), which is The level of production represents (18500) kg and the ratio of economies of scale achieved between points (A) and (B) represents the highest ratios achieved among other levels of output, and it crosses the levels that achieve economic efficiency, and the percentage of crop farmers who produce is between (12000-18500) kg About (88%) of the total crop growers, while the farmers who produce between point (A) and the optimum level of production have reached (60%) and thus produce below the optimum size as capacity savings are achieved with the increase in output, and about (28%) of farmers produce Between point (B) and the level of the optimum volume of production, that is, with production levels greater than the optimum volume, and thus no economies of capacity are achieved as the level of production increases and far away from the optimal volume of production, while the farmers who produce without the economic efficiency zone, i.e. below point (A) have reached Their percentage (11%), as for farms Those who produce above the economic efficiency zone, i.e. above point (B), have reached (1%).

Conclusions

Based on the results reached in this study, the most important conclusions that have been reached can be summarized, including the following:

1- It was evident through the results of the questionnaire that the total variable costs (TVC) of cucumber farms in the sample for drip irrigation represented the largest part of the total total costs (TC) compared to the total fixed costs (TFC), and represented the item of variable costs spent on (fertilizers) part. The largest of the total costs, while the variable costs (seeds) ranked second from the total total costs of the studied sample farms. Based on the above, we conclude that the cucumber farmers in the studied sample bear a large part of the variable costs (TVC) as production costs and expenditures that are paid for the provision of production elements and requirements, especially in the absence of government intervention represented by the failure to provide the necessary support for production requirements, even at a minimum, This causes a decrease in the production efficiency of the cucumber crop in Hawija district.

2- The optimum size for producing a crop was determined according to the marginal method and based on the cubic cost functions, as it reached (15.517) tons, so we conclude from this that the farmers of the cucumber crop by drip irrigation method do not achieve the optimal size of production, which means that there is a deviation from the optimal size of the crop of

the study sample. Because there is a waste of the used resources and their lack of optimum utilization.

3- The results of estimating economies of scale by the marginal method and by relying on the cubic cost function showed that the percentage of farms in the study sample by drip irrigation method achieved (15%) of economies of scale, and the percentage of farms operating in light of increasing yields (economies of scale) before the area of economic efficiency The drip irrigation method reached (70%) for the (cucumber) crop, and the percentage of farms operating in light of diminishing yields (not economies of scale) after the economic efficiency zone (30%). Thus, we conclude that most of the sample farms operate under increasing yields

Recommendations

In light of the results obtained, the study recommends the following:

1- Adopting the experiences of the owners of efficient farms and making use of them in employing their expertise in inefficient farms in order to bring them to full levels of efficiency.

2- The farmers must switch to the irrigation system with modern technologies because of its great importance in saving water and raising the efficiency of water use and the productivity of the unit area.

3- The need to activate the role of the agricultural extension apparatus in training and directing farmers to adopt modern techniques in irrigation, and to guide them in using the optimal quantities of economic resources that achieve optimal production and lower costs through holding seminars and field visits to farmers' fields, especially during the cultivation process, awareness and publications. Indicative.

References

Abdel-Hamid, Abdul-Muttalib. (2003). Economic Policies at the Project Level (Partial Analysis) First Edition. Nile Arab Publishing Group. Cairo.

Al-Athari, Adnan Daoud Muhammad. (2010). Econometrics theory and solutions. Faculty of Administration and Economics. University of Kufa.

Al-Samarrai, Hassan Thamer Zanzal. (2011). To study an economic analysis of the efficiency of onion production in the Samarra district for the 2008 productive season. Al-Rafidain Agriculture Journal. Volume (16) Issue (1): 187-196.

Al-Samarrai, Hassan Thamer Zanzal. (2004). The optimum size of the farm under different irrigation patterns (wheat farms in Salah al-Din is an applied model) for the 2001-2002 productive season. PhD thesis. Baghdad University. faculty of Agriculture.

Attia, Abdel Qader Mohamed Abdel Qader (2004). Econometrician - between theory and practice.

Davied M. Kreps . (2019) . Microeconomics for Managers. Princetion University Press . Second Edition . U.S.A.

