



FINANCIAL AND ECONOMIC EVALUATION OF FISH CAGE BREEDERS IN AL-QADISIYAH GOVERNORATE, AL-SANIYA COUNTY OF IRAQ FOR THE YEAR 2019

Nagham Rahman Muhammad¹, Marwa Najm Abd² and Nasreen Rahman Mohammed¹

¹College of Agriculture, The University of Al-Qadisiyah, Iraq.

²Agricultural Research Department, Ministry of Agriculture, Iraq.

Abstract

This study was restricted to an area of (401.4) kilometers square that is known by its agricultural nature. Most of its inhabitants depend mainly on practicing agriculture. Al-Saniya district, which is one of the suburbs located in the north of Al-Qadisiyah Governorate / Al-Diwaniyah city center, about (15) km. Agriculture is a major source of income for its population. In this respect, many fish farmers own fields that they built at their own expense after 2012. This because of the return obtained from raising fish in the cages and the low cost of constructing these cages, especially since they do not need to provide special water for them, so their dependence on freshwater is direct. As fish is an essential component of the food chain, it has a protein content that is known to be easily digestible. Fish is one of the white meat that doctors advise to eat, especially for those suffering from protein deficiency, anemia and others. Fish farming is controlled by many components (natural - human). Many types of fish are bred in the Al-Qadisiyah governorate in the Sanyih district, which depends on freshwater in (cages). The carp comes at the forefront of its many types (ordinary - silver, herbaceous, coffins, etc.). Fish cages were distributed in the study area into two groups. The first group included (4) cages and the second group included (5) cages. Iraq is witnessing a remarkable development in fish breeding, especially with the presence of freshwater. This has encouraged farmers to go towards raising fish in floating cages. In recent decades, Iraq witnessed raising fish in this type, which led to an increase in the fish supply and thus an increase in the demand for fish. Fish is an important and affordable food source that helps alleviate the deficit in animal protein. SAS computing program was used in the statistical analysis of the data and the results showed that the final weight reached (1.4) kg, with an average of (1.2 kg/fish). Losses were reduced as it met all the economic criteria used to outrun cage fish. The cash flow amounted to (33.321) million dinars. The total and net added value amounted to (35.8 and 34.8) million, respectively. The research also revealed the scarcity of manpower used in raising cages by more than half. As the differences in costs, total revenues and economic evaluation criteria for cage education were significant or high for all the studied criteria.

Key words: Fish cage breeder, Financial, Economic.

Introduction

Iraq has a large aquatic fish wealth represented by the Tigris and Euphrates rivers and water bodies in the Razza and Habbaniyah lakes, as well as the marshes in the south. All of them have not been economically exploited, so fish has been cultivated in cages. Nevertheless, the production did not meet the increased demand for fish, as evidenced by the increase in the imported quantities of different types of fish in the local market. Fish farming in cages is modern in Iraq, despite its global reach. The fishery sector is one of the important productive sectors in developed countries. The Sumerians were the first to discover fish farming and this is a suitable

indicator for fish farming in Iraq, Jeber, B.A. and Khaeim, H.M., (2019). To evaluate projects, whether existing or proposed, is a structured method used to identify the extent of benefit that will be achieved through the investment decision of the project and provide a comprehensive perception of what the project will be during its productive life. It is possible for the decision-maker to establish or not establish the project or continue with it according to financial and economic criteria and standards, Moussa, (2006); Khaeim H.M., (2013).

Increasing productivity is a major factor in increasing income. The duty is to increase interest in raising the level of productivity and since the evaluation process

belongs to the investor in particular, through the direct returns that he will return to through the establishment of this project, which is limited to comparing the money he will spend against the returns he will get from this spending, Al-Baldawy *et al.*, (2019). Considering that the ultimate goal of the project owner is to maximize profit, that is why it is necessary to measure the economic profitability and the total and net added value of depending on the actual prices in the evaluation process, as they reflect the relative scarcity of the production elements used through the project and the real value of its products, Al-Dahri, (1991); Khaeim, H.M. *et al.*, (2019).

