European Online Journal of Natural and Social Sciences 2013;
vol.2, No. 3(s), pp. 60-69 ISSN 1805-3602

Aquaculture capitalization five-fold scenarios sorting out: A case study in Khuzestan fishery

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Abstract

In order to decrease the dependency on petroleum, Iran should apply capitalization in other industries enabling it to be relieved from oil industry linkage. A highly potentiality strategic industry attractive to the capitalization is the aquaculture strategy and Iran is mostly efficient in its preservation and export. Investor's widely important factor of success in and for such an improving craft is and could be their orientation with strategic importance of aquatic craftsmanship. Here, in this article, our objective is to verify these strategies, via interviewing with the staff in Khuzestan County Fishery General Department plus gradating such strategies due to the importance of these strategies from the approaches of analysts, expert and aqua developers. For this purpose, we classified the fivefold scenarios investment capital. A questionnaire was implemented at the disposal of Khuzestan State Fishery Connoisseurs, which was analyzed by Freedman Test and ANP Technic categorization of scenarios. The results indicated first scenario enjoying the strongest absorption level for drawing attention and trend and willing for such capitalization.

Keywords: capitalization; aquaculture; invest scenarios; success strategic elements

Introduction

Economic development in fields in which a country is prone is one of the objectives followed strictly by the majority of countries, including Iran. Similarly, relying on quantitative and qualitative increase of production for constant growth and development has been continuously considered by all countries. According to documented reports of Agriculture organization and Department of Fisheries of Khozestan including talents, fields of capitalization will be in agriculture production and aquaculture farming. Suffer from lack of capital as a factor of production is a serious obstacle for development in developing countries.

Aquaculture area, like other areas of capitalization is the initial cost of capitalization. On one hand, achieving acceptable growth rate of the economy as an integral part of development had been always objective of all developmental development programs in the country. Capitalization in subcategories of agriculture including aquaculture farming can have significant role in empowerment of the country to supply food, suitable economic growth and it consequently brings independency. On the other hand, the need of private sector in economic area of the country after notification of Article 44 of the constitution is evident more than before. Such potential area for presence of private sector in capitalization area is aquaculture farming. In general, due to importance of decreasing economic dependency to oil, need to develop non-oil exports, self-reliance necessity to provide cheap protein (aquaculture products), import decrease of protein products and also due to national plan of spreading capital injection to various potential fields of the country through a channel excluding the government, extension of implementation of article 44 of the constitution in the country and necessity to decide correctly about capitalization, this research aims at ranking the identified scenarios in aquaculture farming. Scenarios such construction and complement of large aquaculture complexes, production and reproduction of fish seller and hydrothermal, production and reproduction of crustaceans (shrimps, brine shrimp), production and reproduction of ornamental and commercial aquacultures, construction of export terminals in Shalamcheh

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frontier market, construction of large markets to offer aquacultures, construction of factories producing aquacultures' food, production and reproduction of sturgeon, mass and industrial cultivation of crocodile with aim of exporting its meat and leather should be considered in order to identify whether they can be regarded as capitalization opportunity or not? If they are considered as a capitalization opportunity, based on scientific and economic reasons which one on is superior to the other another and how is the rank of each opportunity among theothers?In other words, the present research is looking for objectives as below:

What is the ranking (prioritizing) of the identified capitalization opportunities in terms of strategic view in aquaculture farming of fisheries?

Opportunity Identification and Recognition

Opportunities come to us in various shapes and figures that are generally arisen from external sources. To identify an opportunity, it is vital to be aware of what is happening around us and we should be sensitive to our surroundings. If our subconscious mind believes that every event benefits us and not needed our favor, we find out as everything is not going well but there is also a benefit following that (Dargi, 2010).

In entrepreneurship literature, opportunity identification contains of three stages as feeling or comprehension of needs of the market or unused resources, creation of new "proportion" between needs of special market and particular resources and creation of new "proportion" between needs and resources which have been separated so far in shaping concept of business. These processes respectfully involve conception, creation and discovery, and represents "diagnosis". Opportunity identification is a process through which one concludes that a potential ability has been identified to create a new issue which still have capacity of creating economic value (Ahmadpour, Zamani and Maleki, 2011).

