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Information Need of the Farmers in Practicing Aquaculture in Dinajpur District

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Abstract

The purposes of this study were to (i) determine and describe the information need of the farmers in aquaculture practices, (ii) explore the relationship of the selected characteristics of the farmers with their information need in aquaculture practices, and (iii) determine the contributing factors to the information need of the aquaculture farmers. Data were collected from randomly selected 110 farmers from six villages of Sadar, Chirirbondor and Biral upazila of Dinajpur district. Eleven selected characteristics of the farmers were considered to explore relationship with the information need in aquaculture practices. The regression analysis was run to identify the contributing factors that have effects on farmers' information need in aquaculture practices. The findings revealed that the majority of the farmers (62.7 percent) had medium extent of information need while 22.7 percent had low needs and 14.5 percent had high extent of information needs in practicing aquaculture. The 'identification of good quality fish species' was the first ranked information needs of the aquaculture farmers followed by 'selection of disease free seed and species', 'recommended dose of insecticides, pesticides and aqua-drugs, and so on. Among eleven selected characteristics of the respondents, age, educational qualification, extension media contact, aquaculture knowledge and attitude towards aquaculture had positive significant relationship, while annual income from aquaculture sources had negative significant relationships with their information need in practicing aquaculture. Educational qualification of the fish farmers had found the highest predictive power to their information needs in practicing aquaculture followed by aquaculture knowledge, income from aquaculture sources and age.

Keywords: Aquaculture farmer, information need, aquaculture practice, Dinajpur

Introduction

Bangladesh is the fourth largest fish producing country in the world (FAO, 2014). Aquaculture resources play a vital role in improving the socio-economic condition, combating malnutrition, earning foreign currency and creating employment opportunities in the country. Fish production contributes 3.69% to the gross domestic products (GDP), 2.01% to the export earnings and supply about 60% of the animal protein to the nation (DOF, 2015). Aquaculture enjoyed an impressive growth rate of more than 9% (DOF, 2010) in Bangladesh compared to the slower growth of capture-fisheries is due to a variety of factors including habitat loss as a result of agricultural intensification, urbanization, environmental degradation, pollution and overexploitation of resources.

Aquaculture has the potential to address the malnutrition and poverty issues in Bangladesh. The culture, also known as aqua-farming, is the farming of aquatic organisms such as fish, crustaceans, mollusks and aquatic plants commonly practiced by the farmers. It also covers the rearing process to enhance production, such as regular stocking, feeding, protection from predators, etc. and the ownership of the individual or corporate of the stock being cultivated (FAO, 2014). Pond culture represents the mainstay of aquaculture in Bangladesh, accounting for 85.8% of total recorded production and 57.7% of the area under culture

(DOF, 2010). In Dinajpur, 17% of the ponds were seasonal and 83% of them were perennial (Saha, 2003).

The abundance of small ponds is higher in northern region of the country (Saha, 2004) and has more relative operational facilities than larger ones but due to lack of adequate information, the aquaculture farmers are not able to maximize their productivity. Again, only the production of culture-fisheries can be increased than capture-fisheries by proper initialization of inland water bodies. To increase the fish production level different modern aquaculture technologies has large potentiality since technology transfer is fully dependent on information type to enhance the production of aquaculture. Therefore, it is necessary to know about the information need for the aquaculture practice.

Several improved technologies and innovations have been developed by different research organizations in fisheries sector in Bangladesh. But these technologies will be unused until the ideas are communicated properly to the farmers who are the ultimate users of the technologies. For this reason, it is necessary to make available specific information to acquire necessary knowledge and skills in different aspects of improved aquaculture. Considering the above issues the present study was undertaken to identify the information needs of the farmers in practicing aquaculture in Dinajpur district. The specific objectives of this study were: i) to determine the information needs of the farmers in practicing aquaculture; ii) to determine selected characteristics of the aquaculture farmers, the selected characteristics were age, educational qualification, family size, farm size, pond size, annual family income, annual income from aquaculture sources, organizational participation, extension media contact, aquaculture knowledge and attitude towards aquaculture; iii) to determine the relationships between the selected characteristics of the farmers with their information needs in practicing aquaculture; and iv) to determine the contributing factors of the farmers to their information needs in practicing aquaculture.