Fish and fisheries play an important economic role in the development of countries. Fish and aquatic organisms are an important food source for humans in the whole world, as fish and their products provide about 24%, Hassan, (1993). The Iraqi per capita share was estimated to be less than (1) kg/year after the year 2000, Saleh, (2009). The World Health Organization recommended that the per capita share of fish meat should not be less than (6.5) kg/ year, Blasam, (1999). The average annual per capita consumption at the Arab level was (6.52) kg/ year, Saleh *et al.*, (2002); Alawsy, W.S.A. Alabadi, L.A.S. and Khaeim, H.M. (2018).

Research problem

Despite the expansion of fish farming production in Iraq in general and in the Qadisiyah governorate in particular, production is still below the required level and does not meet the local need. Many obstacles prevent the expansion of fish farming in the way of cages, despite Iraq's possession of natural resources such as rivers, lakes and swamps, not exploiting them and relying on traditional breeding in earthen ponds, which require more water and electric energy, which increases production costs. Therefore, the research problem is whether there are modern methods of fish breeding in the study area.

Research aims

- Investigating the economic efficiency of fish breeding by floating cages method in Al-Sanyih district / Al-Qadisiyah governorate.
- Economic indicators and criteria are calculated to find out the profits of fish farmers.
- Conducting an economic evaluation of fish farming in water cages and calculating investment and production costs.

Research importance

The importance of the research comes from the importance of fish as it is an important source of food for Iraqi families, the abundance of water bodies in Iraq, the

existence of the Tigris and Euphrates rivers and their lack of exploitation for fish breeding, despite the spread of fish farming in cages worldwide.

Research hypothesis

The research starts from the hypothesis that new methods have begun to appear to raise fish in floating cages. It has an excellent economic return when used correctly concerning the quantity of fish for each cage and to directly follow up on the technical and economic matters related to the production volume.

Materials and Methods

Descriptive economic analysis of fish breeding in cages and then calculating the following economic parameters, Wadi *et al.*, (2010); Khaeim H.M., Jeber B.A. and Ali M.A., (2019):

$$\text{Net Income} = \text{Total Revenue} - \text{Total Costs}$$

$$\text{The rate of return of the invested dinar} = \frac{\text{net revenue}}{\text{total costs}}$$

$$\text{Total added value} = \text{total output (production value)} - \text{the value of production inputs}$$

$$\text{Net added value} = \text{total added value} - \text{extinction}$$

$$\text{Labor Productivity} = \frac{\text{Net added value}}{\text{number of workers}}$$

Data sources

Two types of data were relied on:

1. Initial data collected through a questionnaire form prepared for this purpose and a sample that included (30) breeders in the Saniyah district / Diwaniyah city, where these data were obtained through a personal interview.
2. Secondary data were represented by government departments / Ministry of Agriculture and the Central Statistical Organization.

Fish cages

Breeding fish in cages has several aspects, including differences of opinion about its fate due to its impact on the Euphrates River. Some demanded that it be preserved according to set some controls on it because this technology is transferred from abroad and in the event of damage, the state using this technology would have canceled it. Meanwhile, some parties called for its removal to protect the waters of the Euphrates from pollution. Analyzes of the random waters of the Euphrates River adjacent to the cages indicate that they are not suitable for sanitary specifications because they contain feed residues and therefore there is a risk to public health, so the concerned authorities must monitor this matter. Cage culture was used 50 years ago in the Delta region and

Asia. In Brazil, it was used extensively in the 1990s in eastern Brazil, Medeiros, (2002); D. Aljawasim, B.M. Khaeim H., and A. Manshood M., (2020). In Iraq, some attempts were made to breed local fish, such as kitan in the Habbaniyah and Tharthar lakes, using cages (Drate, 1983), as well as carp fish, either in Lake Habbaniyah (Drate, 1981) or in Razzazah Lake, where salinity reaches (11.2) parts per thousand, Piotr gumonski, (1982).

Features

- Low costs and high production efficiency as it can be used by individuals.
- The cages can be placed on any water body such as reservoirs and lakes, thus not requiring agricultural lands.
- Ease of monitoring fish, hunting and feeding.
- Selling fresh fish to the consumer at high prices.
- Lack of manpower in this type of education.
- Do not use any energy in drainage irrigation operations.

