

## Extent of Knowledge of Fish farmers about Scientific Fish culture Practices in North 24 Parganas of West Bengal, India

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### ABSTRACT

Fish has occupied an important place in the global food basket as a safe and cheap source of animal protein with high consumer acceptability. The study was conducted in North 24 Parganas district of West Bengal. The present investigation was desirable to measure the extent of knowledge on scientific fish culture practices and to find out the direct and indirect effect of selected independent variables on knowledge. These independent variables were empirically measured by procedures evolved for the purpose, and also by using scales and scoring procedures developed by earlier researchers study. The data were collected with the help of structured and pre tested interview scheduled developed for this purpose from the respondents through personal

**Key words:** Scientific fish culture, knowledge, fish farmer

interview. 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 the names of some aquatic weeds (95.83%), and lowest was observed in the minimum depth of water required for fish culture and the time gap required between manure application and stocking of fish seed (26.67%). The path analysis indicated that innovative proneness was the most potent variable in effecting the knowledge of fish farmers positively. Hence, it was suggested that technology dissemination system must be focused on these variables by organising awareness campaigns, field day, demonstration, exhibitions, krishan gosti, krishan mela etc.

### INTRODUCTION

Fish has long been an important source 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 from 0.75 million tons in 1950 to over 6.4 million tons at present, an over 8 fold increased. At the same time the share of inland fisheries has gone up from 29% to over 50% [1]. Aquaculture in India is seen as an attractive option for enhancing fish production at a stage. Where there has been stagnation of growth from open water fisheries. Fresh water aquaculture continuous to contribute a giant share over 95% of the total aquaculture

production in terms of quantity. This has increased the national average productivity from the ponds and tanks to a present level of 2200 kg/ha, an over 2 folds growth in the last two decades [2]. A host of technology over the years have largely contributed to such growth in the sector. West Bengal has been playing a significant role in regard to fish culture since time immemorial. West Bengal possesses 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 of the State can be attributed to several reasons. However knowledge of the fish farmers on scientific fish culture is the single largest factor responsible for low fish production. Knowledge about scientific fish culture plays a very important role in the adoption of scientific fish culture. Knowledge as a component of the behaviour of an individual. To improve the adoption of scientific fish culture under village condition it is necessary to know the knowledge of fish farmer so that knowledge could be used effectively with an appropriate economic viability.

Keeping these facts in view the present investigation was desirable the following objectives –

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

### **MATERIALS AND METHODS**

The present study was carried out using ex post facto research design during 2005-2006 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 Amdanga, Hasnabad, Habra-I and Habra-II 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 was 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 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. The knowledge was measured by using teacher made knowledge test. In the knowledge test, there were 41 questions. The score for each correct answer was arranged one and zero for incorrect answer. Thus maximum obtainable score of knowledge was 41, where as minimum could be zero and extent of knowledge was calculated by following formula.

$$\text{Extent of knowledge} = \frac{\text{No of correct responses}}{\text{Total no. of knowledge item}} \times 100$$

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 by earlier researchers study. 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**

In the present study knowledge was operationalised as the extent to which understood information 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 finding presented in table-1 revealed that out of 120 fish farmers majority i.e. 61 (50.8%) have medium level of knowledge whereas 43 (35.8%) have a high level of knowledge, followed by 31 (25.9%) with a low level of knowledge. The above findings are in line with those of Anonymous [3, 4, 5, 6] who also reported that majority of fish farmers having medium level of knowledge related to fish culture practices. It could be interpreted from these figures that there was no scope to convert the respondent from medium knowledge category to high score category.

#### **b) Knowledge level of fish farmers regarding specific recommended scientific fish culture**

Perusal of the table-2 indicates that a more or less high percentage of fish farmers have precise knowledge of scientific fish farming in such vital matters or item as the names of some aquatic weeds (95.83%), the need for the use of common organic manures in fish culture (95.83%), the necessity of liming of fish ponds (95%), the need for manuring in the fish ponds (95%), the names of Indian Major Carps (95%), the nature of the soil suitable for fish culture (94.17%), the need for the control of predatory and weed fish (94.17%), the necessity for eradicating excess aquatic weeds (92.5%), names of predatory and weed fishes (90.83%), the indicators of oxygen depletion in the pond (87.5%), the necessity of supplementary feeds (86.67%), the names of fish diseases (86.67%), the manuring schedule recommended to be practiced after stocking (85%), knowledge about the remedies for acidic condition of pond water (81.67%), the correct dose of lime (77.5%), the dose of organic manure to be applied (80.0%), the correct species combination in composite fish culture (77.5%) and water quality management ( involving necessity to stop manuring and feeding beyond a certain level) (72.5%).

