Adoption Behaviour of Fish Farmers in Relation to Scientific Fish Culture Practices in West Bengal

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ABSTRACT

The present study was carried out during 2005-2008 in the purposively selected Dakshin Dinajpur district of West Bengal focused on the factors influencing adoption behaviour of fish farmers towards scientific fish culture practices. The data were gathered using a structured and pre tested interview schedule from 120 randomly selected fish farmers. The findings revealed that majority (74%) of fish farmers belonged to medium to high adoption category. The adoption behaviour of fish farmers towards scientific fish culture practices was positively and significantly influenced by the factors like, occupation, annual income, land holding, extent of weed infestation, social participation, mass media participation, extension agency contact, cosmopoliteness, innovative proneness, value orientation, risk orientation, economic motivation, knowledge about scientific fish culture practices and negatively by their age.

Key words: *Adoption behaviour; Scientific fish culture; Fish farmers;*

Fish has occupied an important place in the global market as a safe and cheap source of animal protein with high consumer acceptability. West Bengal has been playing a significant role in regard to fish culture since time immemorial. Fish being one of the main food items, the demand for fish is very high in the state. The present annual fish production is about 11.70 lakhs tones- and the state incidentally is the highest consumer of fish. The contribution of West Bengal to the total production of the country is about 18.28 percent while the contribution of West Bengal to total consumption of fish food is about 28.57 percent. There is a gap in between supply and demand.

The adoption was considered as one of the consequences of the innovation, decision process, a decision to adopt an innovation or technological invention which had not essentially been the only terminal stage in the innovation decision process. Adoption of any improved technology involves a process in which awareness is created, attitude are changed and favorable conditions for adoption are provided. Adoption of innovation is the dynamic as well as the interactive process to accomplish the needs of the farmers as well as to revive national economy. Scientific fish culture involves stocking and growing two or more compatible and complementary fish species like, Indian Major Carps (IMC) and exotic carps in a water body like pond to maximize the fish production by fullest utilization of all available niches in the pond ecosystem.

The principle behind the scientific fish culture is to produce maximum quantity of fish per unit area from a scientifically managed water body by stocking fast growing, economically important, compatible species having shortest food chain utilizing the all ecological niches of the water body. Though fish culture is an age old practice in West Bengal, but the adoption behaviour of fish farmers about scientific fish culture practices is not known. In fact, hardly any systematic research has done to explore these areas. Keeping in view the dearth of such studies especially in West Bengal, the present study was under taken with the following objectives:

1 To ascertain the adoption behaviour of fish farmers towards scientific fish culture.

2 To determine the factors affecting the adoption behaviour of the fish farmers with regard to scientific fish farmers

3 To bring out the relationship of socio economic and psychological characteristics of fish farmers with attitude and adoption behaviour towards scientific fish culture.

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 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. Numbers 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 dependent variable, adoption behaviour of fish farmers towards scientific fish culture, was quantified by using a partial adoption technique suggested by *Sinha and Kolte (1974)* with necessary modification and adoption quotient developed by *Sengupta (1967)*. Based on a thorough review of relevant literature and discussion with the experts in the subjects, a total of 24 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

The distribution of respondents based on their level of adoption about scientific fish culture practices was shown in Table 1. Majority of respondents (74%) belonged to medium to high category of adoption and the remaining to low adoption category. Thus, it implied that majority of the fish farmers of the study area adopted the scientific fish culture practices to medium to high extent, which might be due to the fact that most of the fish farmers have correct information and knowledge about scientific fish culture practices. This present findings are in conformity with the findings reported by *Krishnaiah (1989)*.

Table 1: Distribution of respondents based on their level of adoption of fish farmers towards scientific fish culture

S. No.	Level of adoption	Fish farmers	
		N	%age
1.	Low (up to 66)	31	25.8
2.	Medium (67-78)	46	38.3
3.	High (more than 78)	43	35.8

Zero order co-relation analysis was carried out between selected socio personal, socio economic, communicational, psychological and situational variables of fish farmers and their adoption behaviour. From Table 2, it was clear that the variables *viz.*, occupation, annual income, land holding, social participation, mass media participation, extension agency contact, cosmopoliteness, innovative proneness, value orientation, risk orientation, economic motivation, knowledge about scientific fish culture practices, extent of weed infestation had recorded strong and positive bearing on the adoption behaviour of fish farmers towards scientific fish culture practices. Age showed negative influence. The other factors studied like caste, family size, family type, education, fish farming experience, possession of fishing equipments, credit orientation, size of water body, duration of water availability, and source of water did not influence adoption behaviour of fish farmers to a significant level. These result implied that high adopters of scientific fish culture would be by their young age and higher levels of annual income, land holding, social participation, mass media participation, extension agency contact, cosmopoliteness, innovative proneness, value orientation, risk orientation, economic motivation, knowledge about scientific fish culture practices, extent of weed infestation. It is obvious that younger farmers being more enthusiastic are attracted more towards scientific fish culture.

