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An investigation of factors affecting the educational needs of warm-water fish breeders in Sari using borich model

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ABSTRACT

The overall aim of this research was to investigate factors affecting the educational needs of warm-water fish breeders in Sari. This study was an applied, descriptive, and correlation research which was conducted using questionnaire survey. The study population consisted of 422 warm-water fish farmers in Sari. In this regard, the study population was estimated based on Cochran 196 formula and sampling was done by proportional stratified sampling method. To assess the educational needs of warm-water fish farmers, Borich model was used. The results of the Cronbach's alpha coefficient, ordinal Theta and combined reliability for the questionnaire were 0.816, 0.803 and 0.760, respectively. The mean of age and years of activity of warm-water fish farmers were 43.66 and 12.83 years, respectively. Moreover, their performances and incomes were 2.4 tons per hectare and 4362000 thousand Rials, respectively. The most appropriate educational methods and ways of getting information were warm-water fish breeders' discussions and meetings with each other and with the corresponding experts. In addition, the highest priority for social characteristics was warm-water fish breeders' Union membership. The results of multiple regression analysis on the effects of independent variables on educational needs of warm-water fish breeders indicated that 54.9 percent of educational needs variance of warm-water fish breeders in Sari was determined by seven factors including social characteristics, work experience, age, economic, performance, income, and use of facilities.

Keywords: Educational needs assessment, Borich Model, warm-water fish breeders, Sari

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INTRODUCTION

Identification and analysis of educational needs is a prerequisite for a successful educational system and determining educational needs is the first step in planning educational programs for the individuals [1]. Therefore, this paper deals with educational needs of warm-water fish farmers in Sari and offers a model since identification and analysis of educational needs is considered as a prerequisite for a successful educational system [2]. Since the current processes to determine educational needs are not often based on scientific and efficient patterns and models, this study utilized Borich model, which is a popular and efficient model among educational scientists, to determine and prioritize educational needs.

Generally, needs assessment is the study of the differences between the current situation and the desired situation [3]. Furthermore, "educational needs" means desirable changes that should take place in knowledge, skills, and behaviors of individuals so that they could be able to do their duties and responsibilities pertaining to their jobs acceptably, desirably, and according to the standards. Educational needs can be divided into two groups of overt and

covert in one aspect [4]. In this study, it was dealt with the educational needs of warm-water fish farmers in Sari because identification and analysis of educational needs is a prerequisite for a successful educational system [2].

Warm-water fish are those which have good nutrition and growth in the temperature above 15°. Cyprinidae are the most common warm-water fish which comprise 90 percent of freshwater fish [5]. In Iran, four species of Cyprinidae are farmed that include conventional, silver carp, bighead, and grass carp [6]. According to statistics, co-production of farming warm-water fish was about 13 percent i.e. 3 /387/918 of total global freshwater aquaculture. The rate of warm-water fish farming increased 9/5 percent globally [7]. Ten thousand one hundred eighty five tons of fish was daily sent to the consumer markets in Sari city. Last year, 7855 pieces of warm-water fish was produced in 91 fish farms under the Bureau of Fisheries of Sari. Sari shares 26 percent of aquaculture production in the province. One thousand employees work in fisheries sector in Sari [8]. Despite educational courses and classes, there are some educational needs and problems for warm-water fish farmers both in terms of participating in these courses and in terms of lack of education and updated information.

Much research has been done in terms of factors influencing the educational needs and the factors affecting it. Shafii [9] performed a study entitled as “The study of educational needs of rural women in the process of healthy milk production in traditional dairy farms in Bam” showed that there was a significant relationship between age, level of education, and experience of cattle ranching variables with the variable of educational needs of women ranchers in terms of healthy milk production. In terms of promoting variables, there was a significant positive relationship between the level of participation in training courses, visiting sample farms, and studying promoting journals with educational needs of cow owners in the field of healthy milk production.

Saburi and Omani [2] in a study entitled "Educational needs analysis of cotton growers from the viewpoint of agricultural promoting experts of Semnan province” concluded that there was a positive relationship between level of education, degree of interest in educational programs, degree of educational programs accomplishment, and amount of educational needs assessment according to experts’ attitudes in terms of the necessity of educational needs assessment in the field of cotton growing.

Panahi [10] in a research entitled “Determining the educational needs of apple growers in Oghlid, Fars” confirmed creation of proper educational fields and educational needs priority of individuals for holding educational-promoting courses by the responsible departments about proper planting and harvesting, diseases and pests, application of pesticides, use of nutritious, and storage.

