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Economic Study of Sheep Production Costs in Salah Al-Din Governorate (Al-Sharqat District as a Model) for the Year 2019

Prof. Dr. Jadoo Shehab Ahmed Al-JumailyMohammed Abdul Rahman Khalaf Al-Jumaily
Tikrit University / College of AgricultureMaster student
Department of Economics and Agricultural Extension

ABSTRACT

Chart of the economics of sheep production costs in the year 2019, the season of the year 2019, the season of the year 2019, the season of 2019, the annual growing season, the breeding of the resident and the seasonal migration, and the permanent migration subject of (72, 60, 31) squares and, respectively, the average number of sheep in The research sample (52, 180, 638) heads, respectively, in addition to that, in the Shirqat district, they formed a percentage of 16.51% of the total sheep breeders in Salah al-Din Governorate, which amounted to 8973 squares for the year 2019. It constituted a percentage (18%, 27% and 23%) respectively, while the variable costs percentage was (82%, 73%, 77%), respectively. The total costs (dinars) are a dependent variable and production (kg) is an independent variable selected. Cubism was chosen as the best formula for statistical and standard tests and the economic zone. From cubic costs, economic derivatives (average costs, average total costs, and marginal costs) were found. The estimated optimal production volume for the head was (76, 85.7, and 83.7) kg, respectively. The type of production most of the estimated profit for the head was (95, 92, 86) kg, which indicates a waste of technical productive resources. The research bought decision-makers in the Ministry of Agriculture and reconsidered the policy of supporting joint games and examining all traditional and Arab feeds in the fall season, as well as the different reviews and technologies at subsidized prices.

Introduction

Animal production is considered one of the most basic components of agricultural production, because its products have a high nutritional value, as the progress of peoples is measured by the amount per person consumes in them of foodstuffs of animal source (Al Shafei, 2010: 1). Where livestock constitutes a large part of the national income and plays a major role in meeting the need for animal protein, and to improve sheep projects, important economic characteristics such as growth and milk production must be highlighted (ALKass, Juma, 2004: 65)). Sheep are considered one of the most important sources of animal production for the production of meat and dairy products. They also represent the only source of wool production. Its importance increases in particular due to the rapid turnover of capital in its investments. The number of sheep in Iraq reached (4516657) heads, and in Salah al-Din Governorate (1060782) heads per year. 2019, and its monetary value in Salah al-Din Governorate is estimated as live weight

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(315052.254) million dinars.

Research problem

Iraq has witnessed a significant increase in the population, which was accompanied by the increase in the volume of food requirements due to the increase in population and thus the increase in the demand for food, although agricultural production, in general, has increased at rates less than the increase in population growth rates and thus increased rates of local demand for agricultural production in particular Animal production represented by sheep cattle, which is reflected in the lack of animal protein for the Iraqi individual and despite the increase in the number of sheep in Iraq and Salah al-Din Governorate, especially in the Badia and its neighboring regions, and accordingly and despite the fact that Salah al-Din Governorate enjoys the comparative advantage in sheep production, the number of The heads of sheep has decreased in the year 2019 than they were in the years prior to the events of 2014, which aroused the researcher's interest in conducting this research.

The purpose of this research

The research aims to conduct a standard economic analysis of the costs of producing sheep according to the type of breeding (resident, seasonal migration, permanent migration) in the Sharqat district for the year 2019.

Data Resource

In this research, descriptive and quantitative standard mathematical methods related to the aim of the research and which are in line with economic theory were adopted. The research used economic standard models for cost functions and according to the breeding pattern (resident, seasonal nomadic, permanent migration), and the one-equation regression method was used to explain the relationship to the amount of output as an independent variable and the number of total costs as a dependent variable, and several formulas were found (linear, quadratic). Cubism) and the best ones were chosen based on (statistical, economic, and analog) logic, and EViews 9 was used.