Table 2: Correlation of different independent variables with the adoption behaviour of fish farmers towards scientific fish culture as dependent variables (n=120)

S. No.	Independent variables	Correlation coefficient
A.	*Socio-personal variables*	
X1	Age	-0.230*
X2	Caste	-0.040 NS
X3	Family size	-0.053 NS
X4	Family type	-0.138 NS
X5	Education	0.126 NS
X6	Fish farming experience	0.166 NS
B.	*Socio-economic variables*	
X7	Occupation	0.218*
X8	Annual income	0.202*
X9	Land holding	0.216*
X10	Social participation	0.249**
X11	Possession of fishing equipment	0.155 NS
C.	*Communication variables*	
X12	Mass media participation	0.456**
X13	Extension agency contact	0.556**
X14	Cosmopoliteness	0.462**
D.	*Psychological variables*	
X15	Innovative proneness	0.598**
X16	Credit orientation	0.023 NS
X17	Value orientation	0.485**
X18	Risk orientation	0.410**
X19	Economic motivation	0.546**
X20	Knowledge about scientific fish culture	0.673**
E.	*Situational variable*	
X21	Size of water body	0.115 NS
X22	Duration of water availability	0.061 NS
X23	Source of water	-0.031 NS
X24	Extent of weed infestation	0.192*

NS = Non significant;
* = Significant at 0.05 level of probability;
** = Significant at 0.01 level of probability

Hence then younger respondents adopted more practices. The finding is similar to those of *Sujath Kumar (1988), Talukder and Sontaki (2005).* The occupation of fish farmers was positively and significantly related to adoption of scientific fish culture practices. Respondents, who pursue fish culture as primary occupation for supporting the family, are better adopter, as they were completely dependent on fishery for their livelihood. Annual income showed positively significant relationship with adoption of scientific fish culture. More income of the respondents would help to adopt improved practices and did not hesitate to increase expenditure on purchasing various inputs for fish culture. The finding are in accordance with the finding reported by *Sujath Kumar (1988)* and *Sah and Ramchand (1999).* Social participation had significant and positive relationship with adoption level of fish farmers. The reason may be that respondents might have come across new ideas related to scientific fish culture practices when they participated in the activities of different social organizations. Present findings are in line with the findings of *Meeran (1983), Sujath Kumar (1988)* and *Reddy (1997).* Mass media participation had positive and significant co-relation with adoption of scientific fish culture. Fish farmers gained more knowledge related to fish culture practices when exposed to different mass media sources. Mass media help to broaden knowledge and give a chance to learn about various benefits like training, credit, and subsidy etc. The findings are in conformity with the findings reported by *Sujath Kumar (1988)* and *Meeren (2000).* A positive and highly significance co-relation existed between the extension agency contact and adoption of scientific fish culture practices. It implied that by contact with extension workers, the fish farmers will gain knowledge and help to increase the adoption of different scientific fish culture practices. Cosmopoliteness of fish farmers showed significantly positive relationship with adoption of scientific fish culture practices, implying there by that those farmers with higher contact beyond there own social system have more adoption. This finding corroborates those of *Reddy (1997), Venkatesh Prashad and Siddaramaiah (2000)* and *Talukder and Sontaki (2005).* Innovative proneness of fish farmers showed positive and significant relationship with extents of adoption. An individual with high innovative proneness generally have more adoption level of scientific fish culture practices. Similar findings are reported by *Moulik (1965)* and *Biswas et al. (1991)* . The risk orientation of farmers was positively and significantly related to extent of adoption of scientific fish culture. It implied those respondents having higher level of risk orientation are better adopter. The finding is line with the findings of *Biswas et al. (1991), Krishnamurty (1997)* and *Meeran (2000).* The economic motivation of fish farmers was positively and significantly related to adoption of scientific fish culture. It implied that those farmers have a tendency to maximize their earning and strive towards this end, have higher adoption. The finding corroborates those of

Biswas et al. (1991) and *Talukder and Sontaki (2005)*. The knowledge level of respondents was positively and significantly co-related to their extent of adoption. It means that when the knowledge of respondents is more, adoption of scientific fish culture is also more. (*Haque (1979)*.