Recognition of Capitalization Opportunities

Capitalization opportunities do not occur spontaneously. But, they should be identified or be created. Various types of capitalization opportunities may root from different levels of enterprise's departments and some others may be submitted by the top management of the organization or members of the board. Partnership of top management in submitting capital opportunities is generally confined to strategic actions as extension of enterprise's activity through financial policies and entry into new markets. Taking into consideration that capitalization opportunities lead to allocation of financial resources of the enterprise in order to acquire income or reduce costs, therefore regular and financial policies based on principles are implemented by the enterprise for capitalization opportunities (Hosseini, & Sarabi Shad, 2009).

Basically, a capitalization opportunity shows a set of policies and capitalization policies and since time passes they will be revised by the enterprise. Moreover, it can be contained contain of environmental factors providing favorable conditions as growing market for products of the enterprise (national and international), or factor confining the competition, changes in currency rate along with companies' benefits, financial situation that promises a trustable future for industry or the enterprise or be an identification of new market (Hekmat Shoar et al., 2010). Detailed study of capitalization opportunities and management principles portfolio can result in better management and rising capitalization wealth. Additionally, it is expected that individuals prevent mistakes as much as possible by studying capitalization's principles and decide knowingly. Capitalizations opportunities cause job and career creation too (Izadi et al., 2010).

Table 1. Five steps for planning and controlling (executive process) capitalization opportunities (Hosseini and Sarabi Shad, 2009)

First Stage	Identification of capitalization opportunities
Second Stage	Estimation and evaluation of cash flows of capitalization opportunities
Third Stage	Acceptance or refusal of capitalization opportunities based on an acceptable criterion
Forth stage	Approval of implementing accepted capitalization opportunities
Fifth Stage	Monitor , and control and evaluation of capitalization opportunities while implementation

Capitalization in Aquaculture Section

Necessity and importance of capitalization as a significant and major economic component is obvious to everyone and it has been always considered as one of the basic factors in economic development of societies. On one hand, increasing growth of the population in developing countries, income increase of consumers, especially in Asia and priority changes of consumers have raised global need to fisheries productions (reports and documents of Fisheries Organization of Iran (2012)). Iran has width of nearly 165 million acres and location of 7/15% of it in mountainous area and suitable rainfall

rain fall and existence of proper percentage of profound and semi-profound wells, qanat, stream with capability of cultivation of fish seller and location of 20% of it in dry and semi-dry area with capability of cultivation of hydrothermal fish and appropriate potentials to cultivate marine fish, shrimp, sturgeon, brine shrimp and algae. Due to increase in aquaculture consumption in Iran resulting from population growth, promotion of income per capita because of changes in culture and public awareness about advantages of aquaculture consumption was in a way that consumption of aquaculture per capita has increased from 5 kg in 2000 to 8/5 kg in 2010 and increase of Iran Fisheries Organization program will continue till approaching to global amount of aquaculture consumption that realization of this issue requires capitalization increase in section of aquaculture farming products and exploitation of new methods.

Status of Fish Farming in Iran

Considering history of fish farming in the world, this activity has been started in Iran from 1922 by reproduction of acipenseridae. Cultivation of hydrothermal fish has been commenced from 1962 by cultivating such fish in natural pond of north of Iran. Iran Fisheries Organization started constructing first fist station of studying reproduction and cultivation of carp fish from 1968-1969 in Pol Astaneh. Afterwards, complex of reproduction and cultivation of sturgeons in Sad Sangar(Rasht) in 1971was exploited. After 1978, considering attractiveness of fisheries experts, using aquaculture sciences and its progress in raised farms and dams have been highly remarkable. Since 1994, considering macro policies of fisheries, complexes of such fish cultivation have been designed and exploited in some potential areas of the country and a number of them are in progress. Production of hydrothermal fish in farms and restored dams in 1994 was 24614 tons that this amount got to more than 102000 tons in 2009 and the growth was remarkable. Considering talent of various areas, lots of thousands of fish farming is are available in the country (Pak, 2007). Based on the available statistics, the number of the active farms in 1992 having more than 21460 tons of production was 1626 acres and this figure in the late 2011 arrived to 8204 farms, active level with 34495 acres of production equaling 102575 tons increased as described below (10-years statistics letter of Iran Fisheries Organization, 2011). During last two decades, due to various reasons including promotion of technical and expertise knowledge, policies, planning, plus capitalizations of private and public sectors in development of this activity, market's demand and familiarity of people with this career beside proper territorial capacities, production of these fish quickly developed in the country. So that, in the late 2009 these figures arrived to as follows follow: 3717 single farms in an area equal to 12485 acres producing 46350 tones, 179 complex farms in an area equal to 2745 acres producing 9720, 3034 micro double-purpose farms in an area of 634 acres producing 3952 tons, 1274 amended dams equal in an area of 18631acres producing 41784 tons, as well as paddy fields producing 326 tons and new species producing 443 tons (total 102575 tons). Additionally, we had 24124 tons of production in natural and semi-natural water resources that total figures of hydrothermal fish in 2011 was more than 126699. Production of such fish is done in most provinces of the country (27 provinces) showing talents and appropriate capabilities of these fish. It is noteworthy to mention that more than 90 percent of the production (93148 tons) is in four provinces including Mazandaran (37120 tons), Guilan (24276 tons), Khouzestan (20135 tons) and Golestan (11617 tons)(reports and documents of Iran Fisheries Organization, 2012, 10-years statistics letters of Iran Fisheries Organization, 2011).

