FARMERS' SATISFACTION ON FISHERIES EXTENSION SERVICES

BY

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FARMERS' SATISFACTION ON FISHERIES EXTENSION SERVICES

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CERTIFICATE

This is to certify that thesis entitled, ***"FARMERS' SATISFACTION ON FISHERIES EXTENSION SERVICES"*** *submitted to the Faculty of Agriculture, Sher-e-Bangla Agricultural University, Dhaka, impartial fulfillment of the requirements for the degree of* ***MASTER OF SCIENCE*** *in Agricultural Extension, embodies the result of a piece of bona fide research work carried out by* ***MD.MARAJUL HAQUE****,* ***Reg. No. 18-09054*** *under my supervision and guidance. No part of the thesis has been submitted for any other degree or diploma in any institute.*

I further certify that such help or source of information, as has been availed of during the course of this investigation has duly been acknowledged.

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DEDICATED
TO
MY BELOVED
PARENTS

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The Author

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ABBREVIATIONS USED

GDP	Gross Domestic Product
FAO	Food and Agricultural Organization
DOF	Department of Fisheries
BFRI	Bangladesh Fisheries Research Institute
BFDC	Bangladesh Fisheries Development Corporation
ACSI	American Customer Satisfaction Index

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ABSTRACT

The purposes of the study were to determine the extent of satisfaction on fisheries extension services in Bangladesh as perceived by the fish farmers and to find out the relationship of each of the selected characteristics of the fish farmers with their satisfaction on fisheries extension services in Bangladesh. The study was conducted in seven villages of Gopinathpur union under Badarganj upazila of Rangpur district. A total of 103 fish farmers were selected randomly from a population of 412 fish farmers. Data were collected from the fish farmers during January to February, 2020 by using an interview schedule. Farmers' satisfaction on Fisheries extension service was the dependent variable. Nine selected characteristics of the fish farmers were considered for the study which might have relationship with their satisfaction on fisheries extension services. Overwhelming majority (95.1 percent) of the fish farmers had low to medium satisfaction on Fisheries extension services in Bangladesh. Co-relation analysis indicated that aquaculture farm area, annual income from aquaculture, daily time spend in aquaculture, aquaculture training exposure, extension media contact and innovativeness had significant positive relationship with their satisfaction on fisheries extension services. But age, level of education and aquaculture experience had no-significant relationship with their Fisheries extension services. Base on the findings of the study, it is recommended that as the largest public fisheries extension organization of Bangladesh, Department of Fisheries (DOF) should increase the number of Fisheries Extension Officer (FEO) like the Department of Agriculture Extension (DAE) to increase fisheries extension services at village level and at least 5% of the FEO should have higher degree in agriculture extension of perform better extension services.

CHAPTER I

INTRODUCTION

1.1.General background of the study

Bangladesh is one of the world's leading fish producing countries with a total production of 42.77 lakh MT in FY 2017-18, where aquaculture production contributes 56.24 percent of the total fish production. Average growth performance of this sector is 5.26 percent for last 10 years. Aquaculture shows a sturdy and consistent growth, average growth rate is almost 10 percent during the same timeframe. It is believed that if the increasing trend of fish production continues, it will be possible to achieve the projected production target of 45.52 lakh MT by 2021 in conformity with the targets of Vision-2021 of the present Government. After 48 years of independence, Bangladesh becomes a self-sufficient country in fish production, with a per capita fish consumption of 62.58 g/day against set target of 60 g/day. According to FAO year(The State of World Fisheries and Aquaculture 2018) Bangladesh ranked 3rd in inland open water capture production and 4th in world aquaculture production. Currently Bangladesh ranks 4th in tilapia production in the world and 3rd in Asia. InBangladesh a huge number of rivers, cannels, ponds, lakes, and other water bodies. The inland water bodies covered 12.4% of the total land area of the country. So, due to rich heritage and geographic advantages, aquaculture is a common occupation for many rural dwellers in the country. Traditionally, people of Bangladesh depend on fish and fish products as a part of their dial food consumption. Unfortunately, depletion of natural resources and excessive use of agrochemicals, especially in crop sector, almost demolish indigenous fishes and aquatic resources in the country in an accelerated rate. However, contrasting depletion of aquatic resources, the population in the country was booming at an alarming rate until the first decade of the 20th century. As a result, fish consumption of mass people depends largely upon the dissemination of modern aquaculture technologies. Dissemination of modern aquaculture technologies in Bangladesh is comparatively a recent phenomenon compared to crop and livestock sector. Modern aquaculture technologies have started their voyage in late sixties. As a result of enormous demand, aquaculture technologies and innovations spread throughout the country in a remarkable rate in the next few decades. According to FAO year, Bangladesh has been in the top five fish cultivation countries for several years and jumped to second position superseding India in 2006. Fish production in the country increased by 53% from the year 2004 to 2014.

As noted by Dr. GolamHossain, former Director General, Bangladesh Fisheries Research Institute, with in a period of 10 years from 2002 to 2012, only tilapia production has increased from 4000 metric tons to 134,000 metric tons. However, despite of this fabulous success in cultured fish production. Bangladesh has so far addressed only a fraction of its production potential. Apart from pond culture, other water bodies remain noticeably underutilized. For instance, fish culture in floodplains, rice fields, cages, and oxbow lakes at present accounts for only around 2% of total aquaculture production.

Agricultural Extension, one of the essential pillars for the development, can play a vital role in aquaculture development. Reviewing a number of literatures, efforts to define and characterize fisheries extension, conceptualize extension as "a set of functions encompasses: Transfer of technology for sustainable aquaculture production; transformation and marketing; transferring management to mobilize and organize producers, rural groups, and communities; transferring capacity to educate, build human resources and enhance local capacity." In general the role of extension is to help people to help themselves through education, so that they can improve their socioeconomic condition. Extension provides a channel through which the problems of the farmers can be identified for research and formulation of aquaculture and fisheries policies for the benefits of the rural communities. Actually the farmers who need to get timely and appropriate information from the Extension services. Extension actors can persistently develop their economic status.

Bangladesh earns a considerable amount of foreign currencies by exporting fish, shrimps and other fishery products. Geographical Indication Registration Certificate has been achieved for our national fish hilsa. In 2017-18, this sector contributes 3.57 percent to the national GDP and more than one-fourth (25.30%) to the agricultural GDP. More than 11 percent of total population of Bangladesh is engaged in this sector on full time and part time basis for their livelihoods. This sector also has high potential for the perspective of economic development of the country. Department of fisheries (DOF) awarded Bangabandhu National Agriculture Award 1423 for its outstanding performance during the recent past years. This sector is contributing significantly in food and nutrition security through consistently providing safer and good quality animal protein, almost 60 percent of total animal protein supply. Bangladesh earns a considerable amount of foreign currencies by exporting fish, shrimps and other fishery products.

1.2. Statement of Problem

Fisheries sector is the single largest contributor to income and employment generation and accepted the challenge to achieve self-sufficiency in food production. It shoulders the responsibility to reduce rural poverty through sustainable aquaculture development. In order to make the study manageable, the following research questions were taken into consideration.

1. What were the extents of the selected characteristics of the fish farmer?
2. What was the extent of satisfaction of farmers on fisheries extension services?
3. What were the relationships between each of the selected characteristicsof thefish farmers andthe satisfaction on fisheries extension services?

1.3 Specific Objectives of the Study

1. To assess and describe the following selected characteristics of the fish farmers
    - Age
    - Level of Education
    - Aquaculture experience
    - Aquaculture farm area
    - Annual family income from aquaculture
    - Daily time spend in aquaculture
    - Aquaculture training Exposure
    - Extension media contact
    - Innovativeness
2. To determine the extent of satisfaction of farmers on fisheries extension services
3. To explore the relationship between each of the selected characteristics of the fish farmers with their satisfaction on fisheries extension services

1.4 Scope of the Study

In this study extent of fish farmers'satisfaction onfisheries extension services was determined. The findings of the study would particularly be applicable to the Badarganjupazila in Rangpur district. However, the findings may also be applicable to other districts of Bangladesh and other similar areas where the socio-economic, cultural, physical and geographical conditions do not differ much from those of the study area. It is felt that, these findings of the study would be

helpful for administrators of the country to formulate appropriate approach in this regard. The study would also be helpful to the extension workers to set up appropriate strategies which would be suitable for the Department of Fisheries Services as well as for the ministry of Livestock & Fisheries.