Materials and work methods

The concept of fitness in the present day plays an important role in economic analysis, as optimality acts as an indicator about the behavior of the individual and gives the appropriate explanation about the truth of how economic decisions are made, and the term optimality or preference is used as alternative terms in welfare economics (Mishan, 1976: 98-101).

Determining the best behavior of the breeder in the short term

The rational agricultural producer always seeks, as a result of practicing the production process, to reach the size of the product that achieves its goal.

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To study the behavior of the ideal educator, we assume the following assumptions: -

A. The market is a perfectly competitive market and the price of the product (p) is fixed.
B. The goal of the product is to achieve:
   1. Minimizing costs.
   2. Maximize your profit.

1- The objective of minimizing costs:

In the short term, the educator faces different situations, or there are alternative situations in which the educator can work according to what he deems appropriate with his technical and economic capabilities. But in general, if the goal of the product is to reduce costs in the short term, it can achieve technical efficiency or economic efficiency, as each of them has its conditions and conditions, but in general, the minimization process requires the fulfillment of two basic conditions (Dowling, 1990: 50):

Essential condition: Necessary Condition: -
It states that the first derivative of the average cost function with respect to production is equal to zero. Which

$$\frac{\partial SRATC}{\partial Y}=0$$

Sufficient Condition: -

That the second derivative with respect to the output is greater than zero (positive).

$$\frac{\partial^2 SRATC}{\partial^2 Y}>0$$

2- The goal of profit maximization:

The Farmer can maximize his profits in light of the perfect competition market, in light of the prevailing prices, and in order to reach the volume of output that achieves the greatest possible profit, it is necessary to achieve the two conditions of maximization of the profit function (Henderson and Quant, 1980: 86), which are: -

$$II= P.Y -TC$$

Necessary Condition:

The first derivative of the profit function with respect to the product is zero

$$\frac{\boldsymbol{II\partial}}{\boldsymbol{\partial Y}}=0$$

Sufficient Condition:

That is, the second derivative of the profit function equal to output is less than zero (negative)

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$< O\frac{\partial^2 II}{\partial^2 Y}$

Results and discussion

The total costs (dinars) were considered the dependent variable (dependent) in the function, while the total output of sheep was considered the live weight of the explanatory variable (independent) when estimating the short-term cost function. (Linear, quadratic, and cubic) for the three sample groups (residents, seasonal nomadic, permanent nomadic) and the cubic formula was the best based on statistical and analogical tests and economic theory.

Firstly, the total cost function of sheep for residents:

$TCn = 39306.9 + 5867.726\ Y - 60.336Y^2 + 0.396\ Y^3$
t (2.378) (2.103) (-2.020) (6.930)
$R = 0.80$, $R^2 = 0.92$
$F = 95.66$ D.W = 2.337 n = 72

The statistical analysis showed the significance of the function parameters according to the t-test for the variable Y, and the F test confirmed the significance of the function as a whole at the level of significance of 5%, and the determination coefficient R^2 showed that 92% of the variables in the total costs are due to changes in the total production of sheep while 8% of The variables refer to other factors that are not included in the model. Also, it was confirmed that there is no self-correlation problem between the residues by using the Durbin Watson test, which amounted to 2.337, and by comparing its value with du = 1.557, dL = 1.395. Estimates depend on cross-section, so the Breusch-Pagan-Godfrey test was used to detect this problem, and it was found that there is no heteroscedasticity problem. Dalia with the Y term in the estimated model but the relationship is nonlinear, so such models do not violate the hypothesis that there is no linear correlation between the independent variables.

