Knowledge of Fish Growers about Fish Culture Practices

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ABSTRACT

The study was conducted in Dakshin Dinajpur district of West Bengal. It was found that majority of the fish farmers (50.8%) had the medium level of knowledge regarding scientific fish culture practices. The highest extent of knowledge was observed in manure application in the fish pond (90.8%) and lowest was observed in recommended stocking rate in composite fish culture (16.7%). Majority of fish farmers were middle aged and younger group category. Overall education level is medium that is, primary and middle school level. Majority of fish farmers possessed low to medium level of experience in fish farming. Majority of farmers belonged to medium level of innovative proneness, risk orientation, economic motivation, and value orientation. Most of the farmers belonged to low level of credit orientation. Majority of fish farmers exhibited medium level of mass media participation extension agency contact while their cosmopoliteness was low.The path analysis indicated that innovative proneness was the most potent variable in effecting the knowledge of fish farmers positively. It is necessary to increase innovative proneness, extension agency contact and mass media participation by the means of organising awareness campaigns, field days, demonstrations, exhibitions, krishan gosti, krishan mela etc. enabling farmers to accrue latest knowledge on scientific fish culture practices.

Key words: *Fish farmers; Scientific fish culture practices; Knowledge; Composite fish culture; Innovative proneness;*

Fish has long been an important source of food for people all over the world. The importance of fish as a source of high quality, balanced and easily digestible proteins is well understood. The fish production of the country has increased eight times from 0.75 million tons in 1950 to over 6.4 million tons at present. At the same time the share of inland fisheries has gone up from 29 per cent to over 50 per cent. Aquaculture in India is seen as an attractive option for enhancing fish production at a stage when there has been stagnation of growth from open water fisheries. Fresh water aquaculture continues to contribute a giant share of over 95 er cent of the total aquaculture production in terms of quantity. This has increased the national average productivity from the ponds and tanks to the present level of 2200 kg/ha, an over two folds growth in the last two decades (*Sagrangi and Jena, 2005*). A gamut of technologies over the years have largely contributed to such a vast growth in the sector.

In India, West Bengal had been playing a significant role with regard to fish culture since time immemorial due to its vast inland aquatic resources. The present fish production is about 11.7 lakh tons but there is a scope to increase the production level. Low fish production in the State can be attributed to several reasons. However, knowledge of the fish farmers on scientific fish culture is the single largest known factor responsible for low fish production.

Knowledge about scientific fish culture plays a very important role in the adoption of scientific technologies. Knowledge is a component of the behaviour of an individual. To improve the adoption of scientific fish culture under village conditions it is necessary to assess the knowledge of the fish farmers. This would form a base for the future extension efforts. Keeping these facts in view, the present investigation was carried out with the following objectives:

1. To measure the extent of knowledge on scientific fish culture practices.
2. To find out the direct and indirect effects of selected independent variables on knowledge.

METHODOLOGY

The present study was carried out using *ex post facto* research design during 2005-06 in the purposively selected Dakshin Dinajpur district of West Bengal. A combination of purposive and systematic random sampling procedures was employed. The District was purposively selected as it has vast and diverse inland fishery resources ideally suited for taking up scientific fish culture. Among the eight development blocks, four blocks namely Balurghat, Kumarganj, Tapan and Gangarampur were selected for the study in the consideration of the preponderance of fish farmers among the population. In the four selected blocks, three villages each were selected by simple random sampling technique. In total, twelve villages served as the representing unit for the study. A list of fish farmers were prepared in the selected villages. The fish farmers in the selected villages which formed the universe were stratified on the basis of the number of fish farmers. Number of fish farmers from each village were selected by using proportionate stratified random sampling technique. A total 120 fish farmers comprising proportionate number from each village constituted the respondents for the study.