Ansarifar [11] in a paper entitled “Review and identification of educational-promoting needs of kiwi growers in Mazandaran province (Tonekabon and Chalus Townships)” showed that the correlation coefficient indicated the existence of an inverse relationship between the independent variables of level of education, experience of kiwi planting, cultivation area, contact with agricultural staff, contact with promoters, use of educational and promoting classes, use of educational journals and publications, and observation of the other kiwi growers with the dependent variable of educational-promoting needs of kiwi growers. The results of individual independent variables on the dependent variable showed that gender, marital status, main occupation, ownership, and membership in kiwi growing cooperative had impact on educational needs, but supportive facilities had no effect on the level of educational needs.

Charmchian and Chizari [12] in a study entitled "The relationship between educational needs and characteristics of silkworm farmers in Gilan province" found a positive and significant relationship between the degree of communication, participation and getting scientific information from agriculture organization, procedures to obtain major and minor job information, type of berries garden ownership, membership of the Council, visiting berries gardens of other silkworm farmers, attending training classes and obtaining scientific information from radio, television, magazines and journals with educational needs of individuals in general field of silkworm farming.

Motamed et al., [13] in a study entitled "Educational Needs of tea growers in Gilan province" came to this conclusion that there was a meaningful relationship between age, use of communication channels, use of training and promoting classes, dependence on local leaders, use of television, radio, and promoting journals with educational needs of the tea farmers. In addition, regarding the Mann-Whitney test, there was a significant difference between needs of tea growers and participation in organizations and cooperatives. Moreover, there was a meaningful difference between the educational needs of tea farmers and participation in promoting activities.

In some studies, Pierre-andre et al [14] assessed educational needs of farmers in Cameron. The study was done by distributing questionnaires among fifty farmers where educational needs of farmers consisted of production of

planting materials, utilization of techniques, careful preparation of stimulation, and improvement of agricultural techniques. The results suggested that there was a significant difference between age, education, social status, and economic status with the educational needs expressed by farmers.

Chawang [15] in a research entitled "Educational needs of rice farmers in Nagaland" came to the conclusion that there was a significant relationship between personal characteristics, social characteristics, and economic characteristics with their educational needs, and there was a significant relationship between age and cultivation experience of respondents as well.

Adesoji et al., [16] in their study concluded that farmers need to be educated in cases such as chemical pest control, proper use of chemicals and plant nutrition. These needs had negative relationship with years of education and there was a significant positive relationship with family size, vastness of cultivated land and diversity of cultivation.

Ommani and Chizari [17] in a study assessed the educational needs of wheat farmers in Khuzestan province in terms of sustainable agriculture. In the study, researchers deemed educational needs assessment necessary for the development of educational programs. The study concluded that wheat farmers needed to be educated in the field of biological control, crop rotation, and green manure use.
Ghasemi and Hajimirrahimi [18] assessed educational needs of nomads utilizing Arasbaran dam watershed in the field of cattle breeding. According to the results, utilizers have low level of literacy so it's essential that their educational-extensional programs have been developed proportional to their literacy level.

The overall aim of this research was to investigate factors affecting the educational needs of warm-water fish breeders in Sari and the specific objectives of this research were:
- Review of theoretical principles regarding educational needs
- Identification and determination of various personal, social, economic, educational, and professional characteristics of warm-water fish breeders in Sari.
- Classification of educational needs of warm-water fish farmers using Borich model in Sari
- study of the impact of various factors on the educational needs of warm-water fish in Sari

MATERIALS AND METHODS

The research method used in this study can be investigated in various aspects. It is applicable in terms of objective because it seeks development of practical knowledge in a particular field and the obtained results can be applied in planning and decision making. In terms of data collection, this method is a descriptive research since it describes events and characteristics of the study population in a systematic, objective and accurate manner. Since it uses the correlation matrix to summarize data set, it is correlation and since it looks for statutory framework, it is a discovery method. In terms of the possibility of variables control, this study is a type of semi empirical research for the lack of variables control [19]. Proportional stratified sampling was used for this study.

To determine the validity of the questionnaire, opinions and suggestions of Agricultural Promoting faculty professors, researchers and Agriculture Organization experts of Mazandaran province were used and after the necessary modifications it was ensured that the proposed questions had the ability to measure the particular content and properties in the study.

