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RESEARCH ARTICLE

The structural and economic analysis of the rainbow trout farming: Case of Erzurum province.

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ABSTRACT

Within the scope of the research, a total of 14 enterprises were studied and it was determined that 85.7% of these enterprises were producing in the ponds on land, 7.1% in net cages and 7.1% in both ponds and net cages. When examined according to their legal structures, it is seen that 85.7% of the enterprises are private companies, 7.1% are limited liability companies and 7.1% are joint stock companies. In the analysis of the workforce in the enterprises, it was found that the ratio of the family labour force is 2.0 Man Power Unit (MPU), the male labour force is the highest as 1.07, and the female labour force is highest as 0.27 at the age group of 15-49. It was determined that the active capital amounts (17,095,548 TRY) of the cage breeding enterprises are much higher than the active capital amounts (453,482 TRY) of the pond enterprises. Operating expenses are calculated as 77,041 TRY in enterprises having ponds, and 749,578 TRY in cage enterprises and 1,087,900 TRY in both pool and cage enterprises. The biggest share of operating costs is constituted by the feed price. The profitability ratios in the enterprises were determined as 66.86% for pond enterprises, 94.73% for cage enterprises, and 91.59% for both pool and cage enterprises.

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Introduction

Fish is an indispensable source of the human nutrition due to the essential amino acids, vitamins and minerals that it contains. However, because of its relatively low cost and easy availability, fish is a food with significant superiority over many animal products (Ezihe et al., 2014, Karakaya and Kırıcı, 2016).

Nowadays, considering the economic conditions, aquaculture is an important sector in terms of the solution of nutritional problems and its place in balanced nutrition. The fish consumption in the world has been increasing in parallel with population growth, urbanization, widespread adoption of western type eating habits, and the rise in the per capita income (Akanbi, 2015). The need for animal protein has been increasing for the sufficient and balanced nutrition, as a

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result of the rapid growth of world population day by day. Production of aquaculture is a very important source in eliminating this necessity due to inadequate land resources in meeting animal protein (Elbek, 1981). Aquaculture has reduced the pressure on natural stocks that emerged because of hunting, and it has avoided negative balance changes.

The aquaculture sector has undergone an astonishing development in the last 50 years, with the training activities and rapid technology transfer. Aquaculture has been identified as the fastest growing food industry in the world by Food and Agriculture Organization (FAO). The production of aquatic products in the world was under 1 million tons in the 1950s, reaching 7 million tons in the 1980s, exceeding 70 million tons in 2015 (Anonymous, 2017a).

Aquaculture, which has an important place in the agricultural sector, has a significant socio-economic place as a business line as well as being a valuable food source. Aquaculture provides significant added value to Turkey's economy by providing raw materials to the industrial sector, creating employment, contributing to rural development and food production. For example, trout farming has become an area of economic activity that provides substantial economic input and employment in Turkey. Entrepreneurs have created integrated systems consisting of production, processing and marketing under free market economy conditions (Doğan & Yıldız, 2008).

In the recent years, aquaculture in Turkey has gained momentum in parallel with the developing technology and economic growth. As a result of the excessive amount of hunting and reduction of fish population, the importance of breeding has been increasing day by day. The aquaculture studies first started in the inner waters, then left their place in marine environments, and with the identification and implementation of economic methods of breeding, the studies that were at the level of being initiatives have turned into efforts of a sectoral structure. Although it was directed towards carp breeding, which is easier to breed, initially, the breeding of trout, sea bream and sea bass species, which have high economic value, have been more prevalent today (Sayılı et al., 1999).

According to the latest statistics of TURKSTAT, a total of 588 thousand tons of aquatic products were produced in Turkey in 2016, consisting of 335 thousand tons of hunting and 253 thousand tons of aquaculture. In 2016, the production through hunting has decreased by 22.27% compared to the previous year, while aquaculture production has increased by 5.42%. Approximately 56.97% of total aquaculture production in 2016 was obtained through hunting and 43.03% by aquaculture (Anonymous, 2017b).