Knowledge was measured by using a teacher made knowledge test. In the knowledge test, there were 41 questions. One score was assigned for each correct response. Thus maximum obtainable score of knowledge was 41, where as minimum could be zero and extent of knowledge was calculated by the following formula.

$$\text{Extent of knowledge} = \frac{\text{No of correct responses}}{\text{Total number of items}} \times 100$$

Based on a thorough review of relevant literature and discussion with the experts in the subjects, a total of 23 independent variables having some bearing on the dependent variables were identified for inclusion in the study. These independent variables represented socio-personal, socio-economic, communicational, psychological and situational variables of the respondents and were empirically measured by procedures evolved for the purpose, and also by using scales and scoring procedures developed earlier. The data were collected with the help of structured and pre tested interview scheduled developed for this purpose from the respondents through personal interview.

RESULTS AND DISCUSSION

Majority of fish farmers were middle aged and younger group category. Overall education level is medium that is, primary and middle school level. Majority of fish farmers possessed low to medium level of experience in fish farming. Majority of fish farmers belonged to low social participation, small land holding and high income group as they have other source of income. Agriculture was an important primary occupation followed by fish culture. Majority of respondents perceived fish culture as secondary occupation.

Majority of farmers belonged to medium level of innovative proneness, risk orientation, economic motivation, and value orientation. Most of the farmers belonged to low level of credit orientation. Majority of fish farmers exhibited medium level of mass media participation extension agency contact while their cosmopoliteness was low.

Majority of ponds were medium sized, low to in water holding and rainfed. Most of the ponds were infested with weeds and the extent of weed infestation was low to moderate.

In the present study knowledge was operationalised as the extent to which information is possessed by the respondents about the specific items of recommended scientific fish culture practices in the study area.

a) Knowledge level of fish farmers regarding scientific fish culture practices : The findings presented in Table 1 revealed that out of 120 fish farmers, majority i.e. 61 (50.8%) of fish farmers had medium level of knowledge whereas 33 (27.5%) had high level of knowledge, followed by 26 (21.7%) with low level of knowledge.

The above findings are in line with those of *Meeran (1983), Mahendra Kumar (1996), Awasthi et al (2000),* who also reported that majority of fish farmers were having medium level of knowledge related to fish

Table 1. A quantified brief account of Socio-personal, Socio-economic, Communication Psychological, Situational characteristics of fish farmers

S. No.	Variable	Fish farmers	
		No.	%
A.	*Socio-personal variable*		
1.	Age		
	Young (>30 years)	44	36.7
	Middle (31 to 45 years)	57	47.5
	Old (46 years and <)	19	15.8
2.	Caste		
	General	70	58.3
	SC	39	32.5
	ST	11	9.2
3.	Family size		
	Small family (< 5 members)	60	50
	Large family (>5 members)	60	50
4.	Family type		
	Nuclear	66	55
	Joint	54	45
5.	Education		
	Illiterate	5	4.2
	Can read and write	10	8.2
	Primary school	34	28.3
	Middle school	38	31.7
	Secondary school	17	14.2
	Higher secondary	11	9.2
	Graduation	5	4.2
6.	Fish farming experiences		
	Low (> 2 years)	55	45.8
	Medium (3 to 6 years)	53	44.2
	High (7 years and <)	12	10.0
B.	*Socio-economic variables*		
7.	Occupation		
	Main occupation	29	24.2
	Secondary occupation	91	75.8
8.	Annual income		
	Up to Rs. 0.11 lakh	8	6.67
	Rs. 0.11 lakh to Rs 0.22 lakh	22	18.33
	Rs. 0.22 lakh to Rs 0.33lakh	10	8.33
	Above Rs 0.33 lakh	80	66.67
9.	Size of land holding		
	Up to 2 acres	74	61.66
	2 to 5 acres	26	21.67
	More than 5 acres	20	16.67
10.	Social participation		
	Low social participation	55	45.8
	Medium social participation	47	39.2
	High social participation	18	15
11.	Possession of fishing equipment		
	No fishing equipment	49	40.8
	Having fishing equipments	71	59.2
C.	*Communication variables*		
12.	Mass media participation		
	Low	45	37.5
	Medium	51	42.5
	High	24	20.0
13.	Extension agency contact		
	Low	32	26.7
	Medium	67	55.8
	High	21	17.5
14.	Cosmopoliteness		
	Low	49	40.8
	Medium	29	24.2
	High	42	35.0
D.	*Psychological variable*		
15.	Innovative proneness		
	Low	36	30.0
	Medium	50	41.7
	High	34	28.3
16.	Credit orientation		
	Low	49	40.8
	Medium	42	35.0
	High	29	24.2
17.	Value orientation		
	Low	37	30.8
	Medium	56	46.7
	High	27	22.5
18.	Risk orientation		
	Low	35	29.2
	Medium	61	50.8
	High	24	21.0
19.	Economic motivation		
	Low	36	30.0
	Medium	49	40.8
	High	35	29.2
E.	*Situational variable*		
20.	Size of water body		
	Up to 0.318 ha	16	13.33
	0.319 ha to 0.862 ha	79	65.83
	Above 0.862 ha	25	20.84
21.	Duration of water availability		
	Short and medium	64	53.3
	Long seasonal	56	46.7
22.	Source of water		
	Rain water	114	95
	Canal	0	0
	Both rain and canal	6	5
23.	Extent of weed infestation		
	Completely chocked	0	0
	Moderate extent	36	30.0
	Low extent	43	35.8
	No weeds	41	34.2