To assess the validity of the prepared questionnaires, 30 versions of them were completed by warm-water fish farmers in Ghaemshahr as the preliminary research (Pilot test) then Cronbach's alpha, ordinal theta and combined reliability of the completed questionnaires were analyzed using SPSS and LISREL software and the results using Cronbach's alpha, ordinal theta and combined reliability for the questionnaire were 0.816, 0.803 and 0.760, respectively.

The study population consisted of 422 warm-water fish farmers in Sari. In this regard, the study population was estimated based on Cochran 196 formula and sampling was done by proportional stratified sampling method. To assess the educational needs of warm-water fish farmers, Borich model was used.

To rank and determine the competencies and educational needs, Mean Weight Discrepancy Score (MWDS) was calculated [20]. To this end, first the discrepancy score of each eligible was calculated individually (Equation 1) then the weight discrepancy score was calculated for each individual job competency (Equation 2). Finally, by summing weight discrepancy scores and dividing it by the number of different people, mean weight discrepancies scores were calculated (Equation 3) and 33 features were ranked according to MWDS.

Discrepancy Score = *I-C* (Equation 1)

Weight Discrepancy Score = *I (I-C)* (Equation 2)

Mean Weight Discrepancies Scores = $\Sigma I\ (I-C)/n$ (Equation 3)

In the above equations, *I* is Importance level, *C* is Competency level and *n* is number of warm-water fish farmers.

RESULTS

The results revealed that 100 percent of the subjects in the study were male, 82.7 percent of them were married, and the rest were single. The mean of age and years of activity of warm-water fish farmers were 43.66 and 12.83 years, respectively. Furthermore, their performances and incomes were 2.4 tons per hectare and 4362000 thousand Rials, respectively. On the use of supportive facilities (such as loans, agricultural inputs, equipments and facilities, etc.), 74 percent of warm-water fish farmers used supportive facilities. Regarding the membership in the warm-water fish farmers cooperative, 69.4 percent stated that they were members of warm-water fish farmers cooperative. The average number of subjects' participation in the educational courses was 2.08 times. According to Table 1, it was shown that discussions and meetings of warm-water fish farmers with each other and with corresponding experts, with 21 percent coefficient of variation, had the first priority.

Table 1. Prioritization of appropriate educational methods and resources to obtain information (n=196)

Appropriate training methods and sources to obtain information	M[1]	SD[2]	C.V[3]	R[4]
Discussions with other breeders and experts	3.55	0.75	21	1
Training by other warm-water fish farmers	3.42	0.82	23.85	2
Making use of educational magazines and extension journals	2.60	0.73	27.93	3
Providing practical training in fish farms	3.36	0.95	28.19	4
Meeting the fisheries experts in the office	3.94	1.12	27.47	5
Broadcasting Educational programs by radio	3.83	1.18	30.79	6
Broadcasting Educational programs by TV	3.38	1.06	31.42	7
Educational Visits from the best fish farms	3.25	1.05	32.44	8
Getting help from local heads and trustees	2.69	0.93	34.52	9
Fisheries experts' attendance in fish farms	2.70	1.22	45.12	10
Training through educational films and slides	1.92	0.89	46.43	11

1- Mean 2- Standard Deviation 3- Coefficient of Variation 4- Rank
Likert scale: Very Low (1), low (2), medium (3), much (4), very much (5)

According to Table 2, it was identified that focusing on financial problems from the samples' perspective and providing appropriate solutions by government agencies had the highest priority among the important economic factors with a variation coefficient of 19.73%.

Table 2. Prioritizing the important economic factors for warm-water fish farmers (n=196)

The important economic factors	M[1]	SD[2]	C.V[3]	R[4]
Focusing on financial problems and providing appropriate solutions by government agencies	3.50	0.69	19.73	1
Fulfilling the commitment made by the Government	4.16	1.03	24.85	2
Having easy access to banking credits and facilities	3.43	0.99	28.76	3
Providing the required supplies	3.49	1.10	31.59	4
The government plans to provide the needed supplies	3.33	1.24	37.19	5

1- Mean 2- Standard Deviation 3- Coefficient of Variation 4- Rank
Likert scale: Very Low (1), low (2), medium (3), much (4), very much (5)

Table 3. Prioritizing the social factors mentioned by the warm-water fish farmers (n=196)