This study was carried out to investigate the economic situation of the trout farming enterprises in Erzurum province. In the study, socio-economic structures and economic performances of the enterprises were examined. We believe that the results of this research will provide important findings for the policymakers and related stakeholders.

Material and Methods

Material

The research aimed to reveal the structural conditions of the trout farming enterprises in Erzurum province and analyse them from the economic perspective. For this reason, research material mainly consists of the data obtained from the surveys of the trout farms that exist in this province.

In the direction of the aim of the study, the enterprises engaged in trout breeding in Erzurum province were included in the research. For this purpose, firstly, support was obtained from Erzurum Provincial Food, Agriculture and Animal Husbandry Directorate to reach the number of the trout farming enterprises. In the Regulation of Aquaculture, the definition given in Article 4 and the categories related to aquaculture in Articles 6 and 9 are explicitly mentioned as aquaculture pool and cage cultivation (Anonymous, 2018a). In the light of the written and verbal information provided by this institution, it was determined that there were 14 trout production facilities that were active in the whole research area and all of these facilities were included in the survey in accordance with the complete sample method.

In the study, survey method was used as the data collection tool. The questionnaires used in the study were designed by the researcher, within the scope of two main objectives. The aim of the first part of the surveys (structural analysis of enterprises) was to determine the structural characteristics (production mode, production quantity, marketing method, type of operation, labour quality, etc.) of the enterprises that cultivating trout. The purpose of the second part of the surveys (economic analysis of the enterprises) was to determine the economic characteristics (such as active capital structures, profitability, labour productivity, etc.) of trout farming enterprises.

With the data obtained through the questionnaires, the production values and costs of the year 2017 were calculated. Although the method used in this study did not resemble with the doctoral dissertation of the first author entitled "*Comparative Structural and Economic Analysis of Trout Establishments in Eastern Anatolia and Mediterranean Regions*", the questionnaire was reworked and new results were obtained with current data.

Method

The service capacity of the population in the enterprises was determined by calculating in man power unit (MPU). The units used by Açıl and Demirci (1984) were utilized in converting the data to MPU (Table 1).

Active capital consists of farms (land, land arrangement, building and pond, cage, breeding fish) and enterprises (instrument and machinery, fish, material, money), while the passive capital is composed of debts and capital stock.

Table 1. Coefficients used in the conversion to man power unit

Age Groups	Male	Female
0 – 6	–	–
7 – 14	0.50	0.50
15 – 49	1.00	0.75
50 +	0.75	0.50

Source: Açıl and Demirci (1984)

The capital structure of the investigated enterprises has been determined by considering the following criteria (Sayılı et al., 1999):

- Land capital covers the area where ponds are used only for fish production. For the land capital, the purchase-sale value that is valid in the research area is taken as the basis,
- For the land arrangement capital, the evaluation is made considering the cost for the new ones, and the ageing degree depending on the reconstruction cost for the old ones,
- For building, pond and cage capital, local construction prices and unit price lists are used. In this valuation, the wear condition in use is taken into account,
- Instrument-machinery capital is taken as the value of purchase for the new instruments, and for the old ones, it is valued over purchase-sale value according to the level of their usability,
- The prices declared by the farmers and the sale price on the market are taken into consideration for the fish capital. The depreciation rate is also considered for the broodstock fish,
- Purchase-sale value is taken as basis for material capital,
- The statement of the enterprise owners is taken as basis for the money amount, receivables and debts.

In the study, capital structures and annual operating results (operating and production costs, gross profit, net income, net profit, profitability, business productivity) of the enterprises surveyed are set forth. The determination of the annual operating results in agricultural enterprises is usually made according to the Laur accounting method. According to Laur, the gross product is the quantity and value expression of an increase in the parts of the capital by means of newly produced goods, goods exchanges and revaluation during an operation year as a result of the economic activity in an agricultural enterprise, considered as an economic whole (Akıl and Demirci, 1984).