1.5 Justification of the study

In Bangladesh, low fish production is a long lasting problem. To ensure adequate extension service, it is necessary to increase Fish production using selected recommended species intensive aquaculture practice can minimize low production and increase maximize fish production. Thus, self-sufficiency in fish production ensures the extension services. Bangladesh Fisheries Research Institute (BFRI) has developed a good quality fish species. But farmers have satisfied a few of them, Yield, taste, marketability, and diseaseresistance and growth rate. Culture system is responsible for varying their satisfaction. At present per hectare production of exotic species is comparatively higher than that of local Species due to its traditional culture system and extension services. In the study area, farmers have started good quality species instead of the local species. It is obviously true that farmers' satisfaction plays key role in increasing production. At present, there is a lack of adequate understanding aboutwhichcharacteristics ofthe farmers influence their satisfaction on good quality production.

1.6 Assumption of the study

An assumption is the supposition that an apparent fact or principle is true in light of the available evidence (Goode and Hat,(1952).An assumption is taken as a fact or belief to be true without proof. In this study, the researcher had the following assumptions in mind while carrying out this study:

1. The respondents included in the sample were competent to furnish proper responses to the items included in the interview schedule.
2. The researcher was well adapted with the study area and their social activities.
3. The responses furnished by the respondents were reliable.
4. The sample drawn was representative of the whole population of the study.

5. The findings of the study would be useful for researching, planning and execution of the programmers in connection with developing and disseminating of new technologies and practice among the farmers.

1.7 Limitation of the Study

Considering the time, money and other necessary resources available to make the study manageable and meaningful, it was necessary to consider the following limitations:

1. The study was confined mainly to farmers' satisfaction on fisheries extension services in selected area.

2. The study was confined in only seven villages of Badarganjupazila of Rangpur district.

3. The characteristics of the fish farmers were many and varied but only nine characteristics were selected for investigation of this study.

4. Population of the study included only the selected fish farmer among the farm families.

5. Facts and figures were collected by the investigator applied to the present situation in the selected area.

1.8 Definition of terms

A concept is an abstract of observed thing; events or phenomenon or in other words, it is a short hand representation of variety of facts. A researcher needs to know the meaning and contents of every term that used for a study. It should clarify the issue as well as explain the fact to the investigator and readers. However, for clarity of understanding, a number of key concepts/terms frequently used throughout the study are defined as follows.

Age

Age of a respondent is defined as the span of life and is operationally measured by the number of years from his/her birth to the time of interviewing.

Level of Education

Empirically it was defined to the development of desirable changes in knowledge, skill and attitudes in an individual through reading, writing, walking, observation and other selected activities. It was measured on the basis of classification.

Aquaculture experience

Aquaculture experience was measured by the year a respondent involvement in fish farmer.

Aquaculture farm area

Aquaculture farm area refers to the area of land of a fish farmer on which he/she practices fish farming. It is expressed in terms of hectares.

Annual family income from aquaculture

Annual family income from aquaculture of a respondent refers to the total earnings receipt by him from fish farming during the last fiscal year. It is expressed in thousand in taka.

Daily time spend in aquaculture

Daily Time spend in aquaculture means how much time (hour)a respondent per day spend for aquaculture.

Aquaculture training exposure

Aquaculture training exposure score of a respondent was obtained by the number of days that a respondent had received training in his or her entire life an aquaculture.

Extension media contact

The term extension media contact refers to ones exposure to influence of different extension media such as interpersonal channels and mass media channels etc.

Innovativeness:

The production and use of new technology and economically useful knowledge. Apersonality is trait possessed, to a greater or lesser degree, by all members of a society as one's ability to create inventions and change them to innovations as beneficial novelties.

Satisfaction on fisheries extension services

Satisfaction on fisheries extension services of a respondent refers to the advisory services received by him from fisheries extension services provide.

CHAPTER II

REVIEW OF LITERATURE

The Chapter deals with the past literature relevant to the objectives of this study. The Researcher made an elaborate search of available literatures for this purpose. The researcher attempted to study the relationship of each of the variables. This Chapter is divided into three sections. The first section deals with the review of studies related to the extent of farmers' satisfaction on different extension services, the second section deals with the research gap of the study and the third section deals with the conceptual framework of the study.

2.1 Farmers' satisfaction on different extension services

Attempts had been taken by the Researcher to review the previous studies to determine the factors which influence satisfaction and dissatisfaction of individuals about development interventions, public policies etc. The literatures on satisfaction of individuals are dominated by consumer satisfaction in the domain of consumer studies. However, there are satisfaction studies applied to farmers' mostly in develop countries where literature is available. In the context of developing countries, literature on the determinants of farmers' satisfaction or dissatisfaction is hard to find, which highlights the importance of this current study.

Studied on the determinants of farmers' satisfaction with farming and life in general and found that farmers' global satisfaction with life was related to their satisfaction with farming. Net farm income was found to determine farm satisfaction while education was associated with dissatisfaction with farming and life in general. The authors noted that perceived rewards of farming are important determinants of satisfaction with farming and life in general.

Performance evaluation mostly focuses on the efficiency of investment and farmers' satisfaction. Summing up previous studies, the construction of rural infrastructure in China has been continuously improved with government's continuous investment, which has promoted the development of rural economy and farmer's economic status and living environment. However, the investment efficiency of rural infrastructure still has to be increased, and farmers' satisfaction on infrastructure construction is unsatisfactory. Many scholars have studied the investment in rural infrastructure by panel data. Xu (2010) and Wang (2014) analyzed the changes in

investment efficiency of rural infrastructure and the trends in its changes in 29 provinces and cities in China.

They studied stock of rural roads, running water facilities, and power facilities from 1990 to 2007 and calculated the contribution of infrastructure investment to farmers' income, expenditure, and the improvement of rural economy Li et al. and Xu (2011) established a fiscal performance evaluation system from economic, social, and ecological effects. The fiscal efficiency of 26 provinces (region) in China was analyzed on the basis of the evaluation system in their research. The investment efficiency of the projects has also been studied.

Ansar*et al.* (2014) analyzed project performance from the perspective of cost performance, schedule performance, and performance by collecting data from 95 railway and highway projects from 1984 to 2008. They found that, contrary to previous studies, the performance of Chinese infrastructure construction is unsatisfactory. They pointed out the necessity of changing the development pattern of China's infrastructure. Besides, scholars have also analyzed the performance of infrastructure investment through surveys. For example, Pen*get al.* (2016) and Zhang and Wang (2012) studied the investigation of infrastructure investment performance from the perspective of farmers' satisfaction. They investigated the influencing factors of farmers' satisfaction and draw lessons from domestic and international experience to put forward suggestions to improve the performance of rural infrastructure investment.

Studies related to farmers' satisfaction have focused mainly on the customer satisfaction model and empirical research. For the research based on customer satisfaction Li and Zeng (2008) performed an empirical analysis using CSIProbit Regression Model on the satisfaction of rural public goods and its influencing factors. They found obvious common characteristics in the same type of city (state), and influencing factors of CSI consist of farmers receiving education, medical accessibility, the income level of farmers, and effective irrigation rate. Li and Xu (2008) and W. Li and K. Xu (2011) built a performance evaluation model and evaluation index system of rural public infrastructure based on the American Customer Satisfaction Index (ACSI).

Studies on farmers' satisfaction and influencing factors show that farmers are dissatisfied with the construction of rural infrastructure by the end of 2010 in most areas of China, and farmers are mainly concerned about roads, drinking water, basic education, water conservancy, and medical facilities. On the other hand, it is worth noting that farmers began to pay attention to living

infrastructure such as waste disposal facilities and sewage treatment facilities. Kong and Tu (2006), Yi *et al.* (2008), Zhang and Wan (2009), Wang (2010), and Gan and Zhu (2011) studied farmers‘ satisfaction, farmers‘ demand, and investment willingness and current situation of rural infrastructure construction through empirical investigation.