culture practices. It is known fact that education is the basic requirement which widens the knowledge of an individual to expose him to various media and information sources. It can be interpreted from these figures that there is a scope to endow these respondents from medium knowledge category to high score category. Keeping in view the need to improve the fishermen's socio economic condition, both the policy makers and extension functionaries should make adequate use of various teaching methods effectively like demonstration, field day, On-farm testing, exhibition, film show, educational tour, campaigns, farm clinic, seminar, workshop and information communication technology like radio, TV, different audio visual aids and internet, etc. for raising the level of knowledge on different aspects of scientific fish culture together with marketing and cultural practices.

Table 2. Distribution of respondents based on their level of knowledge of fish farmers towards scientific fish culture (N= 120)

Category	No.	%	Mean	SD
Low	26	21.7	74.22	11.8
Medium	61	50.8		
High	33	27.5		

b) Knowledge level of fish farmers regarding specific recommended scientific fish culture: Perusal of Table 2 indicates that a high percentage of fish farmers had correct knowledge regarding suitable soil for fish culture (85.8%), necessity of liming of fish ponds (90%), need for manuring in fish ponds (90.8%), need for use of common organic manures in fish culture (86.7%), names of Indian Major Carps (85%), necessity of eradicating excess aquatic weeds (78.3%), names of some aquatic weeds (75.8%), need for control of predatory and weed fish (80.8%), names of predatory and weed fishes (75.8%), the fact that fish grows well in weed infested ponds (77.5%) and necessity of supplementary feeds(77.5%).

Further, the range of knowledge of fish farmers on different items was 50 - 65%. The knowledge level on varied issues were remedies for acidic condition of pond water (62.5%), correct dose of lime (54.2%), advantages of manuring (57.5%), dose of organic manure to be applied (62.5%), need for use of inorganic fertilizer(60%), name of the exotic carps (50.8%), fastest growing major carp and exotic carps (65%), species combination in composite fish culture (60%), ideal size of fish seed for stocking (58.3%), recommended manuring schedule to be practised after stocking (62.5%), feeding method (54.2%), water quality management(necessity to stop manuring and feeding) (61.7%), names of the fish disease (54.2%) and disease control method (51.7%).

