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Factors associated with the adoption behaviour of beneficiaries of Fish Farmers Development Agency (FFDA) regarding recommended scientific fish culture practices in West Bengal, India

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ABSTRACT

This paper analyses the factors associated with the adoption behaviour of beneficiary farmers of Fish Farmer Development Agency (FFDA) towards recommended scientific fish culture practices in North 24-Parganas district of West Bengal. The data were collected from randomly selected 60 FFDA beneficiary fish farmers of 4 blocks with the help of structured schedule. The findings revealed that majority (81.67%) of fish farmers belonged to medium to high adoption category. Correlation analysis revealed that age, farming experience, ownership of pond, selling price of fish, fish production, annual income from fishery, risk orientation, mass media exposure and extension agency contact were significantly correlated with the adoption level of beneficiaries. From regression analysis it was found that selling price of fish was positively associated with adoption level of beneficiaries at 0.05 level of probability whereas farming experience was found to have positive association with adoption level of beneficiaries at 0.01 level of probability. It was also revealed that 30.9 per cent of the variations of adoption level were due to the combined influence of these two variables.

***Keywords*:** Adoption, factors, FFDA beneficiaries and recommended fish farming practices

West Bengal is rich in fishery resources in the form of beels, rivers, ponds, tanks, forest fisheries, swamps, wetland, reservoirs and paddy fields. From the time immemorial, fish has played an important role in social customs and traditions of the people in West Bengal. The present annual fish production in West Bengal is about 16.71 lakh tons (Hand Book of Fisheries Statistics 2015-16). Still there is an immense scope to increase the fish production level. One of the main factors in increasing the fish production level is adoption of recommended scientific fish culture practices by farmers. Fish Farmer Development Agency, working as a nodal agency, established during 1973-74 provides technical support; arrange bank loans and release subsidies to the rural community so that they can adopt the recommended practices required for scientific fish culture. 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 to maximize the fish production by fullest utilization of all available niches in an ecosystem. Initially farmers were culturing fish in traditional way but, later they had realized it essential to adopt the recommended scientific fish farming practices for optimum fish production. Keeping this view in mind the present study was conducted to investigate the factors associated with the adoption behaviour of FFDA farmers regarding recommended fish farming practices.

The objectives of the study were to study the relationship between selected independent variables and adoption behaviour of FFDA beneficiaries about recommended scientific fish culture practices and to measure the extent of correlationship that existed between the independent variables and the adoption level of FFDA beneficiaries.

The study was conducted in North 24-Parganas district of West Bengal, India in the year of 2017. Out of the 22 blocks, data were collected from randomly selected 4 blocks of North-24 Parganas district of West Bengal with the help of structured interview schedule. The selected blocks were Bongaon, Gaighata, Barrackpore-I and Habra-I. From each block 15 FFDA beneficiary farmers were selected by simple random sampling without replacement technique as they were progressive in pursuing different fisheries activities. Thus, total 60 farmers constituted for the sample of the study. Ex-post-facto research design was used for conducting the study systematically. Adoption behaviour was taken as dependent variable. Age, family size, family type, caste, religion, educational qualification, farming experience, marital status, occupational status, land holding, ownership of pond, selling price, fish production, annual income from fishery, marketing of produce, marketing behaviour, vehicle used for transportation, risk orientation, economic motivation, credit orientation, mass media exposure, extension

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agency contact were considered as independent variables. To measure the adoption behaviour of farmers regarding recommended fish culture practices the technique suggested by Sinha and Kolta (1974) was followed with necessary modifications. The score assigned for full adoption of recommended practices was 2, for partial adoption was 1 and for non-adoption was 0.

The raw adoption scores were converted into adoption quotient for measuring the general adoption level. In the present study, the extent of adoption of recommended composite fish culture practices was measured by using the adoption quotient developed by Sengupta (1967). Accordingly, the following formula was used to calculate the general adoption level.

$$\text{Adoption quotient} = \frac{\text{Adoption score of the respondent}}{\text{Maximum adoption score one could get}} \times 100$$

Thus, after computing individual adoption quotient scores, the respondents were grouped into three categories with mean and standard deviation as measure of check. Data were analyzed with the help of correlation and regression analysis.