Fan and Luo (2009) used the structural equation model to analyze 670 questionnaires and found that farmers‟ satisfaction is positively correlated with income, village type, price of infrastructure, family structure, and sense of superiority compared with neighboring villages. They also argued that the rural infrastructure construction suffers not onlyfrom scarcity but also from inequality. Tang *et al*. (2010) and Wang and Zhu (2013) launched studies of farmers' satisfaction and its influencing factors based on a survey of 32 villages and towns in Shaanxi Province. The results showed that farmers‟ satisfaction is significantly affected by rural roads, rural infrastructure, rural healthcare, irrigation facilities, drinking water facilities, and government credit. Moreover, Tang *et al*. (2010) pointed out that farmers‘ demand for rural public services has a certain level and stage, while farmers‟ satisfaction has a certain order according to their demand Han *et al*. (2015) built a custom satisfaction - based quality evaluation index and evaluation system. Existing research on farmers' attitude only stayed at 2010, and there is no further related research after 2010.

Problems and policy recommendations in showed that the main problems in the construction of rural infrastructure consisting of the top down decision-making mechanism cannot meet the real needs of farmers and have incomplete maintenance, imperfect laws and regulations, unclear division of responsibilities, imperfect supervision mechanism, lack of farmers‟ participation, lack of capital, and lack of investors. To solve these problems, researchers suggest establishing a decision-making mechanism to combine bottom up and top down and sound decision making information communication mechanism, improving the decision-making, and supervising the mechanism of rural infrastructure and responsibility.

Mechanism and improving the laws and regulations, rural infrastructure investment and financing system innovation and introducing PPP into rural infrastructure. Integrating existing research, considerable research has been performed in relation to farmers' satisfaction and influencing indicators in rural infrastructure. However, no further analysis related to significant indicators exists, such as the reason of their significant impact, influence pattern, measures to

improve their performance to help with the improvement of rural infrastructure, and ways to avoid negative effects caused by them. Besides, most existing studies separately focus on farmers' satisfaction, a certain kind of infrastructure, and the farmers' satisfaction under horizontal comparison or vertical comparison. No comprehensive consideration of all rural infrastructure satisfaction, horizontal comparison, and vertical comparison of farmers' satisfaction and farmers' perception of infrastructure charges and other factors exist.

On the other hand, there remains a gap ever since 2010, so that we have no understanding of the current situation and farmers actual demands of rural facilities. Thus, to investigate the current status of rural infrastructure in Sichuan, the paper takes these aforementioned factors into account and plans to achieve further analysis for significant indicators. In this paper, factor analysis and legit regression model were used to analyze farmers' satisfaction and its influencing indicators to know the current situation of rural facilities in Sichuan and prepare for further analysis.

Extension Educators should choose different methods of information delivery to maximize program efficiency, effectiveness Jones *et al*. (2007) and client satisfaction Jones *et al*. (2010).

According to Faramarzi and Langerodi(2013) use of communication channels has positive and significant relationship with farmers' attitude towards extension service. In line with the reasoning, we propose frequent use of different communication methods influences farmers' satisfaction positively. Credit access helps farmers through the alleviation of capital constraints and thus enables farmers to make timely purchases of inputs that they cannot afford from their own resources.

Economic factors influence farmers' satisfaction Damisa*et al*.(2008). Hence, we propose use of credit might have positive relationship with farmers' satisfaction. Access to training can also an important factor to build farmers' knowhow as well as skill and in turn it might have positive influence for farmers' satisfaction. Research has shown that older employees are more satisfied and more committed to their work have found this to be true of farmers as well (Coughenour and Tweeten, 1986)

Education is an important variable which has been found to influence satisfaction. It was observed that education increases the individual's capacity to achieve goals but also expands the

individual‘s awareness of alternatives and the rewards expected from his or her activities. This means that, the gap between expectation and accomplishment tends to increase with education, a situation which has been found to depress an individual‘s global and job related sense of wellbeing. However, other researchers have found positive relationship between life satisfaction and education. Hypothesized satisfaction with farming to be positively related to education Molnar Joseph (1985).

Guo and Jiang (2011) analyzed the factors influencing farmers' satisfaction with a voucher system China. They showed that gross income, size of arable land and the varieties purchased by farmers were important determinants of satisfaction with the voucher system. Gender, age and education were found to be insignificant determinants of satisfaction in the study.

Li (2014) studied the determinants of the satisfaction rate of the New Rural Farming Cooperative Medical System‖ in China. Using an ordered probity model, the author found the determinants of satisfaction to include income, health level, medical service accessibility, and reimbursement experience and hospitalization propensity. Age, gender, and distance to the medical center were some of the other variables included in the model.

Demise*et al*. (2008) studied the determinants of farmers' satisfaction with their irrigation system in Nigeria using a legit model. They found that fertilizer availability on time, farmers' output, plot size, timely water release and location of the farm plots influenced farmers' satisfaction with irrigation.

Umar *et al*. (2015) investigated the factors influencing level of satisfaction with a growth enhancement support scheme among farm families in Kaduna State, Nigeria using a multinomial logit regression model. They observed that the level of satisfaction with the scheme increased among families with higher farming experience and education but decreased with age and extension visit. Coughenour and Swanson (1992) studied that all the studies did not examine satisfaction on price, which is very important to producers. As indicated by the perceived rewards of farming are important determinants of satisfaction with farming and life in general. Thus, the study was significant and relevant in filling the knowledge gap in terms of the determinants of farmer' satisfaction with pricing in the Ghanaian cocoa sector.

2.2 Research Gap of the Study

There are some research works on farmers' satisfaction on various issues. No researches conducted on fish farmers' satisfaction on fisheries extension services. Some researchesoccurred farmers' satisfaction on rural public goods supply and its influencing factors. On these consideration attempts was made to determine farmers' satisfaction on fisheries extension services in Bangladesh.

2.3 Conceptual Framework of the Study

In view of the prime theme of the study, the researcher constructed a conceptual framework which is self-explanatory and is presented in Figure 2.1. It is assumed that selected characteristics of the fish farmers' might have influence on their satisfaction on fisheries extension services.Government initiatives may increase the capacity of fisheries Extension Service Providers (GOs, NGOs and Private Sectors). Aquaculture Extension Service Providers are servicing the fish farmers to solve their problems; alternately farmers might be satisfied on fisheries extension services in Bangladesh.