Table 2 and 3 show production rate of hydrothermal fish in different sources of production plus natural and semi-natural water resources in 2009.

Table 2.Production of hydrothermal fish in different resources of production in 2009

Row	Type of Activity	Qt	Useful area(Acres)	Production rate (Ton)
1	Single	3717	12485	46350
2	Complex	179	2745	9720
3	Floodgate	1274	18631	41784
4	Reason and Purpose	3034	634	3952
5	Other (sturgeon, new species)	-	-	443
6	Natural and semi-natural water sources	-	-	24124
Total		8204	34493	126699

Table 3. Production of fish hydrothermal in resources of natural and semi-natural waters in Iran in 2009

Row	Name of Province	Production(ton)	Row	Name of Province	Production(ton)
1	East Azarbaijan	586	17	Qom	63
2	West Azarnaijan	3880	18	Kordestan	1400
3	Ardabil	912	19	Kerman	30
4	Isfahan	424	20	Kermanshah	800
5	Ilam	2735	21	Kohkiloyeh	330
6	Tehran	20	22	Golestan	350
7	Chaharmahal o Bakhtiari	156	23	Guilan	665
8	KhorasanRazavi	320	24	Lorestan	1608
9	Northern Khorasan	36	25	Mazandaran	300
10	Southern Khorasan	35	26	Markazi	25
11	Khouzestan	2900	27	Hormozgan	0
12	Zanjan	1010	28	Hamedan	456
13	Semnan	0	29	Jiroft	400
14	Sistan	4216	30	Yazd	13
15	Fars	350	Total		24125
16	Qazvin	105			

Advantages of Fish Farming

Considering population growth in the world, animal protein is much more important these days. Aquaculture farming has been recognized due to infinity of reasons as the most common and effective approaches to produce protein in the future world.

A) Consumption of Low Energy: Fish and other aquatics are poikilothermic and they consume no energy to adjust and fix temperature of the body and they have more growth talent comparing to other animals (excluding some species). Specific weight of fish body or other floating aquatics is roughly near to specific weight of water, so that fish don't need much energy to float and it uses the energy resulting from food for growing. Fish farming is mostly conducted in areas of 3 or 4 grades which are unused in agriculture or internal water like natural and artificial lakes, rivers, ponds and dams are used for fish farming and no disturbance will occur in agriculture.

B) Coefficient of low conversion and economic benefits: By using various methods for fish farming and considering different food diets in fish, in combined farming, all natural production of water are used which enhance production per unit area. Fish production cost is much cheaper than the cost of other animal proteins and also the cost of raising a certain amount of fish is far less than the cost of catching it from water resources.

C) Characteristics of Fish Farming: Farming fish should be fast-growing and obtain normal expected weight during farming process, being suitable with taste of people of the area and market-friendly and also they should be fed by cheap and artificial food along with consumption of natural food (Pak, 2007).

Methods and various approaches of hydrothermal fish farming

In general, the aforesaid hydrothermal fish (Chinese carp fish), are cultivated at the moment in various fields and sources of Iran as follows:

1. Single farms: these farms have specific ponds full of baby fish in an area of 5000 m, fattening ponds over one acre (1-2 acres) and sediment retention ponds, storage and sometimes washing ponds based on capacity of the farm and the land. Water resources consist of surface fresh water and ground water (including rivers, wells, streams, qanats). Average production of these farms varies due to various climates of different provinces (from 3-6 tons per acre) and production average of the country is about 4 tons per acre that this amount will get over 6 tons per acre using new methods and aeration of ponds' pond\s water.