However, it is clear from the table that majority of fish farmers lacked correct information on knowledge items pertaining to minimum depth of water, nutrients required for production of fish food, advantages of using inorganic fertilizers, names of piscicides, application of mohua oil cake, method of eradication of predatory and weed fishes, the optimum size of harvesting, harvesting period and the necessity of checking growth.

The table reveals that only a few farmers had knowledge about correct feeding rate of supplementary feed (17.5%) and recommended stocking density of different fish species (16.7%).

Thus, it can be concluded that though fish farmers are aware of routine and general practices, they lack adequate knowledge on scientific fish farming. The reason may be low education, lack of adequate scientific curriculum in training programme and poor communication characteristics. More or less similar findings were reported by *Praveena (1993)* with respect to rate of application of manures, fertilizers and diseases.

Path analysis: The path analysis presented in Table 3 indicated that innovative proneness was the most potent variable in effecting the knowledge of farmers positively. The directed effect (0.3613) of this variable was highest. Indirectly it was exerting its influence through mass media participation, extension agency contact and risk orientation. Incidentally this variable was being used by as many as ten variables in exercising their indirect influence, which indicate its significant role on knowledge. Next in order of importance was extension agency contact, which had 0.4202** correlation coefficient, 0.2217 direct effect and 0.2403 indirect effect on the knowledge of farmers. Its total indirect effect was channelised through mass media participation, innovative proneness and economic motivation. This variable is being utilized by nine variables to exert their indirect influence. It is quite logic to assume that those farmers who had more extension agency

Table 3. Knowledge level of fish farmers regarding specific items of recommended scientific fish culture

S. No.	Practices	Responses (yes)	
		No.	%
A	*Pre-stocking practices*		
1.	Good soil type for fish culture	103	85.83
2.	Minimum depth of water required for fish culture	24	20
3.	Nutrients required for production of natural fish food organisms in fish pond	46	38.3
4.	Use of lime in fish culture	108	90
5)	Correction in acidic condition of fish culture pond / tank	75	62.5
6)	Recommended dosage of lime used in general	65	54.2
7)	Use of manure the fish culture ponds	109	90.8
8)	Advantages of manuring fish culture pond	69	57.5
9)	Name of some common organic manures used in fish culture	104	86.7
10	Rate of application of cow dung (including initial dose and subsequent monthly doses)	75	62.5
11.	Days interval in between manure application stocking of fish seed	35	29.2
12.	Use of inorganic fertilizers in addition to organic manures in fish culture	72	60
13.	Advantages of using inorganic fertilizer	32	26.7
14.	Necessity to eradicate excess aquatic weeds	94	78.3
15.	Name some aquatic weeds	91	75.8
16.	Desirability of predatory and weed fishes	97	80.8
17.	Mention any two predatory and two weed fishes.	91	75.8
18	Manual method of eradication / control of predatory and weed fishes	45	37.5
19.	Name any piscide used in fish culture	35	29.2
20.	Recommended dosage of mohua oil cake or bleaching powder	32	26.7
B	*Stocking practices*		
21.	Name three Indian major carps	102	85
22.	Name three exotic carps	61	50.8
23.	The fastest growing major carp and exotic carp	78	65
24.	Catla and silvercarp are surface feeders. Rohu is a column feeder Mrigal feeds on bottom vegetation		
C	*Common carp is omnivorous*	42	35
25.	Type of fish grows well in weed infested ponds	93	77.5
26.	Recommended rate stocking for irrigation tanks when CFC is practiced	20	16.7
27.	The recommended species combination for composite fish culture 3 SSP – 400 C : 300 R : 300 M (or 300 CC) 4 SSP – 300 C : 250 R : 150 M : 300 CC 6 SSP – 150 C : 250 R : 100 M : 200 SC : 100 GC : 200 CC	72	60
28.	The ideal size of fish seed for stocking	70	58.3
D	*Post stocking practices*		
29.	Necessity of supplementary feeding	92	76.7
30.	Name the commonly used supplementary feeds.	93	77.5
31.	Best method of feeding	65	54.2
32.	Rate of supplementary feeding	21	17.5
33.	Time of manuring after stocking	96	80
34.	The recommended manuring schedule to be practiced after stocking	75	62.5
35.	Indicators of oxygen depletion in fish pond	97	80.8
36.	Necessary to stop manuring and feeding when pond water turns greenish	74	61.7
37.	Name any fish disease that occurs in fish culture ponds	65	54.2
38.	Control disease outbreaks	62	51.7
39.	Necessary to check the growth after stocking	57	47.5
40.	In general, after how many months of stocking should the fish crop be harvested	42	35
41.	The optimum size of harvesting	45	37.5