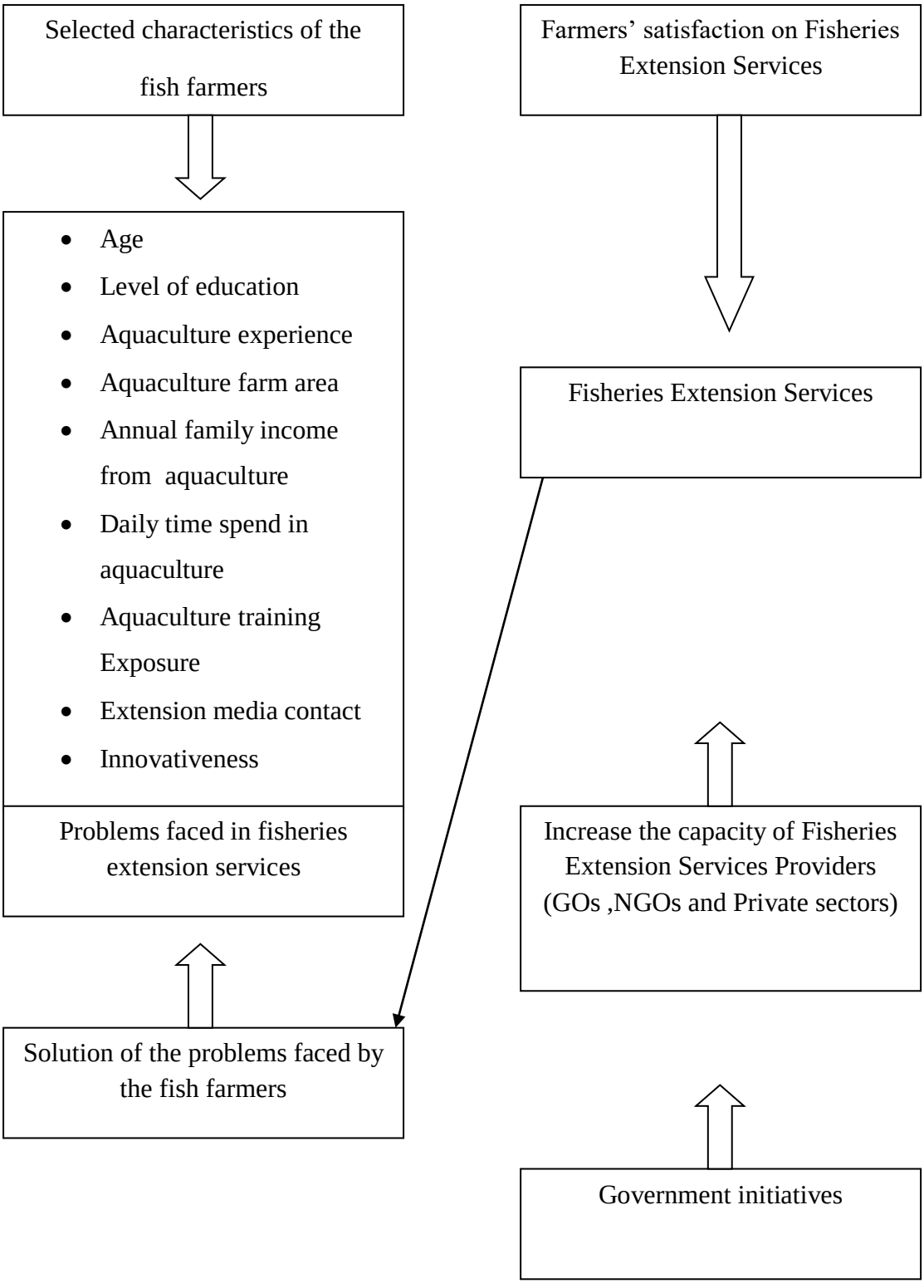

Fig: 2.1Conceptual Framework of the Study

CHAPTER III

METHODOLOGY

Methodology refers to the methods and procedures of any scientific research. This is very important for empirical investigations. It requires very careful consideration in setting objectives of the research and selection of variables to be studied.

The main aspects of methodology considered are:

(i) Selection of locale of the study (ii) Population and sampling design (iii) The research instrument and its preparation (iv) Data collection (v) Variables of the study and their measurement and (vi) Data coding and tabulation etc.

3.1 Locale of the Study

The study was conducted in seven villages namely GopinathpurFokirphara, Helarchok, Dhanghaphara, kamarphara, Shorkerphara, Burirpukur, and Khanabariof Gopinathpur union under the Badarganjupazilaof Rangpurdistict. A map of Bangladesh showing the rangpurdistrict ispresented in figure 3.1 and a map of Badarganjupazila showing the study area is presented in figure 3.2

3.2. Population and Sampling Design

An update list of 412 fish farmers from the selected villages was prepared with the help of statistics office. Twenty five (25%) percent of the population was randomly selected as the sample of the study by using random sampling method. Thus 103fish farmers constituted the sample of the study. The distribution of the population sample and the number of fish farmers are shown below-

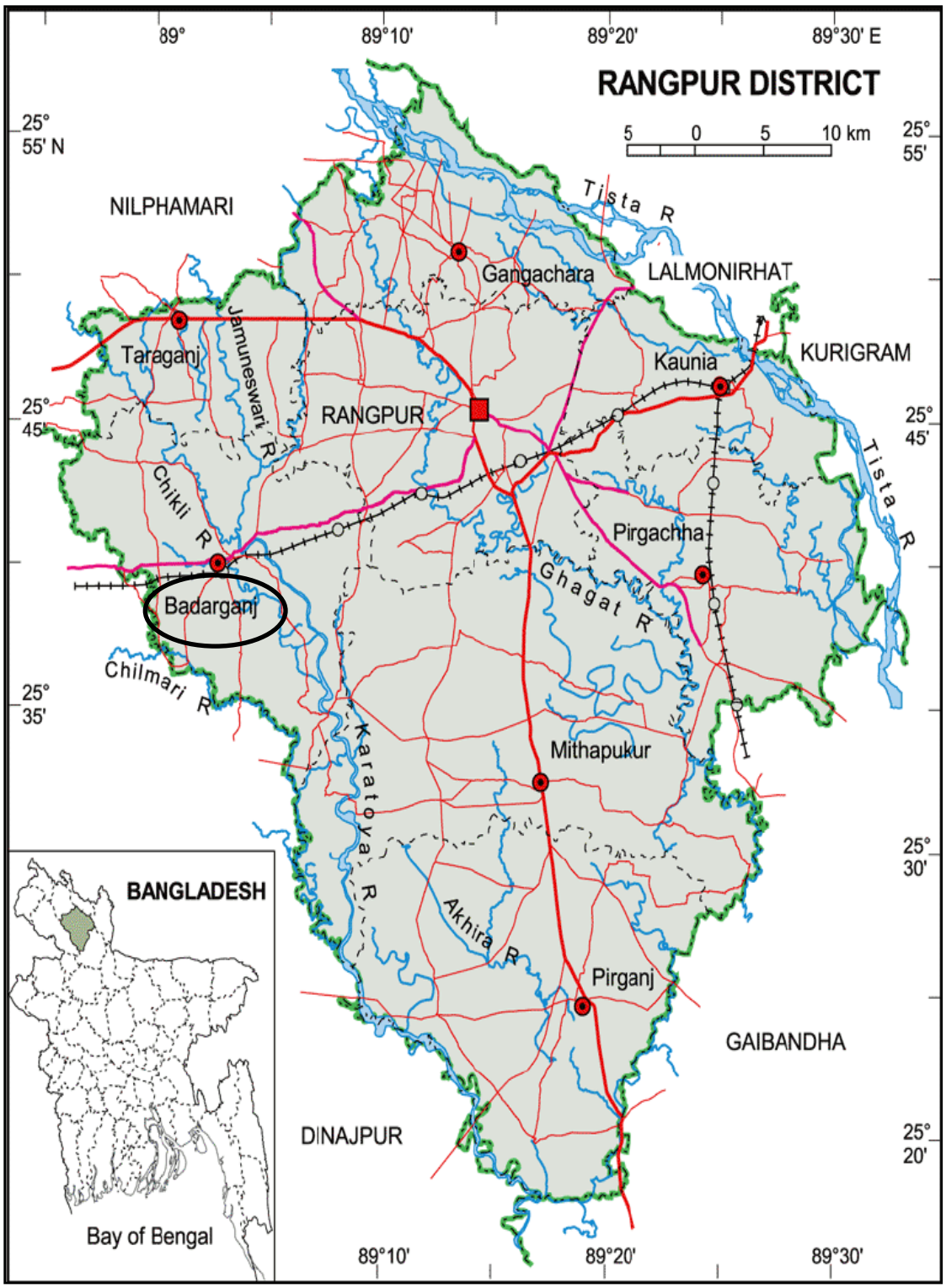

Figure: 3.1 Map of Rangpur district showing Badarganjupazila

Figure: 3.2 Map of Badarganj Upazila showing the study area

Table 3.1 Population and sample of the study area

Name of the Upazila	Name of the Union	Name of the Village	Number of population	Number of sample size
Badarganj Upazila	Gopinathpur	GopinathpurFokirphara	56	20
		Helarchok	60	17
		Dhangaphara	41	13
		Kamarphara	33	8
		Shorkerphara	75	17
		Burirpukur	95	18
		Khanabari	52	10
Total			**412**	**103**

3.3 The Research Instrument and its Preparation

An interview schedule was prepared for collection of data from the respondents keeping the objectives of the study in mind. The questions and statements contained in the schedule were simple, direct and easily understandable by the farmers. Simple and direct questions, different scales, closed and open form questions were included in the interview schedule to obtain necessary information. Appropriate scales were also developed to operationalize fish farmers' satisfaction on fisheries extension services. Theinterviews schedule was prepared both in Bengali and English version and was pretested within 103 selected fish farmers. This pretested schedule facilitated the researcher to examine the suitability of different questions and statement in general. On the basis of pretest result, corrections, modifications and adjustment were done in the interview schedule. The interview schedule may be seen in Appendix-I.

3.4 Data Collecting Procedure

Data were collected personally by the researcher himself by interviewing the sample of 103 selected fish farmers with the help of interview schedule. The researchers made all possible efforts to explain the purpose of the study to the farmers. Rapport was established with the

farmers prior to interview and objectives were clearly explained by using local language as far as possible.

As a result, the respondent did not hesitate to furnish proper responses to the questions and statements, which were collected during the period from 15 January to 25February 2020.The researchers, sought the help from the local leaders and Upazila Fisheries Officers for this purpose. Excellent co-operation was obtained from the respondents, the concerned local leaders and the UpazilaFisheries Officer.