The net return is the value of the capital invested in the business or the profit of the active capital. The net return, which is the result of the capital used in the business, is obtained by subtracting the calculated costs from the gross revenue, excluding the interest of the active capital. The net profit was obtained by subtracting the production costs from the gross profit (Karagölge, 2001, Peker and Kan, 2010).

Operating costs refer to the total expenses incurred outside the interest or interest coverage of the active capital so that the gross receipts can be obtained. Operational costs are divided into two categories: variable costs and fixed costs (Erkuş et al., 1995). Production costs were found by adding active capital interest value to operating costs value (Koç, 2007). In the analysis of production cost, labour costs spent on aquaculture activity, material costs, shipping costs, product prices and market prices related to other goods and services used were evaluated (Özkan and Yılmaz, 1999). 3% of the variable costs are included in the calculation of the general overhead cost included in the operating costs (Kıral et al., 1999). The interest rate on operating capital is the variable cost, which is the opportunity cost of the capital invested in the production activity. For the year 2017, when the research was carried out, the interest rates for the operating capital are taken as the remaining 5% excluding the subsidy from the 10% current interest rate applied to the fishery loans by T.C. Ziraat Bank. Rates of depreciation of fixed capital elements of the examined companies were used as 3.5% for land improvement capital, 11% for building-pond and cage capital, 16.5% for breeding fish capital and 11% for instrument-machinery capital (Anonymous, 2018b).

Profitability is a measure, where the profit is provided from the capital used in the business. The profitability ratio in the enterprises is calculated by using the formula of Karagölge (2001):

$$Profitability\ Factor = \frac{Net\ Return}{Gross\ Product} \times 100$$

The value obtained by dividing the production to the labour force used in that production is called the labour productivity (Çetin and Bilgüven, 1991).

Results and Discussion

Structural Features of the Investigated Businesses

Among the trout farms investigated in the province of Erzurum, 85.7% (12) of them are producing in ponds, 7.1% (1) in net cages and 7.1% (1) in both ponds and net cages. It has been determined that 76.9% of the businesses that produce trout on the pond bring water using PVC pipes, 15.4% using concrete canals and 7.7% using PVC pipes + concrete canals. In addition, it has been determined that a very large majority (92.3%) of these pond enterprises give the water to the ponds separately.

It was observed that 85.7% of the enterprises are in the valley, 7.1% are in the open area and 7.1% are in the mountainside according to the type of the land they were built. When the road conditions of the enterprises are examined, it is seen that 57.1% is stabilized and 42.9% is asphalt. Regarding their legal structure, 85.7% of the enterprises are private ownership, 7.1% of them are limited companies and 7.1% are joint-stock companies. While 85.7% of the farming enterprises are producing in their own

property, 14.3% of them are producing on the land that they have rented.

When the enterprises are examined according to their production status, 85.7% (12) of them carry out complete production, meaningly collecting eggs from their own breeding fish and feeding them until the marketing phase, while 14.3% (2) of them produce edible fish, meaningly purchase juveniles from other enterprises and feed them. When analyzed according to marketing channels used in sales, it was found that 64.3% of businesses use both retail and wholesale, 14.3% use both retail and restaurant, 7.1% only use retail and 14.3% use all three sales channels.

In terms of production conditions, it was determined that 85.7% of the enterprises are small (0-49 tons/year) and 14.3% are medium-sized enterprises (50-499 tons/year). It was found that 57.1% of the enterprises wanted to increase their existing production capacities if the conditions were appropriate over time and it was determined that 100% of the trout operations operating on the sea were not members of any union, but it was also found that they believe that collecting of all the enterprises under a union or cooperative will be useful. 57.1% of the producing enterprises did not use business or investment loans, while 42.9% benefited from business or investment credits.