Social factors	M[1]	SD[2]	C.V[3]	R[4]
Having membership warm-water fish farmers unions	3.81	1.07	28	1
Participating in storing the marketable warm-water fishes	3.49	1.04	29.62	2
Participating in sales	2.77	0.86	31.09	3
Participating in other fish farmers' social-religious ceremonies	3.14	0.99	31.56	4
Participating in rural cooperatives	3.28	1.05	31.92	5
Participating in projects to improve warm-water fish farmers	3.51	0.17	33.46	6
Participating in group works related to fish farming	2.73	1.01	36.98	7
Participating in the promotion and distribution procedures	2.82	1.35	81.4	8

1- Mean 2- Standard Deviation 3- Coefficient of Variation 4- Rank
Likert scale: Very Low (1), low (2), medium (3), much (4), very much (5)

Based on the fish- breeders' ideas, table 3 demonstrates that having union membership has the highest priority among social factors.

Considering Table 4, it can be seen that the highest priorities for warm-water fish farmers' training needs in Sari city were knowing how to identify the good and bad fingerlings, being familiar with environmental factors, knowing how to harvest fingerling and transfer them to winter farms, knowing how to prepare the farms to produce fingerlings and knowing how to conduct the soil tests for fish farms construction.

Table 4. Prioritizing the educational needs of warm-water fish farmers in Sari using Borich Needs Assessment Model (n=196)

Educational needs	Importance average*	Capability average**	Mean Weight discrepancies scores	Prioritizing
Knowing how to identify the good and bad fingerlings	3.82	2.46	6.07	1
Being familiar with environmental factors	3.94	2.56	5.42	2
Knowing how to harvest fingerling and transfer them to winter farms	3.36	2.01	5.33	3
Knowing how to prepare the farms to produce fingerlings	3.74	2.80	4.11	4
Knowing how to conduct the soil tests for fish farms construction	3.72	2.93	3.58	5
Having the awareness of parasites in fingerlings fish farms	2.91	2.13	2.68	6
Knowing how to supply the product (live, processed, fresh)	3.43	3.88	2.59	7
Being aware of the profit and loss	4.07	3.67	2.30	8
Having familiarity with water filling and supplying	2.2	2.22	2.14	9
Being familiar with transportation to the markets	3.48	3.04	2.08	10
Knowing the supply price and quantity	3.57	3.14	1.99	11
Being familiar with the process of farming the young fish to produce fingerlings	3.36	2.01	1.89	12
Knowing how to cultivate green plants	2.71	2.26	1.86	13
Having familiarity with different types of fertilizations during pool (farm) construction	3.21	3.02	1.81	14
Knowing how to identify healthy and unhealthy fishes	2.79	2.86	1.72	15
Being familiar with spring viremia in carps	2.36	2.13	1.42	16
Understanding the process and the procedures to harvest (catch) fish	2.32	2.06	1.40	17
Knowing the right time to harvest (catch) fish	2.76	2.56	1.36	18
Being familiar with the effects of lime application on warm-water fish farms	3.58	3.31	1.30	19
Knowing the essential points in the storage	2.51	2.46	1.09	20
Knowing the main methods of harvesting (catching) fish	2.22	2.08	1.03	21
Being familiar with carp pox disease	2.27	2.08	1.02	22
Knowing how to use the tools and equipment needed to harvest (catch) fish	2.15	2.81	0.98	23
Being familiar with the Saprolegnews disease	2.23	2.23	0.98	23
Being familiar with the Branshiomaikoz disease	2.30	2.24	0.96	24
Knowing how to fight the diseases	2.42	2.75	0.95	25
Being aware of the ways to prevent the loss of (product) fish	2.14	2.26	0.73	26
Familiarity with different types of fertilizations	2.27	2.52	0.49	27
Being familiar with bacterial septicemia disease	2.20	2.51	0.49	27
Knowing the drainage operations	3.19	3.25	0.49	27
Having the knowledge of advertising and distribution	3.09	3.22	0.20	28
Understanding how to plow and dig the pool bed	2.25	3.12	-0.24	29
Knowing how to identify and monitor the consumers' needs	3.27	2.75	-0.46	30
Knowing the sales locations	2.23	3.79	-0.65	31
Knowledge of the distance to the place of sale	3.20	3.72	-0.71	32
Knowing how to dry the pool at the end of a period	2.14	3.29	-0.86	33

** and **: Likert scale: Very Low (1), low (2), medium (3), much (4), very much (5)*

The results of Mann-Whitney test are shown in Table 5. It is witnessed that there was a significant difference in educational-extensive needs of fish farmers who had access to the warm-water fish farmers' cooperatives and those fish farmers who had not such an opportunity. Union membership also affected on the training needs of warm-water fish farmers. Moreover, there was a significant difference between those fish farmers who used the supportive facilities and others that did not have access to the given facilities in terms of educational-extensive needs.