1. The market is the perfect competition market, and the average product price for the total breeders in the research sample is (4,500) dinars per kilogram of sheep meat (live weight).
2. The goal of the product is either:

A-Cost Minimization
B-Profit Maximization

A- Cost Minimization:

The breeder in the short term aims at minimizing costs, in order to achieve technical efficiency or economic efficiency, and that the product in this case has two options, the first option is to achieve technical efficiency, and to achieve this goal, the following two basic conditions must be fulfilled: -

-Necessary Condition: That is, taking the first derivative of the average variable costs of production and equating them with zero**.**

$$\frac{\partial SRAVC}{\partial Y} = 0$$

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-Sufficient Condition: That is, the second derivative with respect to production is greater than zero.

$$\frac{\partial^2 SRAVC}{\partial^2 Y} => 0$$

In the estimated short-term cost function, we obtained the total variable cost function, which is:

$SRTVC = 10462.10Y – 165.917Y^2 + 0.968\ Y^3$

Therefore, the average variable cost function is equal to:

$$SRAVC = 10462.10 – 165.917Y + 0.968\ Y^2$$

And by taking the first derivative with respect to the product, we get:

$$\frac{\partial^2 SRAVC}{\partial^2 Y} = 1.936 > 0 .$$

Therefore, the quantity (85.700) kg is the quantity at which the technical efficiency of production is achieved. In order to demonstrate this, the lowest point reached by the average variable cost was calculated, which compensates for the optimal amount of output that lowers the variable costs in the average variable cost function, so we get SRTVC equal to (6124.379) dinars. Any when

.Min SRTVC = P

This means that the product achieves technical efficiency if the output price is equal to (6124.379) dinars in the market.

At this level of the price, the producer loses all fixed costs and because the prevailing price is (4500) dinars, the product achieves technical efficiency at this price.

B- Profit Maximization: In order to reach the optimum size that will achieve the greatest possible profit, two conditions must be fulfilled:

Profit function

P.Y -TC = P.Y -F(Y) =II

-Necessary Condition:

$$\frac{II\partial}{\partial Y} = P - \frac{\partial F(Y)}{\partial Y} = 0 \quad OR \quad SRMC = P$$

-Sufficient Condition:

$II = P.Y - 12321.23 - 10462.10Y + 165.917Y^2 - 0.968\ Y^3$

By applying the necessary condition, we get: -

$$\frac{II\partial}{\partial Y} = P - 10462.10 + 331.834Y - 2.904\ Y^2 = 0$$

$10462.10 - 331.834Y + 2.904\ Y^2 = P$

We compensate the average prevailing price in the local market for the sample area (4,500) dinars

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$10462.10 – 331.834Y + 2.904 Y^2=4500$
$5962.10 – 331.834Y + 2.904 Y^2=0$
By applying the constitution equation to find the value of Y

$$Y = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$$

We get
Y1=91.937
Y2=22.331
In order to know which of the two quantities that maximize the profit, we substitute the two quantities in the adequate condition, and it is noticed that the first quantity (91.937) kg is the one that maximizes the profit, while the second quantity does not fulfill the second condition.

Third: The total cost function of a sheep for permanent migration:
The cubic formula for the cost function is chosen as the best formula:

$$TCn = 92749.95 + 18078.18\ Y – 371.976\ Y^2 + 2.222\ Y^3$$
t (3.603) (6.719) (-2.699) (2.677)
$R = 0.82$, $R^2 = 0.87$
$F = 82.368$ D.W = 2.773 n = 31

The statistical analysis showed the significance of the function parameters according to the t-test, and the F test confirmed the significance of the function as a whole at the level of significance of 5%, and the determination coefficient R^2 showed that 87% of the variables in total costs are due to changes in the total production of sheep while 13% of The variables refer to other factors that are not included in the model. Also, it was confirmed that there is no self-correlation problem between the residues by using the (Durbin Watson) test, which amounted to 2.773, and by comparing its value with du = 1.425, dL = 1.022, and the Breusch-Pagan-Godfrey test was used to detect the problem of non Heteroscedasticity and found to be absent.
To study the behavior of the producer (sheep breeder) in the short term, we assume two assumptions:
1. The market is the perfect competition market, and the average product price for the total breeders in the research sample is (4,500) dinars per kilogram of sheep meat (live weight).
2. The goal of the product is:

A-Cost Minimization
B-Profit Maximization
A-Cost Minimization:
The breeder in the short term aims at minimizing costs, in order to achieve technical efficiency or economic efficiency, and that the product in this case has two options, the first option is to achieve technical efficiency, and to achieve this goal, the following two basic conditions must be fulfilled: -

- **Necessary Condition:** That is, taking the first derivative of the average variable costs of

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production and equating them with zero

$$\frac{\partial SRAVC}{\partial Y} = 0$$

- **Sufficient Condition:**That is, the second derivative with respect to production is greater than zero

$$\frac{\partial^2 SRAVC}{\partial^2 Y} => 0$$

In the estimated short-term cost function, we obtained the total variable cost function, which is:

$SRTVC = 18078.18\ Y - 371.976\ Y^2 + 2.222\ Y^3$

Therefore, the average variable cost function is equal to:

$$SRAVC = 18078.18 - 371.976\ Y + 2.222\ Y^2$$

And by taking the first derivative with respect to the product, we get:

$$\frac{\partial SRAVC}{\partial Y} = -371.976 + 4.444Y = 0$$

$Y = 83.702$ Kg

That is, the quantity of the product that minimizes the total variable costs is (83.702) kg. To satisfy the sufficient condition, we take the second derivative of the average variable cost function and obtain:

$$\frac{\partial^2 SRAVC}{\partial^2 Y} = 4.444 > 0 .$$

Therefore, the quantity (83.702) kg is the quantity at which the technical efficiency of production is achieved. In order to demonstrate this, the lowest point reached by the average variable cost was calculated, which compensates for the optimal amount of output that lowers the variable costs in the average variable cost function and gets SRTVC equal to (7510.431) dinars. were when

Min SRTVC =P

This means that the product achieves technical efficiency if the output price is equal to (7510,431) dinars in the market.

At this level of the price, the producer loses all fixed costs, and since the average prevailing price is (4,500) dinars, the product achieves technical efficiency at this price.

B-Profit Maximization:

In order to reach the optimum size that will achieve the greatest possible profit, two conditions must be fulfilled:

Profit function $II = P.Y - TC = P.Y - F(Y)$

-Necessary Condition: The first partial differential of the profit function with respect to output must be equal to zero

$$\frac{II\partial}{\partial Y} = P - \frac{\partial F(Y)}{\partial Y} = 0 \quad OR \quad SRMC = P$$

-Sufficient Condition: To find the second derivative of the profit function with respect to output is less than zero

$$< O\frac{\partial^2 SRATC}{\partial^2 Y}$$

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Consequently, the profit function of the perpetual migratory breeder in the short term is: -

II =P. 73.881-92749.95- 18078.18 Y +371.976 Y^2 -2.222 Y^3
Applying the necessary condition, we get:

$\frac{\partial \Pi}{\partial Y}$= P- 18078.18 + 731.976Y - 6.666Y^2=0
18078.18 – 731.976Y + 6.666Y^2= P
We compensate the average prevailing price in the local market for the sample area (4,500) dinars

18078.18 – 731.976Y + 6.666Y^2=4500
13578.18 – 731.976Y + 6.666Y^2=0
By applying the constitution equation to find the value of Y

$$Y = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

We get:

Y1=86.168
Y2=23.639
In order to know which of the two quantities that maximize the profit, we substitute the two quantities in the sufficient condition, and it is noticed that the first quantity (86.168) is the one that maximizes the profit, while the second quantity does not fulfill the second condition.

Conclusions

1. It was found from the study that the total fixed costs of the resident category formed a contribution rate (82%), while the variable costs contribution constituted (18%) of the total costs of the category. While the percentage of variable costs contribution (27%) of the total costs of the category. The study revealed that the total fixed costs for the permanent travel category constituted a contribution rate (77%), while the variable costs constituted (23%) of the total costs of the category.

2. It was also found from the study of the various total revenues and according to the type of education (resident, seasonal travel, permanent travel) that it was the highest for the resident (375,000) dinars, then seasonal travel (371750) dinars, then permanent (355500) dinars, so the revenue received was the highest that gets It must be paid by the breeder from sales of sheep, then milk and its derivatives, wool and dung.