The distribution of respondents based on their level of adoption about recommended scientific fish culture practices has shown in the table 1. It was observed that majority of the respondents (81.67 per cent) belonged to medium to high category of adoption level and the remaining had low adoption level regarding recommended scientific fish culture practices. It implied that majority of the FFDA farmers of the study area adopted the recommended fish farming practices to medium to high extent, which might be due to the fact that most of the respondents have correct information and knowledge about scientific fish culture practices. These findings were in conformity with the findings reported by Bose (1989), Goswami *et al.* (2012), Krishnaiah (1989), Sakib and Afrad (2014) and Wayal (1990). In order to measure the relationship between independent variables and adoption behaviour of beneficiaries, correlation analysis was carried out (Table 2). The variables like ownership of pond, selling price of fish, annual income from fishery, risk orientation, mass media exposure and extension agency contact had positive and significant correlation with adoption behaviour of farmers at 5% level of probability while some other variables such as age, farming experience, fish production showed a highly significant and positive relationship with the adoption behaviour of the beneficiaries about recommended scientific fish culture practices at 1% level of probability.

Table 1: Distribution of respondents based on their level of adoption towards recommended scientific fish culture practices (N=60)

Sl. No	Adoption level	Beneficiary	
		No	%
1.	Low (up to 63)	11	18.33
2.	Medium (64-88)	36	60.00
3.	High (more than 89)	13	21.67
	Total	**60**	**100**
	Mean : 76.01	**SD: 12.55**	

Table 2: Correlation of different independent variables with the adoption level of beneficiaries towards recommended scientific fish culture practices as dependent variable (N=60)

Variables	Correlation coefficient (r)
Age	0.376**
Family size	-0.052 NS
Family type	0.077 NS
Caste	-0.060 NS
Religion	0.072 NS
Educational qualification	-0.043 NS
Farming experience	0.499**
Marital status	-0.215 NS
Occupation	0.243 NS
Land holding	0.254 NS
Ownership of pond	0.283*
Selling price of fish	0.275*
Fish production	0.303**
Annual income from fishery	0.278*
Marketing of produce	0.105 NS
Marketing behaviour	-0.039 NS
Vehicle used for transportation	0.203 NS
Risk orientation	0.219*
Credit orientation	-0.083 NS
Economic motivation	0.091 NS
Mass media exposure	0.224*
Extension agency contact	0.297*

*Note: NS=Non significant, * = Correlation is significant at the 0.05 level of probability (2-tailed), **=Correlation is significant at the 0.01 level of probability (2-tailed)*

It was found that age had a positive and significant correlation with the adoption level of beneficiaries. It indicated that with increasing the age of the respondents the adoption behaviour towards recommended scientific fish culture practices also increases. The findings of the study were in line with the findings of Krishnaiah (1989), Bhaumik *et al.* (1992), Reddy (1997) and Nagaraj *et al.* (2000). The result indicated a positive and significant

Table 3: Stepwise regression of adoption behaviour of beneficiaries with independent variables (N=60)

Independent variables	Unstandardized coefficient		Standardized coefficient	t	Rank
	B	SE	Beta		
Farming experience	8.0171	1.8266	0.4841	4.3890**	I
Selling price of fish	0.1007	0.0453	0.2454	2.2249*	II

*Note: R^2 = 0.309, SE (est.) = 10.62, * = Correlation is significant at the 0.05 level of probability, ** =Correlation is significant at the 0.01 level of probability*

relationship exist between farming experiences and adoption level of farmers. It implied that the length of fish farming experience influences its adoption. The results were in agreement with the findings reported by Das *et al.* (1988), Krishnaiah (1989), Mohan *et al.* (1993), Reddy (1997), Meeran (2000) and Chandrakala and Eswarappa (2001). The result of the study indicated that the ownership of pond having a positive and significant relationship with adoption of recommended scientific fish culture practices. The result was in line with the result of Mahesh Babu (2015). The result of the study revealed that there was a positive and significant relationship between selling price and adoption at 5% level of probability. It indicated that higher the selling price of produce higher the adoption rate of scientific fish culture. A positive and significant correlation between fish production and adoption of farming practices by farmers was found in this study. It was stated that with increasing the recommended adoption practices may lead to increase in fish production.