Table 3: Path analysis of selected independent variables with adoption behaviour of fish farmers towards scientific fish culture practices

Variable	Correlation coefficient	Direct effects	Rank	Total indirect effect	Rank	Variables through which substantial indirect effects are channeled through		
						I	II	III
Socio-personal variables								
X1 Age	-0.230*	-0.230	14	0	13	0.069 (X_{15})	0.039 (X_7)	0.030 (X_{13})
X7 Occupation	0.218*	0.158	7	0.062	11	0.058 (X_1)	0.045 (X_{20})	0.039 (X_{19})
X8 Annual income	0.202*	-0.030	9	0.230	10	0.109 (X_{20})	0.105 (X_{19})	0.099 (X_9)
X9 Land holding	0.216*	0.183	6	0.037	12	0.087 (X_{20})	0.074 (X_{19})	0.050 (X_{12})
X10 Social participation	0.249**	-0.058	11	0.308	6	0.109 (X_{20})	0.077 (X_{19})	0.067 (X_{24})
Communication variable								
X12 Mass media participation	0.456**	0.143	8	0.317	5	0.134 (X_{20})	0.108 (X_{19})	0.103 (X_{15})
X13 Extension agency contact	0.556**	0.270	3	0.290	7	0.138 (X_{19})	0.109 (X_{20})	0.100 (X_{15})
X14 Cosmopoliteness	0.462**	-0.101	12	0.561	2	0.183 (X_{15})	0.165 (X_{19})	0.142 (X_{20})
Psychological variable								
X15 Innovative proneness	0.598**	0.345	1	0.255	9	0.130 (X_{19})	0.127 (X_{20})	0.078 (X_{13})
X17 Value orientation	0.485**	-0.097	13	0.577	1	0.193 (X_{19})	0.159 (X_{15})	0.149 (X_{20})
X18 Risk orientation	0.410**	-0.066	10	0.476	3	0.185 (X_{19})	0.139 (X_{20})	0.134 (X_{15})
X19 Economic motivation	0.546**	0.276	2	0.274	8	0.162 (X_{15})	0.152 (X_{20})	0.135 (X_{13})
X20 Knowledge about scientific fish culture	0.673**	0.249	4	0.421	4	0.176 (X_{15})	0.168 (X_{19})	0.119 (X_{13})
Situational variable								
X23 Extent of weed infestation	0.192*	0.198	5	0.018	14	0.052 (X_{20})	0.040 (X_9)	0.031 (X_{15})

Residual effect: 0.4593

Table 3 presented the path analysis to decompose the total effect of r value into direct, indirect and residual effect of the exogenous variables on the predicted variable i.e. extent of adoption. It was found that the variable innovative proneness had yielded the highest direct effect. It was observed that higher the innovative proneness, the higher had been the extent of adoption. Following this variable, the next variable was economic motivation. Economic motivation of the respondent motivated their tendency to maximize their earnings and ultimately changed their attitude to adopt the scientific fish culture practices. It was found that variable knowledge had gone instrumental to channel the highest indirect effect on as many as twelve (12) variables to

prove its imbibing and associational role to characterize multi-co-linear nature of this important variable. Innovative proneness, economic motivation and knowledge were found to be dominant factors not only with direct effect on adoption behaviour of fish farmers, but also through which most of the other factors influence through adoption level indirectly. The residual effect being 0.4593, it was to conclude that 45.93 per cent of the variables had been left unexplained. This should further suggest that inclusion of more relevant and contextual variables could have more variations than what have been in present instance.

CONCLUSION

The study revealed that majority of the fish farmers adopted the recommended technologies of scientific fish culture practices to medium to high extent. The variables like social participation, mass media participation, extension agency contact, cosmopoliteness, innovative proneness, value orientation, risk orientation, economic motivation, knowledge reflected the strong association and effect with the extent of adoption. The variable knowledge had gone instrumental to channel the highest indirect effect on as many as twelve variables to prove its imbibing and associational role to characterize the extent of adoption. Based on the above findings the study recommends the following to promote large scale adoption of scientific fish culture by fish farmers to increase fish production as well as their socio economic conditions. More number of knowledge building activities like meeting, discussion, mass media etc are to be planned and conducted by fisheries extension personnel to increase knowledge and thereby adoption of scientific fish culture. Economic benefits of scientific culture need to be vividly highlighted to convince fish farmers to adopt scientific fish culture practices. Cosmopolite methods and channels like exposure visits, study tours etc need to be organized by the concerned extension agency. More number of younger fish farmers need to be encouraged in training on scientific fish culture practices.

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