3.5 Selection of Variables

In a descriptive social research, selection and measurement of the variable is an important task. A variable is any characteristic which can assume varying or different values is successive individual cases (Ezekiel and Fox, 1953) Farmers' satisfaction on fisheries extension services was the main focuses of this study. The researcher selected nine fish variables. These 9 fish variables were selected characteristics of the fish farmers namely age, level of education, Aquaculture experience, Aquaculture farm area, Annual family income from aquaculture, Daily time spend in aquaculture, Aquaculture training Exposure, Extension media contact, Innovativeness which might have relationship with their satisfaction an fisheries extension services.

3.6 Measurement of variables

The procedures for measuring variables are presented below:

3.6.1 Age

The age of a respondent was measured by counting the period of time from his/her birth to the time of interview on the basis of response of the respondent and was expressed in terms of years.

3.6.2 Level of education

Education of a respondent was measured on the basis of his ability to read and write or received formal education up to a certain standard. It was expressed in terms of year of schooling. One score was given for passing each level in the educational institution. For example, if the respondent passed the final examination of HSC class, his educational score was given as 12. Similarly if the respondents passed the final examination of class X,

his educational score was given as 10. If the respondents did not know how to read and write, his educational score was given as zero. A score of 0.5 was given to a respondent who could sign his name only.

3.6.3 Aquaculture experience

Aquaculture experience of a respondent was measured in terms of actual involvement in fish farming. It was express in years.

3.6.4 Aquaculture farm area

Aquaculture farm area is the most important capital of a fish farmer and it can influence on many personal characteristics of a fish farmer. Aquaculture farm area of thefish farmers was measured by the land area possessed by him for fish farmers. Data obtained in response to questions under item No.4 of the interview schedule (Appendix-i) formed the basis for determining the aquaculture land area of the respondent. Farm area was obtained in decimal and finally converted in hectare.

3.6.5 Annual income from aquaculture

Annual Income from aquaculture of a respondent was measured in term of thousand taka. It was computed on the basis of total yearly earning from aquaculture by the respondent himself/herself and other family members. The value of all aquaculture products were taken into consideration. One (1) score was assigned as for each one thousand taka of income.

3.6.6 Daily time spend in aquaculture

Daily time spend in aquaculture means the fish farmers in aquaculture was determined by the daily time spend by him for aquaculture practices. It was express in hours.

3.6.7 Aquaculture training exposure

Aquaculture Training exposure referred to any kind of training or learning experience about fish culture from any fisheries institute/ persons. It also measured by asking how many days of received by respondent.

3.6.8 Extension media contact

Extension media contact referred to the exposure or contact of the fish farmers with 5 selected information sources. The extension media contact of a respondent was measured on the basis of nature of contact with 5 selected information sources The respondents were asked to response to 4alternative nature of contact namely regularly occasionally rarely and not at all contact. Logical frequencies were considered for each of the four alternative responses and scores were assigned for these four alternative responses as follows:

Extension of communication	**Score assigned**
Regularly	3
Occasionally	2
Rarely	1
Not at all	0

Thus, the possible score of extension media contact score of the respondents could range from 0 to 15, while 0 indicated no extension contact and 15 indicated highest extension media contact.

3.6.9 Innovativeness

Innovativeness of a respondent was measured by computing innovativenessscore. Six (6) innovations were selected for the study. Innovativeness score was computed based on the following manner:

Degree of innovativeness	**Scores assigned**
Adoption within 2 years of hearing	3
Adoption during 2-4 years of hearing	2
Adoption after 4 years of hearing	1
Not at all	0

Innovativeness score of a respondent could range from 0 to 18 where 0 indicated no innovativeness and 18 indicate maximum innovativeness.

3.6.10 Satisfaction on fisheries extension services

Farmers 'satisfaction onfisheries extension services was the main focus of this study. Farmers' satisfaction on fisheries extension services was measured with the basis of 8 statements. Degree of the satisfaction was measured by assigning the score in the following manner:

Degree of satisfaction	**Score assigned**
Highly	3
Moderately	2
Low	1
Not at all	0

The scores for responses against all the 8 statements were added together to obtain one's satisfaction score. Therefore, satisfaction score of the respondents could range from 0 to 24. Where 0 indicates no satisfaction and 24 indicates highest level of satisfaction.

3.7 Research hypotheses

In the light of the objectives of the study and variables selected, the following research hypotheses were formulated to test them. The research hypotheses were stated in positive form, the hypotheses were as follows:

"Each of the selected characteristics of the fish farmers had relationship to their satisfaction on fisheries extension services.''

3.8 Null hypotheses

In order to conduct statistical tests, the research hypotheses were converted to null form. Hence, the null hypotheses were as follows:

"Each of the selected characteristics of the fish farmers had no relationship to their satisfaction on fisheries extension services."

3.9 Data Processing

3.9.1 Editing

The collected raw data were examined thoroughly to detect errors and omissions. As a matter of fact the Researcher made a careful scrutiny of the completed interview schedule to make sure that necessary data were entered as complete as possible and well arranged to facilitate coding and tabulation. Very minor mistakes were detected by doing this, which were corrected promptly.

3.9.2Coding and tabulation

Having consulted with the research supervisor and co-supervisor, the investigator prepared a detailed coding plan. In case of qualitative data, suitable scoring techniques were followed by putting proper weight against each of the traits to transform the data into quantitative forms. These were then tabulated in accordance with the objective of the study.

3.9.3 Categorization of data

Following coding operation, the collected raw data as well as the respondents were classified into various categories to facilitate the description of the independent and dependent variables. These categories were developed for each of the variables by considering the nature of distribution of the data and extensive literature review. The procedures for categorization have been discussed while describing the variables under consideration in chapter IV.

3.9.4 Statistical Analysis

Data collected from the respondents were complied, coded, tabulated and analyzed in accordance with the objectives of the study. Various statistical measures such as frequency counts, range, mean, percentage, standard deviation were used in describing the data SPSS (version 11.5) computer program were used for analyzing the data. The categories and tables were used in describing data. The categories and tables were also used in presenting data for better understanding.

For determining the relationship between each of the selected characteristics of the fish farmers and their satisfaction on fisheries extension services Pearson`s Product Moment Correlation Co-efficient (r) test was used. In the study five percent (0.05) level of probability and one percent (0.01) level of probability were used to reject any null hypothesis. In order to find out the relationship between the concerned variables correlation co-efficient (r) was done.

CHAPTER IV
RESULTS AND DISCUSSION

The findings of the study and their interpretation have been presented in this Chapter. This Chapter has been divided into following three sections:

First section: Selected characteristics of the fish farmers

Second section: Farmers' satisfaction on fisheries extension services in Bangladesh

Thirds section: Relationship of each of the selected characteristics of the farmers with their satisfaction on fisheries extension services in Bangladesh

4.1 Selected Characteristics of the Fish Farmers

The findings on the fish farmers' selected characteristics have been presented and discussed in this section. The selected characteristics were: age, level of education, Aquacultureexperience, aquaculture farm area, annual family income from aquaculture, daily time spend in aquaculture, aquaculture training Exposure, Extension media contact and Innovativeness. The salient features like measuring unit, possible range, observed range, mean and standard deviation (SD) of the selected characteristics of the fish farmers have been present in Table 4.1. The fish farmer respondents were classified into different categories based on the nature of the characteristics. The distribution of the fish farmers based on the categorized of the characteristic has been presented in the next sub-sections.

Table 4.1: The Salient Features of the Selected Characteristics of the Farmers

Selected characteristics	Measuring unit	Range		Mean	Standard Deviation
		possible	observed		
Age	Score(years)	_	27-70	45.89	10.699
Level of Education	Score(years of schooling)	_	0-16	5.641	5.7550
Aquaculture experience	Years	_	1-25	7.63	5.378

Aquaculture farm area	Hectare	_	0.020-0.437	0.10	0.0741
Annual family income from aquaculture	Score(``000``taka)	_	1-300	50.22	59.36
Daily Time spend in aquaculture	Hours/day	_	1-6	1.84	1.17
Aquaculture Training exposure	Days	_	0-270	19.93	41.82
Extension media contact	Score	0-15	2-13	7.30	2.82
Innovativeness	Score	0-18	1-16	8.91	3.47

4.1.1 Age

The observed age of the farmers ranged from 27 to 70 years with a mean of 45.89 years and standard deviation of 10.70. The respondents were classified into following three categories based on their age:

Categories	**Basis of categorization**
Young aged	up to 35 years
Middle aged	>35-50 years
Old aged	>50 years

Distribution of the farmers according to their age is shown in Table 4.2.