Further, the level of correct knowledge of fish farmers in general, in respect of different items of fish farming varies from item to item, though ranging from slightly above 50 percent to nearly seventy per cent. For instance, the level in question varies as follows for certain items: advantages of manuring (68.33%), feeding method (67.5%), disease control method (65%), names of the exotic carps (62.5%) fastest growing major carp and exotic carps (59.17%), ideal size of fish seed for stocking (55.83%), the optimum size of harvesting (55.83%), need for the use of inorganic fertilizer(54.17%) and method of eradication of predatory and weed fishes (54.17%).

However, it is clear from table that the majority of the fish farmers lack correct information about such important matters as the knowledge items pertaining to nutrients required for production of fish food organism, the names of fish growing well in weed infested ponds, the advantages of using inorganic fertilizers, the names of piscicides, application of mohua oil cake harvesting period, the minimum depth of water required for fish culture, the time gap required between manure application and stocking of fish seed, the correct feeding rate of supplementary feed and the necessity of checking growth. Thus, it can be concluded that though fish farmers are aware of routine and general practices, the scientific fish farming are poorly understood. The reason may be low education, lack of adequate scientific curriculum in training programme, poor communication characteristics. More or less similar findings were reported by Anonymous [7] with respect to rate of application of manures, fertilizers and diseases. Anonymous [4] reported correct knowledge on pond management and pond preparation issues which involved scientific aspects by 38 to 58 per cent of respondents

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

### CONCLUSION

It may be concluded from the above study that majority of respondent (50.8%) 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 was suggested that technology dissemination system must be focused on these variables by organising awareness campaigns, field day, demonstration, exhibitions, krishan gosti, krishan mela etc. So that farmers may be able to accrue latest knowledge on scientific fish culture practices.

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**Table 1 Distribution of respondents based on their level of knowledge of fish farmers towards scientific fish culture n=120**

Category	Frequency	%	Mean	SD
Low	31	25.9	77.5	12.5
Medium	46	38.3		
High	43	35.8		

**Table 2: Knowledge level of fish farmers regarding specific items of recommended scientific fish culture n=120**

Sl. No.	Practices	Response category (yes)	
		Frequency	Percentage
1.	What kind of soil is good for fish culture ?	113	94.17
2.	What is the minimum depth of water required for fish culture ?	32	26.67
3.	What are the nutrients required for production of natural fish food organisms in fish pond ?	58	48.33
4.	Is it necessary to use lime in fish culture ?	114	95
5)	How do you correct acidic condition of fish culture pond / tank ?	98	81.67
6)	Do you know the recommended dosage of lime used in general ?	93	77.5

Sl. No.	Practices	Response category (yes)	
		Frequency	Percentage
7)	Should we have to manure the fish culture ponds ?	114	95
8)	What are the advantages of manuring fish culture pond ?	82	68.33
9)	Name some common organic manures used in fish culture	115	95.83
10	Do you know the rate of application of cow dung (including initial dose and subsequent monthly doses) ?	96	80
11.	How many days before of stocking of fish seed manure should be applied ?	32	26.67
12.	Is it necessary to use inorganic fertilizers in addition to organic manures in fish culture ?	65	54.17
13.	What are the advantages of using inorganic fertilizer ?	44	36.67
14.	Is it necessary to eradicate excess aquatic weeds ?	111	92.5
15.	Name some aquatic weeds	115	95.83
16.	Do you feel predatory and weed fishes are desirable in fish culture pond ?	113	94.17
17.	Mention any two predatory and two weed fishes known to you.	109	90.83
18	What in the manual method of eradication / control of predatory and weed fishes ?	65	54.17
19.	Name any piscicide used in fish culture	57	47.5
20.	Do you know the recommended dosage of mohua oil cake or bleaching powder ?	51	42.5
21.	Name three Indian major carps	114	95
22.	Name three exotic carps	75	62.5
23.	Which is the fastest growing major carp and exotic carp ?	71	59.17
24.	Catla and silvercarp are surface feeders. Rohu is a column feeder Mrigal feeds on bottom vegetation Common carp is omnivorous	65	54.17
25.	Which fish grows well in weed infested ponds?	58	48.33
26.	What is recommended rate stocking for irrigation tanks when CFC is practiced?	86	71.67
27.	Do you know 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	93	77.5
28.	What is the ideal size of fish seed for stocking ?	67	55.83
29.	Whether supplementary feeding is necessary in CFC?	104	86.67
30.	Name the commonly used supplementary feeds.	111	92.5
31.	What is the best method of feeding ?	81	67.5
32.	Generally supplementary feeding is provided at	46	38.33
33.	After stocking, once in how many days should manuring be done ?	87	72.5
34.	Do you know the recommended manuring schedule to be practiced after stocking?	102	85
35.	Do you know the indicators of oxygen depletion in fish pond ?	105	87.5
36.	Is it necessary to stop manuring and feeding when pond water turns	87	72.5