Obstacles to raising in cages

- The high prices of lands that have good ingredients for breeding in fish cages, especially those that are well located.
- The lack of infrastructure in terms of transportation, storage and cooling, as most of the means of storage and transportation. It is simple and does not rise to the level of ambition due to the cost affecting production.
- The lack of cooperation between the relevant departments. Each department has its conditions that hinder the growth of fish farming and this is what caused the slow growth of such projects.

Materials used in the manufacture of cages

- Nets: it is made of flexible nylon or polyethylene material. As for solid plastic or iron-reinforced, it can be used to fix cages.
- pontoons: Several types of pontoons, empty barrels, fiberglass, or cork pontoons can be used.
- Fixed steel frames: They must be strong and resistant to rust, or from bamboo wood, or galvanized tubes and iron reinforced rubber.

Table 1: The most important criteria used in the study.

Benchmark or Standards	1 st group	2 nd group
Wage productivity standard	3.40	10.01
Standard on ROI	1.20	1.41
Profit Standard	52617554	1737454
Standard variable capital productivity	1.30	1.2
Source: from the work of researchers using the questionnaire.		

Table 2: The total fixed and variable costs of raising fish in cages (million dinars).

Details	Cages (% of total costs)	
Fixed costs		
1 Littered buildings	0.200	0.56
2 Equipment extinguished	0.800	2.22
3 The project owner's rent	1.500	4.17
	2.500	6.95
Variable costs (operational)		
1 Cuffs	11.100	30.85
2 Forage	18.876	52.47
3 protection	2.002	5.56
4 Workers' wages	1.350	3.75
5 Transport	0.150	0.42
Total variable costs	33.478	93.05
Total	35.978	100%
Source: from the work of researchers using the questionnaire.		

A farm area of (20) dunums were selected, containing two ponds of (4) dunums each, in the Saniyah area. Cages were hand crafted. Two groups were manufactured, the first consisted of (4) cages and the second group included (5 cages) with a size (6 m long × 3 m wide × 2.5 m high) with an area of (36) m³ for one cage covered by (2) m only. 5.300 cuffs weighing (70-300) grams were placed from the 25th of March until the 25th of June/ 2019. The cuffs were sorted according to their weights to study them economically to find out the weights for fish farming and were as follows:

- Cuffs weighing 200 grams or more.
- Caffeine weighs 150-200 grams.

The density of the cages of the first group was (2500) cuffs with (69.4) coffins / m³, either the cages of the second group were (2.800) coffins with (77.7) cafes / m³ for a total of (5300) coffins with an average of (2.650) coffins / m³.

Samples were taken after a month and two months and at the end of the marketing period to find out the weight increases, the total costs of the cages, fodder, management and prevention were calculated from the beginning of the production process to the marketing that was inside the farm, through the second and third schedules. Expenses for the construction of four cages of (6m length × 3m width × 2.5m height) after subtracting the upper (0.5)m, i.e. the float:

1. The total cost of the nine cages is (8.354) million Iraqi dinars, as follows:

- Iron 2.092 million dinars.
- Cork 0.650 million dinars.
- An internal network of 1.143 million dinars.

Table 3: The total revenues of fish in cages.

	Data	Weight of one palm during the breeding	The total no.	Breeding period (day)	The average weight of the palm (kg)	The average sale price of (1 kg)	Total value per cage (million dinars)	Petitions
1	Group 1	More than 200 gm	2500	75	1.4a	5.50 a	19.173a	10 a
2	Group 2	150-200 gm	2800	85	1.325 ab	5.35 a	19.742 a	15 a
Level of morale	-	-	-	-	*	*	**	**

Source: from the work of researchers using the questionnaire.

- Wood 0.570 million dinars.
- 0.680 million dinars worth of loan.
- RBC Plastic 1.260 million dinars.
- Blacksmithing work 0.525 million dinars.
- Habbal 0.139 million dinars.
- Screws and inserts + attachments 0.157 million dinars.
- Lifting crane 0.100 million dinars.
- Meat generator rent 0.178 million dinars.
- Close cork + stitching 0.208 million dinars.
- Fees for painting cages 0.211 million dinars
- Electricity: 0.067 million dinars
- Million dinars welding materials
- Cement + gravel + sand one million dinars
- A million dinars rock.
- The total number is 8.354 million dinars..