Methodology

Locale, Population and Sampling Design

The present study was done in Dinajpur district of Northern region of Bangladesh. Dianjpur was selected purposively as the aquaculture practice is very common and extensive compared to other districts of the region. Multi-stage random sampling technique was used to select the population and sample. In first stage, three upazilas out of 13 upazilas of Dinajpur district were selected randomly including, Dinajpur Sadar, Chirirbandar and Biral upazila. One union from each of these three upazilas were selected randomly in the second stage, and then two villages from each of the selected unions were selected randomly including Ranigong, Purbopargao, Basudevpur, Lokkhipur, Noyamela and Noyapara as locale of the study. The total number of aquaculture farmers in these six villages was 372 which constituted the population of the study. An updated list of this population (sample frame) was prepared with the help of respective upazila fisheries office. Then the sample size was determined by a mathematical formula given by Miller and Brewer (2003) as:

$$n = N/\{1 + N(\alpha^2)\}$$

Where N is the sample frame, n is the sample size and α is the margin of error (fixed at 8%). The sample size, n becomes;

$$n = \frac{372}{\{1 + 372(0.08)^2\}} \cong 110$$

A simple proportion formula was then used to calculate for the number of farmers who were interviewed in each selected operational village. One hundred and ten aquaculture farmers were randomly selected from the sample frame which constituted the sample for this study. A reserve list of 10 farmers was also made in order to use in case of unavailability of the sampled farmers.

Data Collection

A structured interview schedule was prepared for data collection containing both open and closed form of questions which were pre-tested with 10

farmers selected from the study area. Data were collected from 05 May to 05 July 2015.

Measurement of Focus Issue

The information need of the aquaculture farmers considered as the focus issue of this study. For measuring the information need, twenty eight most frequently mentioned (during pre-testing of the interview schedule) information need items were included in the questionnaire covering six dimensions of aquaculture viz: pond management; water quality management; selection of quality seed, species and their stocking density; feeding and nutrient management of pond; insects and diseases control; and harvesting, fish preservation and marketing of product. During interview the farmers were asked to give opinion on the selected twenty eight items along with their extent of perceived need. A 4-point rating scale was used for computing the extent of information needs of a farmer which was assigned in the following way: 0, 1, 2 and 3 for no, low, medium and high respectively. The weight of responses of each items for all the respondents were summated together to obtain information needs scores. So, total score of each respondent for this variable could range from 0 to 84, where 0 indicated 'no information needs' and 84 indicated 'high information needs' of the farmers in practicing aquaculture. The information needs index (INI) for each of the twenty eight items was also measured using the following equation:

$$\text{Information needs index (INI)} = \left\{\frac{H \times 3 + M \times 2 + L \times 1 + N \times 0}{300}\right\} \times 100$$

Where: H, M, L and N stand for "High", "Medium", "Low" and "Not at all" respectively.

Measurement of Selected Characteristics

The selected personal characteristics were measured following the standard scoring techniques collected from different journals and MS theses of agricultural extension.

Data Processing and Analysis

The collected data were coded, compiled, tabulated and analyzed for interpretation. Different descriptive statistical measures such as frequency, number, percentage, mean, standard deviation and rank order was used for categorization and describing the variables. Karl Pearson's Product Moment Correlation coefficient (r) (Pearson, 1895) was used for testing the relationship between the concerned variables. Nevertheless, the correlation analysis only indicates direction of relationship of selected variables with farmers' information need for practicing aquaculture but cannot show their influences quantitatively so that multidimensional nature of knowledge can be explained. So, regression analysis (both enter and stepwise method) was run to explore the effect of explanatory variables (selected characteristics) on farmers' information need for practicing aquaculture. Thus the influential factors were identified that have effects on farmers' information need for practicing aquaculture. It helps to reveal highest coefficient of determination (R), that is, amount of change of focus issue by the selected variables.