Workforce Existence

Due to the specific nature of agriculture, the farmer's family has a very important place in agricultural production. For this reason, the examination of the population structures of the enterprises is of great importance in terms of revealing the social structures of the agricultural enterprises and making the economic analyses (Karakayacı and Oğuz, 2006).

Table 2. The amount of family and stranger workforce by age groups in the enterprises studied (MPU)

Age Group	Gender	Family	Neighbour
7 - 14 Ages	Male	-	-
	Female	-	-
15 - 49 Ages	Male	1.07	0.93
	Female	0.27	-
50+ Ages	Male	0.59	-
	Female	0.07	-
Total	Male	1.66	0.93
	Female	0.34	-
	Grand Total	**2.00**	**0.93**

In the analysis of the labour force in the examined enterprises, it was found that the family labour force ratio is 2.0 MPU, the highest male labour force is in the 15-49 age group with 1.07 MPU and the highest female labour force is in the 15-49 age group with 0.27 MPU. It was found that 67% of the population in the surveyed enterprises is composed of 15-49 age group. This high ratio indicates that the workforce potential of the surveyed enterprises is good. In the results obtained for the labour force of strangers in the enterprises, it was determined that the ratio of stranger labourer utilization was 0.93 MPU (Table 2).

Capital Structure of Investigated Enterprises

The active capital in the researched enterprises consists of the farms and the operating capital. In the province of Erzurum there are pond, cage, and pond and cage breeding enterprises.

As seen in Table 3, average of total active capital enterprises; 453,482 TRY for pool operators, 17,095,548 TRY for cage operators and 15,657,588 TRY for both pool and cage operators. The largest share in the active capital is the fish. The ratio of fish capital to active capital is 51.10% for pond enterprises, 83.20% for cage businesses and 82.60% for pond and cage businesses.

The amount of active capital per 'kg', is determined as 47.90 TRY in the average of the pond enterprises, 62.63 TRY in the average of the cage enterprises and 62.17 TRY in the average of the pond and cage enterprises. The active capital per fish was determined as 10.18 TRY for pond enterprises, 15.54 TRY for cage establishments and 15.66 TRY for pond and cage establishments.

The passive capital of enterprises consists of the sum of debts and equity capital. On average, the amount of debt in establishments was determined as 4,783 TRY in pond enterprises and 24,304 TRY in pond and cage establishments. Equity capital is determined as 448,699 TRY in the average of pond enterprises, 17,095,548 TRY in the average of cage establishments and 15,633,284 TRY in the average of pond and cage establishments.

The share of debt in the passive capital is 1.05% in pond enterprises and 0.16% in pond and cage enterprises. Equity constitutes 98.95% of passive capital in pond enterprises, 100% in cage enterprises and 99.84% in pond and cage enterprises. The debt and equity capital of the investigated enterprises are shown in Table 3.

Annual Activity Results of Investigated Enterprises

Operating and production costs for the enterprises investigated are given in Table 4. The calculation of the sum of the operating costs in the fisheries breeding enterprises is calculated by subtracting the revolving fund interest from the production costs. In the enterprises that carry out aquaculture, the sum of operating expenses is calculated as 77,041 TRY in pond enterprises, 749,578 TRY in cage enterprises and 1,087,900 TRY in pond and cage enterprises on average.

On the average, the total production costs are 80,350 TRY for pond enterprises, 784,066 TRY for cage enterprises and 1,138,907 TRY for pond and cage enterprises.

The largest share of production costs is the feed cost, which is 43.35% in the pond, 59.23% in the cage, and 66.07% in the pond and cage enterprises.