3. The results showed that the estimated production volume of the head and the most profit for the categories (residents, seasonal travel, and permanent travel) were in the range of 95, 92 and 86 kg, respectively, while the estimated optimal production volume per head for the categories was in the limits of 76, 85.7 and 83.7 kg, respectively. .

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Recommendations

1- The Shirqat Agriculture Division takes care of the sheep breeders in the district, with the aim of reaching the optimum sizes, as well as the optimum utilization of green and dry fodder in the Badia regions for seasonal and permanent migration in the Shirqat district, and the expansion of the areas planted with the barley crop in light of the overtaking of the lands allocated to pastures and maximizing the benefit From agricultural residues of cultivated vegetables and existing orchards, and the formation of unconventional diets that benefit resident sheep keepers, seasonal migration, and permanent migration.

2- Improving and developing the various veterinary services provided to sheep breeders in the Shirqat district, due to its distinguished role in increasing numbers and maintaining them healthily from various communicable diseases.

3- Providing feed in dry seasons in centers close to breeders' gatherings. The decision-makers in the Ministry of Agriculture should reconsider policies to support livestock, especially sheep, and set scientific controls for support from fair foundations and standards so that support is provided to all sheep breeders and the necessary requirements of subsidized feed are provided in Dry season as well as veterinary supplies.

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Analysis results

Dependent Variable: TC
Method: Least Squares
Date: 02/09/21 Time: 23:35
Sample: 1 60
Included observations: 60

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	12321.23	1032812.	3.409767	0.0135
Y	10462.10	44536.77	2.279816	0.0236
Y2	-165.9169	636.8990	-2.299760	0.0155
Y3	0.967957	3.020404	2.320473	0.0498

R-squared	0.913326	Mean dependent var	153749.6
Adjusted R-squared	0.838604	S.D. dependent var	6817.821
S.E. of regression	6948.171	Akaike info criterion	20.59367
Sum squared resid	2.75E+09	Schwarz criterion	20.73209
Log likelihood	624.1069	Hannan-Quinn criter.	20.64792
F-statistic	92.56623	Durbin-Watson stat	2.458182
Prob(F-statistic)	0.006303		

Dependent Variable: TC
Method: Least Squares
Date: 02/09/21 Time: 23:45
Sample: 1 72
Included observations: 72

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	39306.90	10386.05	2.378621	0.0441
Y	5867.726	5317.235	2.103530	0.0387
Y2	-60.33591	88.48230	-2.020949	0.0289
Y3	0.396418	0.479676	6.930665	0.0053

R-squared	0.924921	Mean dependent var	161000.0
Adjusted R-squared	0.802785	S.D. dependent var	7038.083
S.E. of regression	7028.276	Akaike info criterion	20.60722
Sum squared resid	3.36E+09	Schwarz criterion	20.73370
Log likelihood	737.8600	Hannan-Quinn criter.	20.65758
F-statistic	95.66091	Durbin-Watson stat	2.336938
Prob(F-statistic)	0.009351		

Dependent Variable: TC
Method: Least Squares
Date: 02/09/21 Time: 23:16
Sample: 1 31
Included observations: 31

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	927499.5	1040045.	3.603339	0.0113
Y	18078.18	45980.43	6.719397	0.0081
Y2	-371.9763	674.4447	-2.699800	0.0490
Y3	2.222028	3.282022	2.677030	0.0241

R-squared	0.875672	Mean dependent var	137506.2
Adjusted R-squared	0.827031	S.D. dependent var	4229.449
S.E. of regression	4286.230	Akaike info criterion	19.68412
Sum squared resid	4.96E+08	Schwarz criterion	19.86915
Log likelihood	301.1038	Hannan-Quinn criter.	19.74443
F-statistic	82.36807	Durbin-Watson stat	2.773387
Prob(F-statistic)	0.009256		