Results and Discussion

Characteristics Profile of the Aquaculture Farmers

Eleven personal characteristics of the aquaculture farmers were selected to describe the characteristics profile of the aquaculture farmers. Categorical distribution of these characteristics is given in Table 1.

Data presented in the Table 1 show that the mean age of the aquaculture farmers was found 37.23 years and more than half of them were young aged. All of the respondents were found educated with a varying extent of primary level to higher secondary level. The average family size of the respondents was found high compared to national average of 4.6 (BBS, 2012). Majority of the respondents belonged to have small to medium farm sized category. The average pond size of the aquaculture farmers was found 0.45 hectare. Majority of the respondents fell under the category of low income, and the average annual income from aquaculture was 91.58 thousand taka. The organizational participation of the

aquaculture farmers was found very dissatisfactory as majority of them had low participation in different organizations. Extension media contact of the respondents was found satisfactory; this might be due to the fact that, sample farmers received extension services from upazila fisheries offices and different local extension personnel. Vast majority of the respondents had medium to high aquaculture knowledge. The lion portion of the respondents had favorable attitude towards the aquaculture practices and very low portion has neutral and no respondents had unfavorable attitude.

Table 1: Characteristics profile of the respondent aquaculture farmers

Characteristics (measuring unit)	Possible range (observed* range)	Respondents (N = 110)			Mean	Standard deviation
		Category	No.	%		
Age (year)	Unknown (19-72)	Young (1-35)	53	48.2	37.23	11.66
		Middle aged(36-50)	46	41.8		
		Old (above 51)	11	10.0		
Educational qualification (year of schooling)	Unknown (2-17)	Primary (1-5)	19	17.3	10.45	3.98
		Secondary (6-10)	47	42.7		
		Higher secondary and above (above 11)	44	40.0		
Family size (number)	Unknown (1-15)	Small family (1- 4)	34	30.9	5.53	2.24
		Medium family (5-6)	56	50.9		
		Large family (above 6)	20	18.2		
Farm size (hectare)	Unknown (0.01-5.47)	Landless(below0 .02)	2	1.8	1.36	1.07
		Marginal (0.02-0.2)	5	4.5		
		Small (0.2-1)	48	43.6		
		Medium (1-3)	46	41.8		
		Large (above 3)	9	8.2		
Pond size (hectare)	Unknown (0.00-2.83)	All sample	110	100.0	0.45	0.57
Annual family income (‘000’ Taka)	Unknown (7-700)	Low income (up to 200)	64	58.2	222.33	187.36
		Medium income (201-400)	25	22.7		
		High income (above 400)	21	19.1		
Annual income from aquaculture (‘000’ Taka)	Unknown (0-500)	All sample	110	100.0	91.58	121.23
Organizational participation (score)	Unknown (0.00-105)	Low (below 36)	105	95.5	6.84	18.66
		Medium (36-70)	1	0.9		
		High (above 70)	4	3.6		
Extension media contact (score)	0-36 (1-23)	Low (1-3)	18	16.4	8.65	5.25
		Medium (4-14)	80	72.7		
		High (above 14)	12	10.9		
Aquaculture knowledge (score)	0-25 (10-25)	Low (below 15)	15	13.6	18.95	4.05
		Medium (15-23)	83	75.5		
		High (Above 23)	12	10.9		
Attitude towards aquaculture (score)	12-60 (33-59)	Unfavorable (below 25)	0	0.0	47.05	5.51
		Neutral (25-36)	03	2.7		
		Favorable (above 37)	107	97.3		

Information Need of the Farmers in Practicing Aquaculture

Information need of the farmers in practicing aquaculture is the main focus of the present study. Twenty-eight (28) items of information needs were selected to measure the extent of information needs of the farmers in practicing aquaculture. The overall information needs and item wise information need of the aquaculture farmers are presented in Table 2 and Table 3, respectively.