2. Building a room measuring 4×8 as an administration and a store at a total price of 4.8 million dinars

3. The number of workers 2×150 thousand dinars = 300 thousand dinars per month, or 900 during the education period.

4. The field owner's wages are 500×3 = 1.5 million dinars within three months.

5. The goalkeeper 150×3 = 450 thousand dinars.

6. The amount of feed consumed is 28.600 tons of feed.

7. The price of feed is 660 per ton, so the cost of feed will be 18.876 million dinars.

8. Treatment and vaccinations + Baramlex to be added to the diet with a value of 2.002 million dinars.

9. The cuffs are 5300 keffiyehs for 1000 dinars per one, thus their value is 5.3 million dinars.

10. Total production amount 13.200 tons × 5.25 thousand dinars = 69.3 million dinars

Calculation of depreciation premiums by the straight-

line method, where the depreciation premium was for a single meal.

- For cages 800 thousand dinars.
- The building has 240,000 dinars.

The program SAS (STATISTICAL ANALYSIS SYSTEM) was used in the statistical analysis of data by adopting the Duncan test for multiple comparisons between the calculated averages.

Results and Discussion

The goal of any project is to achieve material benefits (profit), given that fish farming projects in cages are among the modern projects in Iraq and to find out the actual reality of these projects, an economic and financial evaluation will be conducted for the breeders of these cages in the study area. The research requirements were fulfilled with the data needed by the questionnaire for a random group of breeders in the Saniyah sub-district / Diwaniyah city center / Qadisiyah governorate.

The research sample was divided into two groups according to the number of cages. The first group included (4) cages, while the second group included (5) cages or more. Appropriate criteria have been used for agricultural activities and it is the basis for the process of evaluating the efficiency of agricultural activity and from this point

Table 4: The costs, revenues, and economic evaluation criteria for cage education (million dinars).

	Total costs and revenues and economic evaluation criteria	Breeding in cages	Level of morale
1	Total fixed costs	2.500	**
2	Total variable costs	33.478	**
3	Total costs	35.978	**
4	Total revenue (production value)	69.300	**
5	Cash flow (financial gain)	33.321	**
6	The rate of return of one dinar	1.93	*
7	Total added value	35.822	**
8	Net added value	34.822	**
9	Labor productivity	11.61	**

Source: From the researchers' work based on the results of table (2, 3). *(<0.05) **(<0.01)

of view, a set of appropriate evaluation criteria have been chosen.

$$\text{Wage productivity standard} = \frac{\text{Value of production}}{\text{wages}}$$

$$\text{Standard of return on investment} = \frac{\text{Profit}}{\text{Invested capital}}$$

$$\text{Variable capital productivity standard} = \frac{\text{Total revenue}}{\text{Total costs}}$$

To explain the criteria for the two groups, the wage productivity criterion shows that the second group was the highest (10.01). This means that the second group has the efficiency of using the labor component in the absence of underemployment. The following table presents the percentage of the total costs of raising fish in cages. The highest percentage of fodder was (52.47)%, followed by beverages (30.85)% and fixed costs (6.95)%, while variable costs amounted to (93.05)%.

The total revenues of fish farming, the sale process started after (75) per day in the first group, which includes (1-5) cages, which reached an average weight of (0.83) kg, which is one of the weights desired by the consumer. The second group, which includes (5) or more, it was sold after (85) days and the average weight was (6.69) kg. It is noted that the numbers of wastes were inversely proportional to the weight of the pellets.

The averages carrying different letters within the same column differ significantly between them.

The economic criteria applied in the research, especially the gross and net added value of (35.8 and 34.8) million dinars. Labor productivity was (11.61) million dinars, which is noted for the superiority in raising fish in cages.

Conclusions

- Facilitating of follow-up and treatment of disease cases in cage culture.
- All economic standards achieved superiority in raising fish in cages.
- Electricity was completely dispensed with.
- Maximize cash flow.

Recommendations

- Establishing an association for fish breeders to spread awareness among farmers and provide basic materials for the manufacture of cages at reasonable prices.

- The necessity for the relevant authorities to study the environmental impacts of raising fish in cages in the future.

- Spreading veterinary and economic awareness among fish breeders.

- Increasing the feed factor and providing it, since the feed constitutes a large percentage of the variable costs of fish production and breeding in the country.

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