2. Complex farms: complexes are constructed and designed equally or differently (in an area of 10 to 40 acres or more) and they utilize water resource, main water transmission network and common infrastructure facilities. Lands of these farms are mostly national lands that fisheries identify and initial studies and outline plus

construction of inlet and outlet water channels, drainage, pumping station from national and provincial funds are done there and they are granted to qualified applicants. Production performance of such farms varies from 3 to 5 tons due to different climates of provinces and average of the country's production is roughly 3 tons per acre that this amount can reach over 6 tons per acre using modern methods and aeration of ponds' water.

3. Double-purpose agricultural micro farms: these farms include dusty or concrete ponds of water storage for agriculture which are constructed in the epitome of canals and wells of agricultural water and in most cases, with little changes in their structures, fish farming is conducted over there. In such ponds, merely two species of fish (ordinary carp and herb-eater one) are cultured of fish who are fed with hand food due to withdrawal of water for agricultural activities and lack of fertility and enrichment of pond water.Average of production of the country was about 9 tons per acre.

4. Restored dam: in certain provinces including provinces of the northern part of Iran, natural and artificial water reservoirs are available for exploiting in agricultural activities that they will have capability of implement aquaculture farming including hydrothermal fish after restoration, dredging, construction of inlet and outlet valves and conversion to restored dam in order to optimal and multi-purpose use of such resources. The restored active dams in fish farming were 1274 cases in useful level of 18631 acre and production equal to 41784 tons.Rate of production in them was more than 1/5 tons and production average of the country was is about 2-3 tons per acre in 2010.

5. Paddy fields (Both rice and fish culture): this combined activity is to use optimally available water in paddy fields, increase farmers' income, pest control and finally increase rice production in slight area of the land (1m). In order to release baby fish, certain puddles with 1-5 m depth are dug and 1100 to 1400 baby fish with initial weight of 20to 50 grams gram of all four species by ordinary combination will be released.

In individual weight of harvest is about 600-750 grams gram and the final production in the acres is about 0/8 to 1 ton. Examples of this activity's advantage decrease of poisons consumption and fertilizers (Izadi *et al.,* 2010).

Research questions and hypotheses

This research intends to answer the following questions :

How are the recognized capitalization opportunities ranked (prioritized) in terms of strategy in aquaculture farming of Khouzestan fisheries?

To answer research's questions, the following research hypotheses have been determined.

Main hypothesis: The recognized scenarios of five-fold aquaculture farming have equal ranking (priority).

H_0*: the median of all variables are equal.*

H_1*: there are at least two variables that their medians median are not equal.*

Characteristics of each scenario are shown in Table 4.

Table 4.Characteristics of capitalization scenarios in aquaculture industry

Scenario	Scenario Description
Scenario 1	Construction and completion of large integrated aquaculture
Scenario 2	Production and reproduction of fish seller, hydrothermal, shrimp, ornamental fish, ...
Scenario 3	Construction export terminals
Scenario 4	Fish and shrimp waste recycling
Scenario 5	Fish farming behind dam of Shahid Abbaspour, Karoun 3, Dez Dam

Methodology

To compare and rank ranking components of "the identified scenarios" Freidman test is applied. Data analysis in area of SPSS software was done. Method of data collecting in this research is field research method. Namely, the researcher has collected data by visiting experts and aquaculture farmers personally.

Population and sample

The population of this research are all experts (experts of aquaculture) and aquaculture farmers (exploiters) or in other words word, managers of private sector in aquaculture of Khouzestan. To calculate sampling volume, Cochran formula is used for a confined population. Sampling method is categorized randomly so that each element of the population in organizational levels has a chance compatible with volume of that floor for selecting.

$$N=\frac{N * z^2 * p * q}{(N * d2) + (z2 * p * q)}$$

N: Population Volume; *n*: Sampling Volume

$Z_{\frac{\alpha}{2}}$ value of standard normal variable of corresponding unit with 95% confidence

P: Success proportion (proportion of the trait in the population).

q: Percentage of people who are without that trait
d: Tolerance (Sampling precision)
from table of standard normal possibilities of

$$\frac{\alpha}{2} = \% 2.5 \rightarrow Z_{\frac{\alpha}{2}} = \pm 1 / 96$$

In this research, tolerance which was the proportion of parameter's error and sampling is considered to be 9%. In order to better estimate the P value, for the experts (experts in aquaculture farming) is equal to 0/37 and for aquaculture farmers is also considered as 0/31.

544 / 203= 37/0 and1480 / 462 = 31/0

203 = number of experts of Aquaculture Department and 544= total number of personnel of Department of Fisheries Khuzestan

462 = number of aquaculture farmers of Khuzestan (hydrothermal fish, seller, ornamental and shrimps)

1480 = total number of aquaculture farmers of Iran (hydrothermal fish, seller, ornamental and shrimps)

Considering the mentioned formula, sample volume for experts was calculated 72 people and for aquaculture farmers 83.