In the examined enterprises, the gross profit was calculated as 232,485 TRY in pond enterprises, 14,231,250 TRY in cage establishments and 12,937,500 TRY in pond and

Table 3. Capital structure of trout enterprises investigated in Erzurum province

	Capital Components	Pond Averages		Cage Averages		Pond and Cage Averages	
		TRY(₺)	%	TRY(₺)	%	TRY(₺)	%
Active Capital	Farm Capital						
	Land Capital	8,552	1.9	0	0.0	0	0.0
	Land Adjustment Capital	12,257	2.7	16,044	0.1	24,979	0.2
	Building and Pond Capital	136,189	30.0	178,267	1.0	277,543	1.8
	Cage Capital	0	0.0	400,000	2.3	251,816	1.6
	Total	156,998	34.7	594,311	3.9	554,338	3.9
	Operating Capital						
	Machine-Equipment Capital	14,466	3.2	2,100	0.0	16,100	0.1
	Fish Capital	231,954	51.1	14,231,250	83.2	12,937,500	82.6
	Material Capital	8,708	1.9	116,100	0.7	188,125	1.2
	Breeding Fish Stock	6,032	1.3	17,100	0.1	20,900	0.1
	Money	35,324	7.8	2,134,688	12.5	1,940,625	12.4
	Total	296,484	65.3	16,501,238	96.1	16,003,250	96.1
	Active Total	**453,482**		**17,095,548**		**15,657,588**	
Passive Capital	*Debts*	4,783	1.05	0	0	24,304	0.16
	Equity Capital	448,699	98.95	17,095,548	100	15,633,284	99.84
	Passive Total	**453,482**		**17,095,548**		**15,657,588**	

Table 4. Production costs of enterprises investigated in Erzurum

Cost Elements	Pond Averages		Cage Averages		Pond + Cage Averages	
	TRY(₺)	%	TRY(₺)	%	TRY(₺)	%
Feed Costs	34,832	43.35	464,400	59.23	752,500	66.07
Labour Costs	25,785	32.09	77,749	9.92	118,018	10.36
Egg and Juvenile Cost	1,440	1.79	19,000	2.42	2,660	0.23
Heating-Lighting	1,023	1.27	24,300	3.10	24,300	2.13
Chemical and Disinfectant Value	18	0.02	3,200	0.41	2,080	0.18
Maintenance-Repair Costs	5	0.01	0	0.00	4,800	0.42
Shipping Costs	1,733	2.16	3,100	0.40	24,800	2.18
Tax Cost	1,333	1.66	98,000	12.50	91,000	7.99
Total Costs	66,169	82.35	689,749	87.97	1,020,158	89.57
Interest Rate of Operating Capital (0.05%)	3,308	4.12	34,487	4.40	51,008	4.48
Total Variable Costs	**69,478**	**86.47**	**724,236**	**92.37**	**1,071,116**	**94.05**
General Administration Expenses (3%)	2,084	2.59	21,727	2.77	32,135	2.82
Production Areas' Rental and Water Price	315	0.39	11,330	1.45	8,305	0.73
Land arrangement. depreciation	429	0.53	562	0.07	874	0.08
Building. Pond and Cage Depreciation	5,448	6.78	23,131	2.95	21,174	1.86
Machine-Equipment Depreciation	1,591	1.98	231	0.03	1,771	0.16
Breeder Fish Amortization	1,005	1.25	2,849	0.36	3,482	0.31
Total Fixed Costs	**10,872**	**13.53**	**59,829**	**7.63**	67,742	5.95
Total Operating Costs	**77,041**	**95.88**	**749,578**	**95.60**	**1,087,900**	**95.52**
Production Costs	**80,350**	**100**	**784,066**	**100**	**1,138,907**	**100**

1

cage enterprises on average. On average, the ratio of gross revenue to active capital was 0.51 for pond businesses, 0.83 for cage businesses, and 0.83 for pond and cage businesses. Pond + cage enterprises are found to be in the most advantageous position due to the gross amount falling to the unit number of fish with 12.94 TRY, while there are pond operations with 5.22 TRY in the worst case position. When they are examined in terms of the gross amount falling to the unit amount of 'kg', it is seen that the most advantageous case is the pond + cage enterprise with 51.75 TRY, similar to the case of unit fish, and pond enterprise with 24.56 TRY in the worst case.

