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# COSTS ESTIMATION AND ECONOMIES OF SCALE FOR FISH FARMING PROJECTS IN MUTHANNA GOVERNORATE FOR 2018

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## Abstract

This study aims to analyze the costs estimation and the optimal volume of production for fish production projects in Muthanna province, where the study sample represents 20% of the total study society and the main findings of the study have been showed that the cost of feed constitutes a large proportion of the total cost items Followed by other costs like rent of land, fuel and Transportation, the study recommends to provide financial support by offering loans for the purpose of covering the fixed costs and maintaining the continuity of production, holding specialist seminars in order to guide the projects owners to the modern methods of fish breeding As well as the best methods to raise the economic efficiency of fish farming, the study also recommends that the need to support farmers to achieve the optimum size of production that will ensure the efficiency to increase production by expanding the basic education by the state to encourage investors in order to support the fish farming sector in the province.

***Key words:*** fixed costs, variable costs, optimum production size, fish.

## Introduction

Fisheries is one of the important branches of the economics of livestock production, which is an important resource to achieve the economic surplus sought by all the countries of the world and the gap between food production and consumption is one of the most important challenges facing the process of economic and social development in the country, if the continuation of this the gap means continued dependency on the outside, which is represents a burden on the balance of payments (Ali and Farhan, 2015) and fish is considered one of the most important sources of cheap protein that must be invested to increase its production in order to reduce the demand of other animal products, where it provides (24)% of animal protein while Meat of all kinds provides (40)% (Mahmoud Radhi, 1993). The average of annual consumption of fish per capita in 2016 at the Arab level (2.61) kg/person, while fish meat which is available to consumption was approximately (98.77) per thousand tons (Arab Organization for Agricultural Development, 2016), farm owners are working to provide all the requirements of production in the beginning of the season and they offer three types of fish (carp, kras and silver) which is preferred by the Iraqi consumers, carp usual like the rest of the fish species does not have a lymph node as its bones do not have marrow gaps because the hematopoietic tissue usually falls in the spleen, kidney and some areas The liver and intestines in the submucous layer as well as in the thamus gland, as the anterior kidney is the main center of blood formation (Phalate, 2007).

**The first topic: The scientific methodology of the study**

• First: The problem of the study: The study aims to estimate the long-term total cost function to estimate the optimal size of production, which charges the cost of producing for each one kg of fish meat to the lowest total cost as well as to identify the flexibility of costs.

• Second: The importance of the study: The importance of the study comes for its purpose of reducing production costs to increase income and thus encourage the owners of fish farming enterprises to expand and increase production as well as to draw agricultural policies such as support and so on.

• Thirty : The hypothesis of the study: The study hypothesis based on the assumption that most fish farming fielders do not achieve the optimum size of production, because of high production costs.

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## Materials and Methods

A questionnaire was adopted to collect the primary data about the study sample which was represents (35%) of the study community. The number of forms of distributed questionnaire among the owners of fish production projects randomly were represents (25%), if the form contains many information, including (fixed and variable costs, feed, etc.) and has been reflected. The sample of the great interest of breeders in the breeding of three main species of fish is foremost (carp), which accounts for the bulk of the production of fish farm owners, followed by the following two species (Crass and Silver) which produce less than the first type. The sample showed that the owners of the farms are preparing all the requirements of production at the beginning of the season and continue to provide all the food, pesticides and treatment needed by the fish until the end of the season, knowing that the breeding season is between three and six months.

## Results and Discussion

**First: the relative importance of the variable and fixed costs of fish farms**

The fixed and variable costs of fish farming farms were studied to highlight the importance of each of these cost items, as the variable cost items consisted of the costs of pesticides, feed, vaccines, leased work, electricity and fuel costs, seed costs, etc. Fixed costs are land rent, family work costs and pond construction costs. The following table shows the ratio of the contribution of variable cost items to total variable costs.

It appears from the table above, that the contribution of the feed costs and other which consisted of (maintenance wages, depreciations and watering wages. The cost of seed, followed by vaccines (treatment costs), transportation costs and leasing work, is due to the relative increase in the cost of feed, which is due to the fact that part of the blackberry used from abroad such as protein and earned soybeans and the other part its local prices are high, such as barley. A group of international companies specializing in the production of pesticides control the prices of their products. As for the contribution of the cost of seed, it is high and consider as a determining factor in the production process, without which the breeding process cannot be carried out. Treatment costs are lower than previous ones due to the lack of fish pathogens, as well as other costs, which included relatively high water wages due to water scarcity and the need to install pumps on rivers near lakes for water supply, while transport fares were relatively low because of the producers Sometimes they take their produce to the markets and often sell at the farm door. The ratio of the contribution of fixed cost items to total fixed costs shown in table 2.