Doll .P John , F Orazem. (1979) . Production Economics , Theory with Application , OP , Cit, Ch.7, PP :205-220.

Ferguson, C.E and Gould j.P.(1975), "Microeconomic Theory", Richard D. IRWIN, INC, 4th Edition.

Hassan, Rahim Kazim (2009). Estimating the functions of production costs and the optimum size of the crop of watermelon in Babil governorate for the year (2008). Iraqi Agriculture Journal. Vol (14). Issue (9).

Mandour, Ahmed Mohamed. Mohammed Fawzi Abu Al Saud. Mohamed Ezzat Mohamed Ghazlan. (2006/2007). Principles of Microeconomics. Department of Economics. Commerce College. Alexandria University.

Melmore.D.L.,G.Whipple,and K.Spielman,(1983), OLS and frontier function estimates of long-run average cost for Tennessee livestock action markets S.J.Agr.Econ.15. pp:79-83 .

Nicholson, Walter . Christopher Snyder. 2008 . Microeconomic Theory.

Sriti, Mr. Muhammad Ahmad. God's blessing, Ahmed Ramadan. The elephant, Osama Ahmed. Al-Shami, Muhammad Hassan. (2019). Microeconomics. First edition. Commerce College. Alexandria University.

Waqf, harmful to Ali and the youth of Nasser. (2016). Estimating the cost functions and economies of scale for the irrigated tomato crop in the Qamishli region (Al-Hasakah governorate). Al-Baath University Journal. Vol (38). Issue (18).

تقدير الحجوم المثلى لمزارع محصول الخيار في محافظة كركوك – قضاء الحويجة (إنموذجاً للموسم الانتاجي (2020)

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الخلاصة

الكلمات المفتاحية:
الحجوم المثلى، اقتصاديات الحجم، محصول الخيار

تبرز أهمية البحث في السعي لزيادة الغلة الدونمية منها مما يؤدي إلى توفير مؤشرات لأصحاب القرار في رسم السياسة الزراعية وإدارة موارد الإنتاج بشكلٍ كفؤ، وتتركز مشكلة البحث في افتقار مزارعي محصول الخيار في محافظة كركوك– قضاء الحويجة إلى المعرفة بالحجوم المثلى للمزارع مما يؤدي ذلك الى تدني الإنتاج من جهة وارتفاع تكاليف الإنتاج من جهة أخرى، ونظراً لكون العراق من البلدان النامية فإنه يعاني من المعوقات الإنتاجية الكثيرة و منها ارتفاع عناصر الموارد الاقتصادية كالبذور والأسمدة ومواد المكافحة والمبيدات أو استيرادها من خارج البلد، وانطلاقاً من مشكلة البحث فقد هدف هذا الى: تقدير الحجوم المثلى للمساحات والانتاج لمحصول الخيار في عينة البحث، تقدير نسبة اقتصاديات الحجم المتحققة لمزارعي المحصول من خلال حساب مرونة دالة متوسط التكاليف ومعامل الدالة. تم استخراج الحجوم المثلى للمساحات والانتاج لمحصول الخيار في قضاء الحويجة بطريقة الري بالتنقيط من خلال دوال التكاليف في المدى الطويل واستخراج مرونة التكاليف ومعامل الدالة لمحصول الخيار في عينة البحث كما تم تحديد الحجم الأمثل لإنتاج محصول الخيار وفق الأسلوب الحدي وبالاعتماد على دوال التكاليف التكعيبية إذ بلغ (15.517)طن، وبلغت المساحات المثلى من هذا المحصول(13.453) دونم، لذا فان مزارعو محصول الخيار بطريقة الري بالتنقيط لا يحققون الوصول الى الحجم الامثل للإنتاج وهذا يعني وجود انجراف عن الحجم الأمثل لمحصول عينة البحث وعلى ضوء النتائج التي تم التوصل اليها اوصت الدراسة اعتماد خبرات أصحاب المزارع الكفوءة والاستفادة منهم في توظيف خبراتهم في المزارع غير الكفوءة من اجل الوصول بها إلى مستويات الكفاءة الكاملة، ضرورة تفعيل دور الجهاز الإرشادي الزراعي في تدريب وتوجيه المزارعين على تبني التقنيات الحديثة في الري.