Overall Information Need of the Farmers in Practicing Aquaculture

The total score of information needs could range from 0 to 84, while observed scores ranged from 5 to 84 with an average of 54.72 and standard deviation of 20.53. Based on their information needs scores the respondents were classified into three categories (considering mean ± standard deviation as the basis of categorization) as presented in Table 2. The highest proportion (62.7 percent) of the aquaculture farmers had medium extent of information needs while 22.7 percent had low and 14.5 percent had high extent of information needs in practicing aquaculture. It was also observed in the study area that the aquaculture farmers were having strong desire for practicing aquaculture but they had lack of knowledge and insufficient information about the expected activities in aquaculture. Thus, the respondents logically felt information needs in practicing aquaculture.

Table 2: Distribution of the aquaculture farmers according to their overall information need

Categories	Respondents (n = 110)		Mean	Standard deviation
	Number	Percent		
Low information need (below 35)	25	22.7	54.72	20.53
Medium information need (35-75)	69	62.7		
High information need (above 75)	16	14.5		
Total	110	100.0		

Item wise extent of information need of the farmers in practicing aquaculture

There were twenty eight items covering six dimensions of aquaculture practice used for measuring the extent of information needs of aquaculture farmers. The item wise percent distribution of the aquaculture practices are presented in Table 3. The top three ranked information need of the aquaculture farmers are, 'identification of good quality fish species' followed by 'selection of disease free seed and species' and 'recommended dose of insecticides, pesticides and aqua-drugs'. The least three ranked information need are, 'highest water level of flood during last 10 years' followed by 'interval period of water changing' and 'methods of post-harvest preservation'.

Relationships between the Selected Characteristics of the Farmers and Their Information Need

Pearson's Product Moment Coefficient of Correlation (r) was computed in order to explore the relationships between the selected characteristics of the farmers and their information needs and the results are presented in Table 4.

Among the nine selected characteristics five, namely age, educational qualification, extension media contact, aquaculture knowledge and attitude towards aquaculture showed positively significant relationships with the farmers' information need in practicing aquaculture. Therefore, farmers having older age, high educational attainment, more extension media contact and favorable attitude towards aquaculture had more information need in practicing aquaculture. This might be due to the fact that, all these factors develop the insight and broaden the horizon of outlook, which might help farmers to build their knowledge base and they seek more information to develop this knowledge base. On the other hand, annual income from aquaculture sources had negative significant relationships with the information need in practicing aquaculture indicating farmers with low income from aquaculture sources have high

Information need of the farmers in practicing aquaculture

Table 3: Item wise percentage distribution of information need of the farmers in practicing aquaculture

Items of information need	Percentage of farmers (n = 110)				INI	Rank order
	No	Low	Medium	High		
Identification of good quality fish species	8.2	7.3	14.5	70.0	82.1	1
Selection of disease free seed and species	10.9	9.1	16.4	63.6	77.57	2
Recommended dose of insecticides, pesticides and aqua-drugs	5.5	20.9	12.7	60.9	76.33	3
Proper doses and time of feed application	6.4	14.5	27.3	51.8	74.83	4
Availability of insecticides/pesticides and aqua drugs in market	8.2	11.8	34.5	45.5	72.43	5
Doses and time of fertilizer application	10.9	16.4	19.1	53.6	71.80	6
Recommended dose of lime	12.7	11.8	24.5	50.9	71.17	7
Presence of undesirable weeds and predatory animals	13.6	10.0	26.4	50.0	70.93	8
Optimum level of acidity, alkalinity and Oxygen	14.5	8.2	29.1	48.2	70.33	9
Water holding capacity of soil	6.4	15.5	42.7	35.5	69.13	10
Disinfection fingerling before stocking	14.5	13.6	31.8	40.0	65.73	11
Optimum level of water in pond	12.7	14.5	35.5	37.3	65.8	12
Time and method of harvesting	13.6	16.4	30.0	40.0	65.47	13
Productivity of water in pond (Greenness)	16.4	12.7	29.1	41.8	65.43	14
Stocking density of fish species	20.0	9.1	27.3	43.6	64.83	15
Source of water during dry season	13.6	16.4	32.7	37.3	64.57	16
Sources of water supply	19.1	9.1	30.9	40.9	64.53	17
Optimum pond size for fish culture	16.4	11.8	34.5	37.3	64.23	18
Forecasting about upcoming disasters (like flood, drought, disease infestation, etc.)	17.9	18.0	24.5	39.6	61.93	19
Ways of early marketing system	20.0	14.5	25.5	40.0	61.83	20
Availability of hatchery	25.5	6.4	26.4	41.8	61.53	21
Optimum level of water temperature	15.5	15.5	42.7	26.4	60.03	22
Acclimatization of fingerling with pond water environment	20.9	14.5	28.2	36.3	59.94	23
Optimum temperature during conditioning	24.5	10.0	33.6	31.8	57.53	24
Sloping ratio of dyke	14.5	27.3	41.8	16.4	53.37	25
Methods of post-harvest preservation	31.8	7.3	32.7	28.2	52.43	26
Interval period of water changing	23.6	20.9	37.3	18.2	50.03	27
Highest water level of flood during last 10 years	27.3	22.7	34.5	15.5	46.07	28