Table 4. Path analysis of selected independent variables with knowledge of fish farmers towards scientific fish culture practices

Variables	Correlation coefficient	Direct effects	Rank	Total indirect	Rank	Variables through which substantial indirect effects are effec channeled through		
						I	II	III
Socio-personal								
X5 Education	0.3150	0.1161	5	0.1954	12	0.1284 (X15)	0.0899(X13)	0.0618(X12)
X6 Fish farming experience	0.3295	0.1049	6	0.2246	11	0.1453(X13)	0.0463(X15)	0.0340(X14)
Socioeconomic								
X8 Annual income	0.2407	0.0410	10	0.2371	10	0.1015 (X15)	0.053(X12)	0.037(X13)
X9 Land holding	0.2027	0.0423	9	0.2501	6	0.0704(X15)	0.042(X17)	0.037(X19)
X10 Social participation	0.2831	0.0432	8	0.2406	8	0.0775(X13)	0.065(X15)	0.035(X14)
Communication								
X12 Mass media participation	0.3771	0.1240	4	0.2470	7	0.0385(X13)	0.0214(X15)	0.0112(X18)
X13 Extension agency contact	0.4202	0.2217	2	0.2403	9	0.1160(X12)	0.0597(X15)	0.00485(X19)
X14 Cosmo-politeness	0.4312	0.0529	7	0.4823	2	0.2390(X15)	0.1238(X13)	0.0582(X12)
Psychological								
X15 Innovative proneness	0.5160	0.3613	1	0.2847	5	0.1471(X12)	0.0534(X13)	0.0494(X18)
X17 Value orientation	0.4920	0.1794	3	0.3654	4	0.1943(X13)	0.1137(X12)	0.0597(X15)
X18 Risk orientation	0.5127	0.0235	12	0.4221	3	0.1278(X15)	0.0.0617(X12)	0.0540(X5)
X19 Economic motivation	0.4093	0.007	13	0.5004	1	0.2272(X18)	0.1310(X13)	0.0529(X10)
Situational								
X23 Extent of weed infestation	0.1963	0.034	11	0.1885	13	0.0576(X10)	0.0528 (X19)	0.0264(X14)

Residual effect : 0.4593

contact would like to acquire more knowledge on scientific fish culture practices. Mass media participation was positively correlated and contributing significantly to the variation in knowledge. Its direct effect (0.1240) and total indirect effect (0.2470) influence was found to be additive. This showed that farmers who had more exposure to mass media such as radio, television, newspaper etc. are likely to acquire more knowledge on scientific fish culture practices.

CONCLUSION

On the whole it may be concluded that majority of the respondents (50.8%) of the study area were having medium level of knowledge on scientific fish culture. It is worth to increase innovative proneness, extension agency contact and mass media participation. Hence, it is suggested that technology dissemination system must focus on these variables by organising awareness campaigns, field days, demonstrations, exhibitions, krishan gosti, krishan mela etc. enabling farmers to accrue latest knowledge on scientific fish culture practices. In order to improve the process of reorienting the fishery extension system and to provide technical and input support to the farmers to enhance knowledge, the authorities should arrange to formulate and monitor visit schedule of extension officials along with introduction of a system of evaluation at apex level.

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