Sl. No.	Practices	Response category (yes)	
		Frequency	Percentage
	greenish?		
37.	Name any fish disease that occurs in fish culture ponds	104	86.67
38.	How do you control disease outbreaks ?	78	65
39.	Is it necessary to check the growth after stocking ?	47	39.17
40.	In general, after how many months of stocking should the fish crop be harvested ?	56	46.67
41.	What should be the optimum size of harvesting ?	67	55.83

**Table 3: Path analysis of selected independent variables with knowledge of fish farmers towards scientific fish culture practices n=120**

Variable code	Variables	Correlation coefficient	Direct effects	Rank	Total indirect effect	Rank	variables through which substantial indirect effects are channeled through		
							I	II	III
<b>Socio-personal variables</b>									
X5	Education	0.3150	0.1161	5	0.1954	12	0.1284 (X <sub>15</sub> )	0.0899(X <sub>13</sub> )	0.0618(X <sub>12</sub> )
X6	Fish farming experience	0.3295	0.1049	6	0.2246	11	0.1453(X <sub>13</sub> )	0.0463(X <sub>15</sub> )	0.0340(X <sub>14</sub> )
<b>Socioeconomic variables</b>									
X8	Annual income	0.2407	0.0410	10	0.2371	10	0.1015 (X <sub>15</sub> )	0.053(X <sub>12</sub> )	0.037(X <sub>13</sub> )
X9	Land holding	0.2027	0.0423	9	0.2501	6	0.0704(X <sub>15</sub> )	0.042(X <sub>17</sub> )	0.037(X <sub>19</sub> )
X10	Social participation	0.2831	0.0432	8	0.2406	8	0.0775(X <sub>13</sub> )	0.065(X <sub>15</sub> )	0.035(X <sub>14</sub> )
<b>Communication variable</b>									
X12	Mass media participation	0.3771	0.1240	4	0.2470	7	0.0385(X <sub>13</sub> )	0.0214(X <sub>15</sub> )	0.0112(X <sub>18</sub> )
X13	Extension agency contact	0.4202	0.2217	2	0.2403	9	0.1160(X <sub>12</sub> )	0.0597(X <sub>15</sub> )	0.00485(X <sub>19</sub> )
X14	Cosmopolitaness	0.4312	0.0529	7	0.4823	2	0.2390(X <sub>15</sub> )	0.1238(X <sub>13</sub> )	0.0582(X <sub>12</sub> )
<b>Psychological variable</b>									
X15	Innovative proneness	0.5160	0.3613	1	0.2847	5	0.1471(X <sub>12</sub> )	0.0534(X <sub>13</sub> )	0.0494(X <sub>18</sub> )
X17	Value orientation	0.4920	0.1794	3	0.3654	4	0.1943(X <sub>13</sub> )	0.1137(X <sub>12</sub> )	0.0597(X <sub>15</sub> )
X18	Risk orientation	0.5127	0.0235	12	0.4221	3	0.1278(X <sub>15</sub> )	0.0.0617(X <sub>12</sub> )	0.0540(X <sub>5</sub> )
X19	Economic motivation	0.4093	0.007	13	0.5004	1	0.2272(X <sub>18</sub> )	0.1310(X <sub>13</sub> )	0.0529(X <sub>10</sub> )
<b>Situational variable</b>									
X23	Extent of weed infestation	0.1963	0.034	11	0.1885	13	0.0576(X <sub>10</sub> )	0.0528 (X <sub>19</sub> )	0.0264(X <sub>14</sub> )

Residual effect: 0.4593