information need. This might be due to the fact that, farmers with low income from aquaculture sources try to increase their income level from the same, thus try to seek more information regarding production of aquaculture.

Factors Contributing to Farmers' Information Need in Practicing Aquaculture

In order to find out the relative contribution of independent variables to the farmers' information need in practicing aquaculture, multiple regression analysis was computed. Out of eleven

variables, six variables were included in regression analysis due to their significant values in correlation analysis. The different independent variables had their own units of measurement that did not permit a comparison of the unstandardized regression coefficient values. For this reason a standardized regression coefficient values also computed to avoid the problems of different units of measurement.

The values of multiple determination coefficients (R^2) for all the six independent variables jointly explained 52.9% of variation in the information need in practicing aquaculture (Table 5). The observed t value for regression coefficient was significant in case of age, educational qualification, income from aquaculture sources and aquaculture knowledge. For reaching an optimum model of prediction, analysis of selected independent variables with the information need in practicing aquaculture only significantly contributed variables to the information need were included in the stepwise multiple regression analysis (Table 6).

Table 4: Relationships between the selected characteristics of the farmers and their information needs in practicing aquaculture

Focus variable	Selected characteristics	Correlation coefficient (r) with 108 d.f.
Information need in practicing aquaculture	Age	0.270**
	Educational qualification	0.574**
	Family size	0.149
	Farm size	0.182
	Pond size	-0.058
	Annual family income	-0.167
	Annual income from aquaculture sources	-0.290**
	Organizational participation	0.138
	Extension media contact	0.248**
	Aquaculture knowledge	0.515**
	Attitude towards aquaculture	0.260**

**Significant at 1% level of probability.

Table 5: Contributing variables to explain the information need in practicing aquaculture (N=110)

Variables entered	Unstandardized coefficient (B)	Standardized coefficient (Beta)	(% contribu-tion)	t value	F value
Age	0.359	0.204	52.9	2.810***	21.41***
Educational qualification	2.384	0.462		6.032***	
Annual income from aquaculture sources	-0.054	-0.320		-4.656***	
Extension contact	-0.312	-0.080		-0.974	
Aquaculture knowledge	1.704	0.336		4.028***	
Attitude towards aquaculture	-0.162	-0.043		-0.491	

Constant = -0.583; R^2 = 0.745; Adjusted R^2 = 0.529; *** = Significant at 0.01% level of significance.

According to multiple regressions analysis among the four variables, educational qualification of the aquaculture farmers contributed 32.3% in predicting their information need in practicing aquaculture while aquaculture knowledge contributed only 9.7%, income from aquaculture sources and age contributed 8.7% and 2.7%, respectively.