The average of the enterprises surveyed with net returns was calculated as 155,444 TRY in pond enterprises, 13,481,672 TRY in cage enterprises and 11,849,600 TRY in both pond and cage establishments. On the other hand, the ratio of net return to active capital was 0.34 for the pond, 0.79 for the cage, 0.76 for pond and cage, respectively. With regards to the net return per fish, the most advantageous case is the cage enterprise with 12.26 TRY and the worst case is the pond enterprises with 3.49 TRY. When they are examined with respect to the net return per "kg", it is seen that the most advantageous case is the cage business with 49.02 TRY while the worst case is the pond business with 16.42 TRY. The gross profit and net return figures of the enterprises are given in Table 5.

Table 5. Gross profit and net return values of the enterprises investigated in Erzurum province

	Pond Averages (TRY)	Cage Averages (TRY)	Pond + Cage Averages (TRY)
Gross Profit (1)	232,485	14,231,250	12,937,500
GP / Active Capital	0.51	0.83	0.83
Operating Costs (2)	77,041	749,578	1,087,900
Net Return (1-2)	155,444	13,481,672	11,849,600
NR / Active Capital	0.34	0.79	0.76

For the enterprises surveyed within the scope of the research, the value of net profit is calculated as 152,135 TRY for pond enterprises, 13,447,184 TRY for cage establishments and 11,798,593 TRY for pond and cage establishments. On average, the net profit value of the unit 'kg' is determined as 16.07 TRY for pond operators, 48.90 TRY for cage operators and 47.19 TRY for both pond and cage operators. When the value of the net profit per unit of fish is examined, it is determined as 3.41 TRY for pond and 12.22 TRY for cage and 11.80 TRY for both pond and cage. The net profit figures for the businesses are shown in Table 6.

The profitability ratios in the examined enterprises are given in Table 7. The profitability ratios were calculated as 66.86% for pond enterprises, 94.73% for cage enterprises and 91.59% for pond and cage establishments, respectively. In terms of profitability, the cage establishments are in the most advantageous state.

Table 6. Net profit figures of the studied enterprises

	Pond Averages (TRY)	Cage Averages (TRY)	Pond + Cage Averages (TRY)
Gross Profit (1)	232,485	14,231,250	12,937,500
Production Costs (2)	80,350	784,066	1,138,907
Net Profit (1-2)	152,135	13,447,184	11,798,593

Table 7. The profitability ratios of the studied enterprises in the province of Erzurum

	Pond Averages (TRY)	Cage Averages (TRY)	Pond + Cage Averages (TRY)
Net Return (1)	155,444	13,481,672	11,849,600
Gross Profit (2)	232,485	14,231,250	12,937,500
Profitability (%) (1/2)	**66.86**	**94.73**	**91.59**

Total production in the provinces surveyed in Erzurum province and the amount of manpower consumed to realize this production are shown in Table 8 in days. It was determined that the maximum production amount for a daily operation was obtained in cage establishments with 251.14 kg/day, whereas the pond enterprises was at a disadvantageous state with 11.41 kg/day.

Table 8. Workforce productivity in the surveyed enterprises

Factors of Productivity	Pond	Cage	Pond + Cage
Annual Production Amount (kg/year) (1)	9,468	275,000	250,000
Working Duration (Days) (2) (Table 1)	830	1,095	2,188
Labour Productivity (kg/day) (1/2)	**11.41**	**251.14**	**114.26**

Conclusion

In this study, the structural and economic analysis of trout operations in Erzurum province was made. Within the scope of the research, a total of 14 enterprises were examined. Businesses were examined in detail regarding their breeding types, production situations, types of feeding fishes, marketing channels used in sales, water supply type, maintenance periods of ponds and cages, credit utilization situations, capacity increase situations, views on producer organizations, association memberships and family and the amount of stranger labour force.