Table 4.2 Distribution of the farmers according to their age

Categories(years)	Respondent farmers	
	Number	Percent
Young aged	17	16.3
Middle aged	55	53.4
Old aged	31	30.3
Total	103	100

Table 4.2 reveals that the middle aged farmers comprised the highest proportion (53.4%) followed by old aged (30.3%) and the lowest proportion (16.3%) of the farmers comprised the young aged group. Data also indicates that the middle and old aged respondents constitute almost 83.7% of the total respondent farmers. It is assumed that the aged farmers might have comparatively more capacity to determine their satisfaction level on fisheries extension services in Bangladesh.

4.1.2 Level of Education

Education scores of the respondents ranged from 0 to 16 with the mean of 5.64and the standard deviation of a 5.6. Based on their educational scores, the farmers were classified into following four categories

Categories	**Basis of categorization** (Year of Schooling)
Illiterate (don‘t read and write)	0 -0.9
Primary education	1-5
Secondary education	6-10
Above secondary education	> 10

Distributions of the respondents according to their education are presented in Table4.3.

Table 4.3 Distribution of the farmers according to their education

Categories(score)	Respondent farmers	
	Number	Percent
Illiterate(don`t read and write)	46	44.7
Primary education	11	10.6
Secondary education	23	22.3
Above secondary education	23	22.3
Total	103	100

Table 4.3 shows that farmers under illiterate category constituted the highest proportion (44.7%) of the respondents followed by 22.3%, 22.3% and 10.6%having secondary education, and above secondary education and primary level of education respectively. From the findings, it was found that the literacy rate (55.6%) of the area was lower than the average literacy rate of 72.8% (BBS, 2018). It was assumed that the educated fish farmers might have more capacity to determine their judgment of satisfaction on fisheries extension services in Bangladesh.

4.1.3 Aquaculture experience

Aquaculture experience of the fish farmers in the study area varied from 1-25years with the mean of 7.63 and the standard deviation of 5.37. The respondents were classified into following three categories based on their aquaculture experience:

Categories	**Basis of categorization**
Low experience	1-5
Medium experience	6-10
High experience	>11-25

Distribution of the fish farmers according to their aquaculture experience is presented

In Table 4.4.

Table 4.4 Distribution of the fish farmers according to their aquaculture experience

Categories	Respondent farmers	
	Number	Percent
Low experience	48	46.6
Medium experience	34	32.9
High experience	21	20.5
Totals	103	100

Data in the Table 4.4 reveals that the majority (46.6%) of the respondents had low experiences, while 32.9% of them had medium, and 20.5% had high experience in aquaculture.

4.1.4 Aquaculture farm area

Aquaculture farm area of the fish farmers in the study area varied from 0.020-0.437hectares. The mean was 0.10 and the standard deviation was 0.07. On the basis of aquaculture farm area, the respondents were classified into following three categories:

Categories	**Basis of categorization**
Small farm area	up to 0.050
Medium farm area	0.05-0.100
Large farm area	> 0.100

Distribution of the fish farmers according to their land area is presented in Table 4.5.

Table 4.5 Distribution of the fish farmers according to their aquaculture farm area

Categories	Respondents farmers	
	Number	Percent
Small farm area	26	25.4
Medium farm area	37	35.8
Large farm area	40	38.8
Totals	103	100

Data in the Table 4.5 reveals that the majority (38.8%) of the respondents had large aquaculture farm area, while 35.8% of them had medium, and (25.4%) had aquaculture farm areaIt is necessary to find out the perception of all categories of fish farmers, specially the small and medium aquaculture farm holding. Satisfaction on fisheries extension services in Bangladesh. Most (61.2%) of the fish farmer had small to medium aquaculture farm area.

4.1.5 Annual family income from aquaculture

Annual family income from aquaculture score of the respondents ranged from 1to 300 with the average of 50.22 and the standard deviation of 54.36. On the basis of the annual family income from fish culture, the respondents were classified into following three categories:

Categories	**Basis of categorization ("000" BDT.)**
Low income	up to 20
Medium income	21-50
High income	above 50

Distribution of the fish farmers according to their annual family income from aquaculture is shown in Table 4.6.

Table 4.6Distribution of the fish farmers according to their annual family income from aquaculture

Categories(``000``)	Respondents	
	Number	Percent
Low income	42	40.8
Medium income	26	25.4
High income	35	33.8
Totals	103	100

From Table 4.6, it was observed that the highest portion (40.8%) of the respondents had low annual family income while 25.4% respondents had medium and 33.8% had high annual family income from aquaculture. Two-third of (66.2%) of the farmers had low to medium annual income from aquaculture. It is necessary to determine the satisfaction level of all categories of fish farmers on fisheries extension services in Bangladesh.

4.1.6 Daily Time spend in aquaculture

Daily timespends in aquaculture scores of the respondents range from 1-6 with the mean of 1.84 and the standard deviation of a 1.17, on the basis of the time spends and the respondents were categories into three ways:

Categories	**Basis of categorization**
Low time spend	<2
Medium time spend	2-3
High time spend	>3

Distribution of the fish farmers according to their daily time spend in aquaculture is presented in Table 4.7

Table 4.7 Distribution of the fish farmers according to theirdaily time spend in aquaculture

Categories	Respondents farmer	
	Number	Percent
Low time spend	53	51.5
Medium time spend	40	38.8
High time spend	10	9.7
Totals	103	100

From Table 4.7, it was observed that the highest portion (51.5%) of the respondents had low daily time spend while 38.8% and 9.7% spend medium and high time for aquaculture. Mainly (90%) of the farmers spend low to medium daily time for aquaculture. It is necessary to determine the satisfaction level of all categories of fish farmers on satisfaction a fisheries extension services.

4.1.7 Aquaculture training exposure

The aquaculture training experience score of the respondents ranged from 0to 270. The mean score was 19.93 with the standard deviation of 41.82. On the basis of aquaculture training exposure, the respondents were classified into following three categories:

Categories	**Basis of categorization**
Low training exposure	<1
Medium training exposure	1-20
High training exposure	>20

Distribution of the fish farmers according to their training exposure is shown in

Table 4.8 Distribution of the fish farmers according to their aquaculture training exposure

Categories(days)	Respondents farmers	
	Number	Percents
Low training exposure	57	55.3
Medium training exposure	24	23.5
High training exposure	19	21.2
Totals	103	100

Data contained in the Table 4.8 revealed that the majority (55.3%) of the farmers had low training exposure as compared to (23.5%) and (21.2%) having medium and high training exposure respectively. Data again revealed that majority (78.8%) of the fish farmers had lowto medium training exposure. It is assumed that the farmers having more aquaculture training exposure might have more capacity to determine their satisfaction on fisheries extension services in Bangladesh.

4.1.8 Extension media contact

Extension media contact score of the fish farmers ranged from 2 to 13 against the possible range of 0-12 with an average of 7.30 and standard deviation of 2.82. It was measured as one's extent of contact with different media. On the basis of their extension media contact, the respondents were classified into following three categories:

Categories	**Basis of categorization**
Low extension media contact	1-5
Medium media contact	6-10
High media contact	>10

Distribution of the farmers according to their extension media contact score is given in Table 4.9

Table 4.9Distribution of the farmers according to their extension media contact

Categories	Respondents farmers	
	Number	Percent
Low media contact	30	29.1
Medium contact	59	57.3
High contact	14	13.6
Totals	103	100

Data contained in the Table 4.9 indicated that the highest proportion (57.3%) of the respondents had medium contact as compared to (29.1%) and (13.6%) had low and high media contact respectively. Overwhelming majority (86.4%) of the farmer had low to medium extension contact. It is assumed that the farmers having more extension media contact might have more capacity to determine their satisfaction on fisheries extension service in Bangladesh.

4.1.9Innovativeness:

The scores of the innovativeness of the respondents ranged from 1to 16 with a mean of 8.91 and the standard deviation of 3.470. On the basis of their innovativeness scores, the farmers were classified into following three categories:

Categories	**Basis of categorization**
Low	up to 6
Medium	7-12
High	>12

Table 4.10 Distribution of the respondents according to innovativeness

Categories	Respondents farmers	
	Number	Percent
Low	25	24.3
Medium	62	60.2
High	16	15.5
Totals	103	100

Data presented in the Table 4.10 show that the highest proportion (60.2%) of the farmers had medium innovativeness as compared to 24.3 percent had low innovativeness and 15.5 percent had high innovativeness. Thus, most (84.5%) of the farmers had low to medium innovativeness.