A positive and significant relationship exists between income and the adoption. Beneficiaries with a higher income did not hesitate to increase investment on various inputs and management aspects of fish culture. With a view of realizing more profit one has to adopt improved practices. This might be possible reason for a significant relationship between the annual income and the adoption level of farmers. These findings were in agreement with, Mathiyalagan (1997) and Shinde *et al.* (1999). The study showed that there was a positive and significant correlation between risk orientation and adoption level of fish farmers. The similar type of findings was reported by, Meeran (2000) and Talukdar and Sontaki (2005). Mass media exposure of the farmers had a positive and significant correlation with adoption. Fish farmers gain more knowledge related to fish culture practices as well as it can help them to broaden their knowledge base. It also gave them a chance to learn about the usefulness of the various associated benefits like training, credit and subsidy *etc*. These findings were in conformity with the results of SujathKumar (1988), Das *et al*. (1988), Mathiyalagan and Subramaniam (1995), Mathiyalagan (1997) and Nagaraj *et al*. (2000). A positive and significant correlation exists between extension agency contact and adoption level of beneficiaries. It implied that the adoption level of the respondents is significantly influenced by their contacts with the extension agencies. By contact with the extension personnel farmers gain more knowledge and ultimately get convinced about the advantages of adoption of improved practices. This helped the farmers to increase the adoption rate. The findings were in agreement with the findings reported by Meeran (1983), Chandra (1986), Bhaumik *et al.* (1992), Balaubramaniam (1988), Nagaraj *et al.* (2000) and Shinde *et al.* (1999).

Family size found negatively non-significant with adoption and similar findings reported by Reddy (1997). Family type was positive non significant relation with adoption and findings were in agreement with Mathiyalagan (1997). Caste was found to have a negatively non significant relationship with adoption which was similar with the findings of Chandra (1986) but in contrast with Bhaumik *et al.* (1992) and Reddy (1997). Negatively non significant relationship existed between education and adoption level of beneficiaries. The findings were in line with the findings reported by Chandra (1986) and Kumar (1988). The study also revealed that occupation had non-significant relationship with the adoption of farmers that was in agreement with Meeran (2000) and Krishnaiah (1989). In the present study it was found that credit orientation had negatively non significant relationship with adoption and economic motivation was found to have a positively and non-significantly related with adoption level of farmers. These findings contradicted with the findings reported by Nagarajaiah (2002).

To predict the extent of relationship among the independent variable and the adoption level of beneficiaries towards recommended scientific fish culture practices, step-wise multiple regression analysis was done. A close observation of the table 3 revealed that two variables *i.e*. farming experience and selling price were significant in multiple regression analysis in explaining the variations in the adoption level of beneficiaries. Further it was observed that 30.9 per cent

of the variation in the adoption behaviour of the beneficiaries towards scientific fish culture practices could be explained by variables included in the study. The independent variables were ranked on the basis of standard beta values to find out their relative importance in predicting the dependent variable. Farming experience occupied the first rank and selling price occupied the second rank and they have relative importance in predicting the beneficiaries' adoption behaviour. These two variables termed as good predictors of the adoption behaviour of farmers. These variables help in increasing the level of adoption of scientific fish culture. Based on the findings of the study a regression model was developed:

$v=a+b_1X_1+b_2X_2$, where, v=adoption level, a = constant, b_1= 8.01, b_2= 0.1, X_1= farming experience, X_2= selling price, adoption level= $44.42+8.01\ X_1+0.1X_2$

The study revealed that majority (81.67 per cent) of the respondents adopted the recommended technologies of scientific fish culture practices to medium to high extent. Farming experience of respondents and selling price of fish were good predictors of adoption behaviour of beneficiaries. So, for transfer of recommended fish farming practices at field level, extension person should involve experienced fish farmers in the training and meeting programmes so that they can share their knowledge among fellow farmers. For motivating the farmers to adopt recommended practices, concerted efforts are needed from the government organization so that farmers can get remunerative prices for their product.

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