Data analysis

To analyze data, Friedman test is used. Data in SPSS software area will be studied. Table 5, 6 and 7 show each status of respondents based on variables of gender, age, education and service background.

Table 5. Distribution of Respondents according to age (year)

Group	Age (year)	Gender	Frequency	Percentage
Experts	21-30	Male	19	36/5
		Female	19	95
	31-4F	Male	7	13/5
		female	1	5
	41-50	Male	21	40/4
		Female	0	0
	Over 51	Male	5	9/6
		Female	0	0
Aquaculture Farmer	21-30		18	21/7
	31-40		26	31/3
	41-50		20	24/1
	Over 51		19	22/9

Table 6.Distribution of experts per education level

Group	Education Level	Gender	Frequency	Percentage
Experts	Associate degree	Male	2	3/8
		Female	0	0
	Bachelor	Male	32	61/5
		Female	9	45
	Master	Male	17	32/7
		Female	10	50
	Doctorate	Male	1	1/9
		Female	1	5
Aquaculture	Diploma		28	33/7
	Associate Degree		4	4/8
	Bachelor		28	33/7
	Master		9	10/8
	Doctorate		2	2/4
	No response		12	14/5

Table 7.Distribution of respondents according to years of service (year)

Percentage	Frequency	Service background (year)	Group
61/ 1	44	1-10	
26/ 4	19	11-20	Experts
12/ 5	9	20-30	
56/ 6	47	1-10	
39/ 8	33	11-20	Aquaculture
3/ 6	3	20-30	

Table 8.Average Rating Components "Identified Scenarios" in Friedman test

Row	Variable	Ranking Mean
1	Construction and complement large complexes of aquaculture	3/34
2	Production and reproduction of fish seller, hydrothermal, shrimp, ornamental fish and....	3/15
3	Construction export terminals	3/06
4	Recycling waste of fish and shrimp	2/ 87
5	Fish farming behind Shahib Abbaspour dam, Karoon 3and Dez Dam	2/ 59

Table 9. Results of Friedman test on components "recognized scenarios"

Qt	Freedom rate	t	P-value
155	4	27/ 26	0/ 000

Results of Friedman test are also shown in table 8.

Considering that the value of significance is less than 0/05, we conclude the test was significant. Therefore, null hypothesis is rejected and we can conclude that the aforsaid variables are not related.

Subordinate hypothesis 1- scenario 1 is in the same rank with scenario 2.

Subordinate hypothesis 2- scenario 1 is in the same rank with scenario 3.

Subordinate hypothesis 3- scenario 1 is in the same rank with scenario 4.

Subordinate hypothesis 4- scenario 1 is in the same rank with scenario 5.

Subordinate hypothesis 5- scenario 2 is in the same rank with scenario 3.

Subordinate hypothesis 6- scenario 2 is in the same rank with scenario 4.

Subordinate hypothesis 7- scenario 2 is in the same rank with scenario 5.

Subordinate hypothesis 8- scenario 3 is in the same rank with scenario 4.

Subordinate hypothesis 9- scenario 3 is in the same rank with scenario 5.

Subordinate hypothesis 10- scenario 4 is in the same rank with scenario 5.

In order to test all above subordinate hypotheses, we use the test of Wilcoxon that its results are shown in table 10. Considering table 10, we observe that only significance level between production and reproduction of fish by construction of export terminals and recycling wastes and also between construction of export terminals and recycling wastes has become more than 0/05 and equality test between ranks in the three above mentioned cases, is accepted and in other cases, between ranks of variables, there are two significant differences. Then, to choose the effective variable on capitalization, methods of multi-criteria of ANP decision-making were used.