Table 5. Comparing the warm-water fish farmers' training needs based on the independent variables in Sari

Independent variable	U	Z	Sig
Cooperatives existence in the region	1579.000	-2.343	0.019
Membership in the cooperative	2952.500	-3.081	0.002
The use of support facilities	1744.000	-5.607	0.000

The warm-water fish farmers' training needs are influenced by various elements of which 54.9 percent of the training needs of warm-water fish farmers' variance in Sari is illustrated by seven factors of social characteristics, working record, age, economic factors, performance, income and the use of facilities (Table 6).

Table 6. Warm-water fish farmers' educational needs Multiple Regression in Sari

Model	Unstandardized Coefficients		Standardized Coefficients	t	sig
	B	Std. Error	Beta		
1(Constant)	1.539	1.030	-	-	-
Social characteristics	-1.151	0.150	-0.423	-7.659	0.000
Working record	-0.099	0.020	-0.420	-4.856	0.000
Age	0.047	0.016	0.254	3.012	0.003
Economic factors	0.488	0.134	0.194	3.656	0.000
Performance	0.436	0.128	0.178	3.18	0.001
Income	-0.007	0.003	-0.129	-2.334	0.021
The use of facilities	0.449	0.223	0.110	2.014	0.045

R= 0.752 *R^2= 0.565* *Adjusted R Square= 0.549* *F= 34.936* *sig = 0.000*

CONCLUSION AND DISCUSSION

The average age range of the warm-water fish breeders was 43.66 years which shows they are middle aged. Regarding the best educational strategies in obtaining the needed information from the fish farmers' perspective, the discussion sessions with the experts and other fish farmers and also training provided by other warm water fish farmers were the first and second most important resources, respectively. Therefore, it is necessary to create more connections and partnerships among the warm-water fish farmers to attend training classes.

The most important educational needs of the warm-water fish farmers in Sari include knowing how to identify the good and bad fingerlings, being familiar with environmental factors, knowing how to harvest fingerling and transfer them to winter farms, knowing how to prepare the farms to produce fingerlings and knowing how to conduct the soil tests for fish farms construction. Therefore, it is recommended that warm-water fish farmers be taught on these subjects.

The regression results showed that age as an important factor plays an important role on the educational needs of warm-water fish farmers. Researched conducted by Shafii [9] and Motamed et al. [13] showed that there is a significant relationship between age and educational needs which is consistent with the present study results. So according to the warm-water fish breeders' age, we should measure their educational needs, that is, the younger they are, the higher their educational needs must be.

Warm-water fish farmers' working record also has direct effect on the educational needs of fish farmers, that is, the higher the warm-water fish farmers' working record , the lower their need to the educational programs. The results of the researches done by and Shafii [9] show that there is an inverse relationship between working experience and the educational needs which is in line with the current study results. So fish breeders' educational needs should be measured based on their working record, i.e., those with less experience need more training and more training should be planned for them.

The regression results showed that fish breeders' performance as an important factor plays an important role on the educational needs of warm-water fish farmers. Based on the results of the study, it is necessary that the people with less education have more training to meet their educational needs.

Income, as another factor related to the educational needs, plays an important role on the educational needs of the warm-water fish breeders. Study conducted by Charmchian and Chizari [12] showed that there is a relation between income levels and educational needs of the fish farmers which confirms the present study results.

The results from the Mann- Whitney test on the mean differences of the fish farmers needs to the educational programs that used or did not use the supportive facilities revealed the fact that there was a significant difference between the two groups on their needs to educational and extensive programs. There is also a significant difference between the two groups in terms of presence or absence of warm-water fish farmers' cooperative in the region and their educational and extension needs. The results from the Mann- Whitney test on the mean differences of the fish farmers needs to the educational programs that were the members or were not the members of the cooperatives revealed the fact that there was a significant difference between the two groups on their needs to educational and extensive programs. Motamed et al. [13] believed that there was a significant difference between training needs of the tea farmers and participation in cooperatives. Therefore, the development of warm-water fish breeders' cooperatives should be considered and fish farmers should be encouraged to join such cooperatives.

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