**Table 1:** The ratio of the contribution of variable cost items to total variable costs.

| Percentage of contribution % | Cost lines |
|---|---|
| 10.40 | Vaccine costs |
| 25.30 | Feed costs |
| 10.29 | Fuel wages |
| 5.35 | Rented work |
| 9.61 | Transport costs |
| 15.25 | cost of seed is |
| 23.8 | Other |
| 100 | Total |
| Source: Researcher based on the questionnaires. | |

**Table 2:** The ratio of the contribution of fixed cost items to total fixed costs.

| Percentage of contribution % | Cost lines |
|---|---|
| 10.40 | Vaccine costs |
| 27.34 | Land rental costs |
| 22.35 | Family business costs |
| 50.31 | Basin construction costs |
| 100 | Total |
| Source: Researcher based on the questionnaires. | |

The table shows that the high cost of the construction of docks compared to the cost of renting land and the costs of family work due to drilling machines in general in the study area and that the cost of family work is managed by most owners because the docks are often close to rivers and housing belonging to them. Ponds are considered fixed and not renewable, such as annual land rent and the following table shows the ratio of the contribution of fixed and variable costs to total costs.

The table shows that the overall variable cost contribution ratio is higher than the fixed cost contribution ratio, which is means that the variable costs makes up the bulk of the costs of education, so it is necessary to try to minimize costs that come through the lowness of one or all of the variable cost items.

**Second: Economies of scale for the sample of fish breeders farmers**

• Diagnosis and estimation of the standard model.

We considered adopting the cubist formula of cost function, which takes the form of a letter (U) based on economic theory (John, P. Dool and F. Orazem, 1978). The cost function takes the following cubist form:

Tc = total production cost

Q1 = amount of output (ton)

U = random variable that reflects the effect of other related variables that did not involve in the model directly and which are difficult to quantify. It is worth noting that the output box is the output cube and is dalia linked to the Q1 variable, but the relationship is not linear, such as this model meets the assumption that there is no multiple linear relationship between the multicollinearity variables that

**Table 3:** The ratio of the contribution of fixed cost items to total fixed costs.

| Percentage of contribution % | Cost lines |
|---|---|
| 39.22 | Fixed costs |
| 60.78 | Variable costs |
| 100 | Total |
| Source: Researcher based on the questionnaires. | |

the model is not linear in terms of variables (Severe, 2003). The cost function for fish farms has been estimated and the linear formula has been used in the model estimate and was as follows:

$$TC = 2738955.43+1.161q+5.153q2+0.139q3+Ui \quad ...1$$

(3.40) (0.897) (12.19) (4.19)

$R^2 = 0.95$; F = 68.63; D.W. = 1.885

TC = represents the total cost of producing fish meat in Iraqi Dinars

B0 = represents fixed limit (fixed costs)

Q = represents the amount of meat production per kg

Bi = represents regression coefficients

The modified D-W test showed that the model is free of autocorrelation self-correlation problem between random variables, with a value of 1.885 *i.e*. any contrast du <d** 4-du and at a moral level of 5% *i.e.* the calculated D-W value Located between the two values (du<d*<4-du).

After conducting statistical tests on the model, the t test showed that the parameters (b3, b1) were non-moral except for the X2 variable and can be relied upon to estimate the relationship between the total cost. By comparing the estimated F of the estimated function of 68.63 with the padded F value, the model is shown to be highly moral, reflecting the importance of the variables included in the function on the one hand and the realism of the function on the other, while the r2 limit was 0.95 in the function, which reflects the quality of the toffee. The slope line shows that 95% of the changes in total costs are attributable to production, while 5% of the changes in total costs were the result of other factors not included in the model.

Determine the optimal size of cost reduction: To calculate the optimal size of the cost reduction in fish-rearing projects, the average total cost must be found in the long term, since all costs in the long term are variable costs. The total cost in the long term is as follows:

$$LRATC = 1.161 - 5.153\ q + 0.005\ q^2 \quad ...2$$

In order to determine the optimal size of production for cost reduction, it is necessary to apply the first necessary condition for the reduction of the cost function, which is to take the first derivative of the average total cost function for the output and its equality to zero and then solve the equation for Q, so we get:

$$\frac{\partial LRATC}{\partial Q} = -5.153 + 0.005Q$$

Tons of fish meat (optimum production that costs) Q = 1030.6

This is the optimal amount of production at which the lowest long-term cost is achieved

## Conclusions

Cost of feed, seed and other items constitutes a large proportion of the total variable cost items, accounting for 15-25% each of the total total variable costs, followed by vaccines and fuel, which account for 10% of the total variable costs and followed by transportation and less work. High costs of establishing breeding docks due to the fact that agricultural land rents are relatively high in the study area, especially those close to rivers. Overall variable cost contribution ratio is higher than that of the total fixed cost contribution, which means that variable costs make up the bulk of fish farming costs. Farmers are not achieving the optimum size of production.

## Recommendations

Viding financial support by giving loans for the purpose of covering costs and maintaining the continuity of production. Ding seminars and field day for fish breeders to guide them on modern fish breeding methods as well as optimal methods to raise the economic efficiency of fish farming. Need to support farmers from achieving optimum production size that achieves efficiency by increasing production by expanding breeding basins and increasing numbers. The support of the state to encourage investors for the purpose of supporting the fish sector in the province.

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