Table 10. Results of complimentary Wilcoxon test

Row	Testing Components		Number of ranking			P-Value
	Component 1	Component 2	Greater	Smaller	With same rank	
1	Construction in aquaculture complex	Production and reproduction fish	54	38	63	0/ 039
2	Construction inaquaculture complex	Construction export terminals	60	39	56	0/ 003
3	Construction inaquaculture complex	Waste recycling	61	30	64	0/ 001
4	Construction in aquaculture complex	Fish farming behind dams	73	37	45	0/ 000
5	Production and reproduction fish	Construction export terminals	48	39	68	0/ 635
6	Production and reproduction fish	Waste recycling	61	44	50	0/ 180
7	Production and reproduction fish	Fish farming behind dams	69	34	52	0/ 001
8	Construction export terminals	Waste Recycling	56	39	60	0/ 328
9	Construction export terminals	Fish farming behind dams	65	34	56	0/ 002
10	Waste recycling	Fish farming behind dams	65	41	49	0/ 035

Analysis of Network Processing (ANP)

A network analysis process is one of the multi-criteria decision making techniques and it is in not needed in the models series which can be compensated. This model was designed based on AHP and replaced "Network" with "hierarchy". An example of hypothesis of AHP is that the parts and upper branches of hierarchy are independent of the parts and lower levels. In most decision-makings, one cannot model elements of decision-making hierarchically and independently. Therefore, to solve such issues issue, different elements will be associated with each other and the technic of analysis of network processing is applied. In AHP , relationships between different decision levels of one-way decision-making are considered. The Major advantage of the aforesaid method is that various measurements are is done based on their relationships, not the hierarchy and considering complexity of different issues, better results should be taken. Although analysis of network processing also uses a relative measuring scale based on paired comparisons, a structure never imposes impose a hierarchy to the issue and decision-making issue models a systematic view with feedback.Although analytic network process uses a relative measurement scale based on paired comparisons, its ANP model contains control hierarchy, clusters, elements, mutual relationships between clusters and elements.

Results

In this research, 5 aquaculture capitalization opportunities have been identified that the matrix of paired comparisons of decision maker is as the following table (Table 11).

After construction of the model in Super decision program and matrix entry of paired comparisons, weight of criteria is gained as below. Prioritizing indexes of marketing strategy selection is shown based on combination of decision-making methods using ANP analysis network process and Super Decision software. As it is shown in table 12, criterion to construct and complement large complexes

of aquaculture farming by weight of 0/372 has the most importance and fish farming behind dams by relative weight of 0/075 was in the last priority. Inconsistency rate of comparisons has been obtained 0/0157; since it is less than 0/10, these comparisons are acceptable.

Table 11.Matrix of paired comparisons Index of Research

Selection of capitalization opportunities	Construction of Aquaculture Complexes	Production and reproduction of fish	Construc-tion of export terminals	Recycling waste of fish and shrimps	Fish farming behin dams
Construction of Large Aquaculture Complexes	1	1/651	2/48	3/03	4
Production and reproduction of fish seller, hydrothermal, shrimp, ornamental fish and		1	1/98	2/25	3
Construction of exports terminals			1	2/06	2/ 64
Recycling waste of fish and shrimps				1	1/ 89
Fish farming behind Shahid Abbaspour Damp, Karoon 3, Dez Dam					1

Table 12.Prioritizing indexes of selection of capitalization opportunities

Row	Criterion	Weight	Priority
1	Construction and complement large complex of aquaculture	0/ 372	1
2	Production and reproduction of fish seller, hydrothermal, shrimp, ornamental fish and	0/260	2
3	Construction export terminals	0/176	3
4	Recycling waste of fish and shrimp	0/114	4
5	Fish farming behind Shahib Abbaspour dam, Karoon 3and Dez Dam	0/075	5

Discussion and conclusion

Objective of the present research is to rank capitalization opportunities in aquaculture farming based on strategic views in Fisheries Organization of Khouzestan. In this research, a number of questionnaires questionnaire were distributed among two groups of 83 aquaculture farmers (exploiters) and 72 experts (aquaculture experts) using categorized random sampling in order to extract point of view of each category and compare opinions of experts and aquaculture farmers of Khouzestan fisheries. Data analysis method for ranking of capitalization opportunities was Friedman test.

Moreover, analysis network process was used to achieve matrix of paired comparisons of capitalization opportunities. Considering results of Freidman test, construction and complement of large aquaculture farming (scenario1) is top rated and production of fish behind ShahidAbbaspour dam, Karoon 3 and Dez dam (scenario 5) is the lowest rated in aquaculture field.

Three other scenarios of capitalization as production and reproduction of fish seller, construction of export terminals and recycling waste of fish and shrimp were respectively ranked second and fourth. Therefore, to experts and aquaculture farmers, construction and complement of large aquaculture farming complexes have the most attraction to absorb capital for the investors. As a matter of fact, considering scenarios ranking of capitalization based on attractiveness, the government could consider special facilities for these scenarios to encour-

age investors to invest. For instance, the government could encourage investors through tax break and long-term loans with low interest to conduct their own capital from the market intermediation to production and especially aquaculture industry.

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