4.1.10 Farmers satisfaction on fisheries extension services

Satisfaction of the fish farmers on fisheries extension services was the main focus variable of the study. The observed satisfaction score of the respondents ranged from 3 to 21 against the possible ranged of 0-24. The mean score was 11.01with the standard deviation of 3.74. Based on their satisfaction scores, the respondents were classified into three categories:

Categories	**Basis of categorization**
Low satisfaction	up to 9
Medium satisfaction	10-13
High satisfaction	>13

Distribution of the fish farmers according to their satisfaction on fisheries extension services is shown in Table 4.11.

Table 4.11 Distribution of the fish farmers according to their satisfaction on fisheries extension services in Bangladesh

Categories	Respondents farmer	
	Number	Percent
Low satisfaction	23	22.3
Medium satisfaction	75	72.8
High satisfaction	5	4.9
Totals	103	100

Data contained in the Table 4.11 revealed that majority (72.8%) of the fish farmers had medium satisfaction on fisheries extension services as compared to 22.3% and 4.9% had low and high satisfaction respectively. It means that overwhelming majority (95.1%) of the fish farmers had low to medium satisfaction on fisheries extension services. It was might be for the lack of fisheries extension and rural advisory services in the study area.

4.2Relationship between each of the selected characteristics of the fish farmers and their satisfaction on fisheries extension services

Relationship between each of nine selected characteristics of the fish farmer with their satisfaction on fisheries extension services was determined by Pearson Product Moment Correlation Coefficient. The coefficient of correlation between concerned variables was presented in table 4.12.

Table 4.12 Co-efficient of correlation showing relationship between selected characteristics of the fish farmers and their satisfaction on fisheries extension services (n= 103 with df 101)

Independent variable	Computed value of" r"
Age	0.167^{NS}
Level of education	-0.100^{NS}
Aquaculture experience	0.105^{NS}
Aquaculture farm area	0.386**
Annual income from aquaculture	0.652**
Daily time spend in aquaculture	0.542**
Aquaculture Training exposure	0.307**
Extension media contact	0.644**
Innovativeness	0.705**
** Significant at 0.01 level of probability ^{NS}Non-significant	

Based on the findings of the Table 4.12 out of 9 selected characteristics of the respondents, 6 namely aquaculture farm area, annual income from aquaculture, daily time spend in aquaculture, aquaculture training exposure, extension media contact and innovativeness had significant positive relationship with their satisfaction on fisheries extension services.

On the other hand, age, level of education, aquaculture exposure had no relationship with satisfaction on fisheries extension services. Aquaculture farmarea of the farmers had positive significant relationship with their satisfaction on fisheries extension services.

Annual income from aquaculture had positive significant relationship with satisfaction on fisheries extension services. More annual income develops extrovert mentality and establishes coordination capability to cause more mass media. Extension media contact had positive significant relationship with satisfaction on fisheries extension services. The extension media contact strengthened the base of the farmers' knowledge. The knowledge acts as motivator towards satisfaction of new technologies. Innovativeness had positive significant relationship with fish farmers' satisfaction on fisheries extension services.

Innovative farmers are more educated, more venturesome and more communicative. So, innovativeness might have favorable effect on satisfaction. Daily time spend had positive significant relationship with satisfaction on fisheries extension services. This indicates that higher the production of fish farmers higher the satisfaction on fisheries extension services. Aquaculture training exposure had positive significant relationship with satisfaction on fisheries extension services. This indicates strengthened the base of the farmers' knowledge.

CHAPTER V

SUMMARY OF FINDINGS

5.1. Findings

5.1.1 Selected characteristics of the farmers

Findings in respect of the 9 selected characteristics of the farmers are summarized below:

Age:

The highest proportion (53.4) percent) of the fish farmers was middle aged while 30.3 percent was old and 16.3 percent was young aged.

Level of education:

The highest proportion (44.7 percent) of the respondent had illiterate, while 10.6percent had primary level of education, 22.3 percent had secondary level of education and 22.3 percent had above secondary level of education.

Aquaculture experience

The highest proportion (46.6 percent) of the fish farmers had low skill, while 32.9 percent had medium skill, 20.5 percent had high skill.

Aquaculture farm area

Aquaculture farm area of the fish farmers ranged from 0.020 to 0.43 with the mean of 0.10 and the standard deviation of 0.074. The highest proportion (38.8 percent) of the fish farmers had large farm size compared with 25.4 percent and 35.8 percent having small farm and medium farm size respectively.

Annual family income from aquaculture

The annual family income from aquaculture of the fish farmers ranged from 1 to 300 with an average of 50.22 and standard deviation of59.35. The highest proportion (40.8 percent) of the

respondents had low family income compared to 33.8 percent having high family income and 25.4 percent had medium income.

Daily time spend in aquaculture

The daily time spend in aquaculture of the fish farmer ranged from 1 to 6 with an average of 1.170 and standard deviation of 1.84. The highest proportion (51.5 percent) of the respondents of the study area had the low time spend, while 38.8percent had medium time spend and 9.7 percent had high time spend.

Aquaculture training exposure

The aquaculture training exposure ranged from 0 to 270 with an average of 19.93 and standard deviation of 41.81. The highest proportion (55.3 percent) of the respondents of the study area had the low aquaculture experiences, while 23.5 percent had medium aquaculture experiences and 21.2 percent had high aquaculture experiences.

Extension media contact

The extension media contact ranged from 0 to 15with an average of7.30 and standard deviation of2.82. The highest proportion (57.3 percent) of the respondents of the study area had the medium contact, while 29.1 percent had low contact and 13.6 percent had high contact.

Innovativeness

The innovativeness ranged from 0 to 18 with an average of 8.91 and standard deviation of3.47. The highest proportion (60.2percent) of the respondents of the study area had the medium innovativeness, while 24.3percent had low innovativeness and 15.5 percent had high innovativeness.

5.1.2**Farmer satisfaction on fisheries extension services**

The Farmer satisfaction on fisheries extension services ranged from 0 to 24 with an average of 11.01 and standard deviation of 3.74. The highest proportion (72.8percent) of the respondents of the study area had the medium satisfaction, while 22.3 percent had low satisfaction and 4.9 percent had high satisfaction.

5.2 Conclusions

Conclusion is the final decision or judgment, which is placed through contention at the end or termination of a research work. The findings and relevant facts of research work prompted the researcher to draw following conclusions:

i. The findings revealed that an overwhelming majority (95.1%) of the fish farmers had low to medium satisfaction on fisheries extension services in Bangladesh. It is therefore, concluded that the overall activities of the extension services of Bangladesh for fisheries is not satisfactory. So, there is a scope to improve the fisheries for higher satisfaction of the fish farmers.

ii. Most (61.2%) of fish farmers had small to medium aquaculture farm area. Finding also revealed that aquaculture farm area of the fish farmer had significant relationship with their satisfaction on fisheries extension services in Bangladesh. Thus, it may be concluded that aquaculture farm area makes a fish farmers able to understand about the extension providers initiatives for the aquaculture development in Bangladesh, which may led to increase their level of satisfaction on fisheries extension services.

iii. Two-third (66.2%) of the farmers had low to medium annual family income from aquaculture activities. Annual income from aquaculture of the fish farmers had positive relationship with their satisfaction on aquaculture fisheries extension services. It is therefore, logically concluded that increase of income from aquaculture of fish farmers can increase the level of their satisfaction on fisheries extension services in Bangladesh.

iv. Overwhelming majority (90.3%) of fish farmers spend low to mediumdaily time spend in aquaculture. Finding also revealed that daily time spend of the fish farmer had significant relationship with their satisfaction on fisheries extension services in Bangladesh. Thus, it may be concluded that daily time spend in aquaculture make a fish farmer also to understand the government initiatives for the fisheries extension services in Bangladesh, which may lead to increase their level of satisfaction on fisheries extension services.

v. Majority (78.8%) of the farmers had low to medium aquaculture training exposure. experience. There existed a positive significant relationship of the fish farmers' aquaculture training exposure their satisfaction on fisheries extension services in Bangladesh. Therefore, it

may be concluded that training exposure of the farmers' make them satisfied on the fisheries extension services in Bangladesh.

vi. Overwhelming majority (86.4%) of the fish farmers had low to medium extension media contact. Findings indicated extension media contact of the fish farmers had significant positive relationship with their satisfaction on fisheries extension services in Bangladesh. So, it may be concluded that if the fish farmers come in more contact with extension providers, electronic and print media, they could be more satisfied on fisheries extension services in Bangladesh.

vii. Most of the fish farmers (84.5%) had low to medium innovativeness. Findings indicated that innovativeness of the farmers had significant positive relationship with their satisfaction on fisheries extension services in Bangladesh. So, it may be concluded that the fish farmers having higher innovativeness, had higher satisfaction on fisheries extension services in Bangladesh.

viii. Majority (79.5%) of the farmers had low to medium aquaculture experience. There existed a positive significant relationship of the fish farmers'aquacultureexperience their satisfaction on fisheries extension services in Bangladesh. Therefore, it may be concluded that aquaculture experience of the farmers' make them satisfied on the fisheries extension services in Bangladesh.