Information need of the farmers in practicing aquaculture

Table 6: Summary of stepwise multiple regression analysis showing contributing variables to information need in practicing aquaculture (n=110)

Mo-del	Variable entered	Unstand-ardized coefficient (B)	Standar-dized coefficient (Beta)	Adjusted R^2	R^2 Change (% contribution)	t value	F value
1	Constant + Educational qualification	2.285	0.443	0.323	32.3	-6.245 ***	53.095***
2	Constant + Educational qualification + Aquaculture knowledge	1.530	0.302	0.420	9.7	4.151***	40.523***
3	Constant + Educational qualification + Aquaculture knowledge + Annual income from aquaculture sources	-0.054	-0.319	0.507	8.7	-4.847 ***	38.344***
4	Constant + Educational qualification + Aquaculture knowledge + Annual income from aquaculture sources+ Age	0.319	0.181	0.534	2.7	2.671***	32.204***

*** = Significant at 0.1% level of significance.

The results revealed that educational qualification and aquaculture knowledge of the farmers increased their information need in practicing aquaculture. This might be due to the fact that, these two factors broaden the horizon of outlook of an individual. Thus, farmers might seek more information on aquaculture practices. Age might also contribute in the same way to the information need. But income from aquaculture sources contributes negatively as the farmers with low income from aquaculture sources might try to acquire more information to increase the production efficiency and thereby increase their income from aquaculture.

Conclusions

The majority of the farmers had medium to high information needs in practicing aquaculture. These farmers need to be supported with their demanded information for making successful aquaculture programs. Educational qualification was positively correlated with their information needs in practicing aquaculture which indicates the eagerness of the educated farmers to improve their aquaculture production practices. Education makes a person more progressive, innovative and broadens his/her horizon of outlook. So, there should be effective educational program in the study area for providing adequate functional literacy to the aquaculture farmers. The overwhelming portion of the aquaculture farmers had medium to low level of aquaculture knowledge. For this reason, they were not completely able to improve their farming systems. Again, farmers with high aquaculture knowledge had high information need. Thus, the concerned agencies should undertake effective aquaculture programs in order to enhance the aquaculture knowledge of the farmers. The relatively aged farmers need to be given much emphasis as they seek more information. The extension media contact of the aquaculture farmers showed significant positive relationship with their information needs about practicing aquaculture. Extension helps the farmers to be more experienced, modernized and become

effective motivator. All of these increase their eagerness for seeking more information in practicing aquaculture. Comprehensive, effective and improved information should be provided on the above mentioned spheres to the aquaculture farmers of Dinajpur district through District or Upazila Fisheries offices under the Department of Fisheries. Similar studies may be conducted in other areas of the country to generalize the findings. Research should be undertaken particularly to identify the further factors causing hindrance to expected level in practicing aquaculture and to explore the potentialities to overcome the hindrances.

References

BBS. 2012. *Statistical Yearbook of Bangladesh*. Bangladesh Bureau of Statistics, Government of the People's Republic of Bangladesh, Dhaka.

DOF, 2010. *Fisheries Statistical Yearbook of Bangladesh*, Department of Fisheries, Ministry of Fisheries and Livestock, Ramna, Dhaka.

DOF, 2015. National Fish Week 2015 Compendium (in Bengali). Department of Fisheries, Ministry of Fisheries and Livestock, Dhaka, p.133.

FAO, 2014. The State of World Fisheries and Aquaculture 2014: Inland waters capture: major producer countries. Food and Agriculture Organization of the United Nations, Rome, p. 18.

Miller, R. L. and J.D. Brewer. 2003. *A – Z of Social Research*. London: SAGE Publication Ltd.

Pearson, K. 1895. Notes on Regression and Inheritance in the Case of Two Parents. Proceedings of the Royal Society of London. 58, pp. 240-242.

Saha, M.K. 2003. A Study on Fish Production Technology in North-West Bangladesh. *M.S. Thesis*, Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh, Bangladesh.

Saha, S.K. 2004. Socio-economic Aspects of Aquaculture in Tangail Sadar Upazila. *M.S. Thesis*, Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh, Bangladesh.