Within the framework of economic analyzes, mainly active and passive capital structures have been analyzed in detail. In this context, in terms of active capital, it has been evaluated on the basis of farmland capital, land capital, land

regulatory capital, building and pond capital, cage capital, breeding fish capital, farmland, instrument and machinery capital, fish capital, material capital and money capital. In the evaluations made in terms of passive capital, debts and equity were examined.

The study also includes a detailed analysis of operating and production costs, gross profit, net profit, profitability and business productivity.

As is known, the production enterprises are producing for a full period of the year. This leads to the conclusion that the employer needs labour throughout the year. In the analysis of the labour force in the enterprises, it is determined that the ratio of the family labour force is 2.0, the male labour force is in the 15-49 age group with 1.07 and the female labour force is in the 15-49 age group with 0.27. It can be considered that the fact that the female labour force in all enterprises, in general, is much smaller than the male labour force is due to the fact that the physical labour portion of the work is much more intense. In the results obtained about the foreign labour force in the enterprises, the ratio of foreign labour force utilization was found to be 0.93. As a result of this situation, it has been observed that the operations of Erzurum province have a low use of foreign labour force due to the fact that the family labour force is sufficient for production because it operates as a small size family business.

As a result of the structural analysis, it is seen that a very important part of these enterprises is the "private operation" when the legal structure of the enterprises in the field is evaluated. This is thought to be due to the fact that the businesses are small family businesses. The same situation has also been observed as a result of examining the ownership of the enterprises. The vast majority of businesses are seen to perform their activities in their own properties. Since these enterprises are "private entities", they are seen as "own property" status. A large part of the existing enterprises is small-scale enterprises.

The trout farms were seen to be a large aquaculture farmer. At the same time, it has been determined that businesses are doing "complex" production, that is, they take eggs from their own breeding fish and feed them from the offspring to the marketing stage. In the question of which establishments have provided their puppies, it has been found that businesses operating on the ground are assuring the puppies from their own bodies.

When the maintenance periods of the ponds and cages in the enterprises are examined, it is seen that the enterprises clean the ponds and the cages periodically once a week or every two weeks.

It is understood that when companies look at producers' organizations, they are warmly welcomed by producer organizations. As a result of this positive outlook, it is thought that businesses in the field are expecting that they will benefit from the promotion of their products from the organizations, marketing and government incentives.

Nevertheless, when it was examined whether or not businesses on the field were members of any association, it was observed that none of the enterprises in the province of Erzurum was members of a union or co-operative. Although the producers are warm to the organization, it is thought that the reason for not becoming active in the association is due to inadequate or ineffective organizations in the region.

When the active capital amounts of the enterprises are examined, it is seen that the active capital amounts of the enterprises which are growing in the cage in Erzurum province are much higher than the active capital amounts of the pond enterprises and the enterprises which cultivate both ponds and cages.

In the study, it is seen that the costs vary considerably when fixed and variable costs of the enterprises are examined. The main reason for this is that the items that make up the variable costs are the main expense items of the enterprises. Another remarkable fact is that the sum of both variable and fixed costs of pond + cage facilities is much higher than that of pond enterprises and cage enterprises, which is due to the fact that the production quantities of pond + cage facilities are much higher than the production quantities of pond enterprises and cage enterprises.

When the enterprises are analysed in terms of gross receipts, it is seen that the highest gross value of the reindeer is in the cage enterprises. This is thought to be due to the fact that the production volume of the enterprises is much higher than the production volume of other enterprises.

Since the net returns values of the enterprises are technically calculated on the gross revenues values, it is seen that the results obtained when the net revenues of the enterprises are examined are likewise very similar to the results obtained in the examination of the gross revenues. When businesses are assessed in terms of net profit situations, it appears that the net profit ratios of the cage enterprises are similar to the above cases.

When the profitability ratios of the enterprises are examined, it is seen that the highest profitability is in the cage enterprises and the lowest profitability is in the pond enterprises. When the enterprises are evaluated in line with the values of the business productivity, it is seen that the highest production amount is obtained in the cage business.

Conflict of Interest

The authors declare that there is no conflict of interest.

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