5.3 Recommendations

Recommendations based on the findings and conclusions of the study have been presented below:

5.3.1 Recommendation for policy implications

i.Overwhelming majority (95.1%) of the fish farmers had low to medium satisfaction on fisheries extension services in Bangladesh. It means that most of the fish farmers are not satisfied with the existing status of fisheries extension services in Bangladesh. It may be therefore, recommended that extension service providers should takeninitiatives for increasing their extension activities by increasing the number of farm visit by increasing the number of extension personnel, so that the fish farmers could increase their farm productivity and possess their level of satisfaction on fisheries extension services in Bangladesh.

ii. Aquaculture farm area, annual income from aquaculture, daily time spend in aquaculture and aquaculture training exposure of the fish farmers had positive significant relationship with their satisfaction on fisheries extension services in Bangladesh. Therefore, it was recommended that fisheries extension services providing organization of Bangladesh should provide motivational campaign, technical support and necessary training to the fish farmers so that they could increase their level of satisfaction on fisheries extension services in Bangladesh.

iii. Extension media contact of the fish farmers had significant relationship with their satisfaction on fisheries extension services in Bangladesh. So, it may be recommended that the extension workers of the concerned authority should increase their contact with fish farmers personally and motivate them to be connected with electronic and print media that can help them to exchange related information which would increase their performance potentials of farm productivity which turns increase fish farmers satisfaction on fisheries extension services in Bangladesh.

iv. Innovativeness of the farmers had positive significant relationship with their satisfaction on fisheries extension in Bangladesh. Therefore, it may be recommended that the extension service providers should increase the number of their staff to increase their contact with the fish farmers to make them innovativeness, So that they could increase their level of awareness about development initiatives of the government which in turn increase the satisfaction on fisheries extension services in Bangladesh.

Base on the above recommendations, following overall recommendation was made:

As the largest public fisheries extension organization of Bangladesh, Department of Fisheries (DOF) should increase the number of Fisheries Extension Officer (FEO) like the Department of Agriculture Extension (DAE) to increase fisheries extension services at village level and at least 5% of the FEO should have higher degree in agriculture extension of perform better extension services.

5.3.2 Recommendations for the future study

A single research work is very inadequate to have in-depth understanding of the fish farmers' satisfaction on fisheries extension services in Bangladesh. Further studies should be undertaken

covering more dimensions of the same issue. The following recommendations are made for future study:

i. The present study conducted on the population of the fish farmers of 7 villages of one union under Badarganjupazila of Rangpur district. The findings of the study needed to be varied by undertaking similar research in other zones of the country.

ii. The study investigated the relationship of the 9 selected characteristics of the fish farmers with their satisfaction on fisheries extension services in Bangladesh. But fish farmers' satisfaction on fisheries extension services in Bangladesh might be affected by other various personal, social, psychological, cultural and situational factors. It is, therefore, recommended that further study should be conducted involving other characteristics of the fish farmers.

iii. In addition to fish farmers' satisfaction on fisheries extension services in Bangladesh, the fish farmers faced various problems in aquaculture practices. Therefore, it may be recommended that research should be conducted by involving other dimensions of satisfaction of the fish farmers.

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APPENDIX - I

AN ENGLISH VERSION OF INTERVIEW SCHEUDLE

Department of Agricultural extension and Information System

Sher-e-Bangla Agricultural University,
Sher-e-Bangla Nagar, Dhaka-1207
An interview schedule for a research study entitled

FARMERS' SATISFACTION ON FISHERIES EXTENSION SERVICES

Serial No:…….

Name of the respondent:…….

Village:……..

Union:……...

Upazila:…….

District:……..

(Please answer the following question. Your Information will be kept confidential and will be used for research purpose only)

1. Age

What is your present age? .....years

2. Level of Education

What is the level of your education?

1. Do not know reading & writing……
2. Can sign only……
3. I have passed up to class……

3. Aquaculture experience

Please mention your experience &aquaculture experience in fisheries sector

……years

4. Aquaculture farm area

Please mention the amount of aquaculture farm area

(i)Local unit……

(ii)Hectare……..

5. Annual Family Income from aquaculture

Please mention the amount of annual income from aquaculture.

……TK

6. Daily time spend in aquaculture

How much time do you spend each day for fish culture?

……..hour/day

7. AquacultureTraining Exposure

Did you receive any fisheries related training?

Yes……. /No… (If yes, please furnished following information)

SL No.	Title of the training course	Duration	Training offering organization
1.			
2.			
3.			

8. **Extension media contact**

Please indicate the extent of your exposure with the following media

Information sources	Extent of communication			
	Regularly (3)	Occasionally (2)	Rarely (1)	Not at all (0)
Neighboring model farmers	5-6times/ months( )	3-4 times/ months( )	1-2 times/ months( )	0 times/ months( )
Local fisheries resources persons	5-6 times/ months( )	3-4 times/ months( )	1-2 times/ months( )	0 times/ months( )
Fisheries related NGO workers	5-6 times/3 month ( )	3-4 times/3 month ( )	1 -2 times/3 month ( )	0 time/3 month ( )
Fisheries field worker	5-6 times/3 month ( )	3-4 times/3 month ( )	1 -2 times/3 month ( )	0 time/3 month ( )
Upazila fisheries Officers	5-6 times/ year( )	3-4 times/ year( )	1-2 times/ year( )	0 times/ year( )

9. Innovativeness

Please mention the degree of use of the following innovation

SL No	Name of the innovation	Degree of innovativeness			
		Adoption within 2 year of hearing (3)	Adoption during 2-4 year of hearing (2)	Adoption After 4 year of hearing (1)	Not at all (0)
1.	Use of lime(to reduce acidity, to improve water quality)				
2.	Use of Fertilizer(to produce primary productivity)				
3.	Use of supplementary feed				
4.	Use of rotenone(to kill the carnivorous fish)				
5.	Use of aeration(to maintain oxygen level)				
6.	Use of water quality parameter(seccidick,PH-meter)				

10. Farmers satisfaction on fisheries extension services.

Please mention the degree of your satisfaction on fisheries extension services

Sl. No	Fisheries extension services by Upazila Fisheries Officer	Degree of satisfaction			
		Highly (3)	Moderately (2)	Low (1)	Not at all(0)
1.	Regular Fisheries advisory services				
2.	Regular monitoring				
3.	Information to ensure good quality inputs				
4.	Provide information on new technology				
5.	Regular treatment				
6.	To form a community				
7.	Information to credit support				
8.	Exposure visit				

APPENDIX -II

Correlations between dependent and independent variables of the study

	X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8	X_9	Y
X_1	-									
X_2	-0.189	-								
X_3	0.381**	.097	-							
X_4	0.043	.127	0.175	-						
X_5	0.124	-.028	0.005	.624**	-					
X_6	0.119	-.025	0.144	.617**	.771**	-				
X_7	0.012	.119	0.172	.412**	.293**	.449**	-			
X_8	0.072	-.033	-0.020	.320**	.590**	.474**	.293**	-		
X_9	0.147	-.144	0.124	.349**	.584**	.552**	.333**	.632**	-	
Y	0.167	-.100	0.105	.386**	.652**	.542**	.307**	.644**	.705**	-

Legend

X_1	= Age	X_6	= Daily time spend in aquaculture
X_2	= Education	X_7	= Training exposure in aquaculture
X_3	= Experience in aquaculture	X_8	= Extension contact
X_4	= Aquaculture land area	X_9	= Innovativeness
X_5	= Annual income from aquaculture	Y	= Satisfaction on fisheries extension service