INFORMATION SOURCES USED BY FISH FARMERS IN POND FISH FARMING

SUBRINA RAHMAN OYSHE

Department of Agricultural Extension and Information System

Sher-e-Bangla Agricultural University

Dhaka-1207

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By

SUBRINA RAHMAN OYSHE

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Approved By:

Prof. Md. Abul Bashar Supervisor Department of Agricultural Extension and Information System Sher-e-Bangla Agricultural University Dhaka1207	Prof. Dr. Mohammad Zamshed Alam Co-Supervisor Department of Agricultural Extension and Information System Sher-e-Bangla Agricultural University Dhaka1207

Prof. Dr. Mohammad Zamshed Alam
Chairman
Department of Agricultural Extension & Information System
Sher-e-Bangla Agricultural University Dhaka-1207

DEPARTMENT OF AGRICULTURAL EXTENSION AND INFORMATION SYSTEM

Sher-e-Bangla Agricultural University
Sher-e-Bangla Nagar, Dhaka-1207

CERTIFICATE

This is to certify that the thesis entitled **"Use of Information Sources by the Fish Farmer in Pond Fish Farming"** submitted to the Faculty of Agriculture, Sher-e-Bangla Agricultural University, Dhaka in partial fulfilment of the requirements for the degree of **Master of Science (MS) in Agricultural Extension and Information System**, embodies the result of a piece of bona-fide research work conducted by **SUBRINA RAHMAN OYSHE**, **Reg. No. 19-10371** under my supervision and guidance. No part of this thesis has been submitted for any other degree or diploma.

I further certify that any help or source of information, received during the course of this study has been dully acknowledged by him.

Dated: December, 2021
Dhaka, Bangladesh.

Md. Abul Bashar
Supervisor & Professor
Department of Agricultural Extension and Information System
Sher-e-Bangla Agricultural University Dhaka-1207

DEDICATED TO MY BELOVED PARENTS AND HUSBAND

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The Author

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ABBREVIATIONS

DoF = Department of Fisheries

UFO = Upazila Fisheries Officer

AUFO = Assistant Upazila Fisheries Officer

UFEO = Upazila Fisheries Extension Officer

FSY = Fisheries Statistical Year

BBS = Bangladesh Bureau of Statistics

FAO = Food and Agriculture Organization

GDP = Gross Domestic Product

NGO = Non-Governmental Organization

SPSS = Statistical Package for Social Science

Information Sources Used by the Fish Farmers in Pond Fish Farming

Subrina Rahman Oyshe

ABSTRACT

The purposes of this study were to determine the use of information sources by fish farmers on pond fish farming and to explore the relationship between selected characteristics of the farmers and their use of information sources. The selected characteristics were age, education, family size, fish farm size, experience on fish farming, annual income, training received in fish farming, knowledge on fish farming and usefulness of information sources. Data were gathered from randomly selected 96 respondents (farmers) of Banaripara upazila under Barishal district by using a pretested interview schedule. The entire process of collecting data was completed between June and July, 2022. Apart from descriptive statistical methods, Pearson's Product Moment Correlation Co-efficient analysis was used in order to analyze the data. Data revealed that majority (65.63 percent) of the fish farmers were less user of information sources, while 29.16 percent were moderate user and 5.21 percent were high user of the information sources. So, it can be said that there was scope to increase the use of information sources by the fish farmers in the study area. Fisheries officer was highly used while reading fisheries books/magazines/leaflets was least used by the fish farmers as information sources. Out of nine selected characteristics of the fish farmers education, fish farm size, annual income, training received in fish farming, knowledge on fish farming and usefulness of information sources showed significant and positive relationships with the use of information sources. Thus, the study concludes with the recommendation to enable favorable environment to promote use of information sources in receiving pond fish farming information.

Keywords: Information sources, Pond, Fish farmer, Fish farming

CHAPTER 1

INTRODUCTION

1.1 Background of the Study

Bangladesh is an agro-based riverine country and is uniquely affluent with natural fisheries resources. Immense riverine network and enormous floodplains makes the aquatic resources of this county highly potential and diversified. Fish is the main aquatic resource of Bangladesh. It plays a very important role in the daily life of many people in Bangladesh. Rice and fish together constitute an average Bangladeshi's principal diet. Fish and Fisheries sector play an extensively important role on the socio-economic development of Bangladesh from time immemorial and it is the part of our cultural heritage (Akter et al., 2015). From time immemorial, the people are engaged themselves in catching of fish both for subsistence and professional purposes.

Fish farming is rapid growing food producing sector in the World. World fish farming is rising with an annual rate of 8.9–9.1% since the 1970s (Delgado, 2003). Global fish farming has grown dramatically over the past 50 years to around 52.5 million tons and accounting for around 50 per cent of the world's fish food supply (FAO, 2016). Asia dominates aquaculture production of the world and contributes around 87% to the global cultured fin-fish production of 25.7 million tons in 2005 (De Silva et al., 2006). Aquaculture production in our country is gradually increasing over years since 1970, after 1995 it has been growing at a high rate.

Bangladesh is deliberated as one of the most compatible territory for fisheries in the world, with the world’s largest flooded wetland and the third largest aquatic biodiversity in Asia after China and India. The water bodies are parted into inland fisheries and marine fisheries and inland fisheries are parted into capture fisheries and culture fisheries (Shamsuzzaman et al., 2017). Bangladesh is one of the world’s leading inland fisheries producers and it has a huge water resource all over the country in the form of small ponds, ditches, lakes, canals, small and large rivers and estuaries covering about 4.34 million hectare (Ghose, 2014). Freshwater aquaculture engaged pond aquaculture of native and exotic species. The country also has a coastal area of 2.30 million ha and a coastline of 714 km alongside the Bay of Bengal, which supports a large artisanal and coastal fisheries (Ghose, 2014).

The water resources of Bangladesh bestowed with rivers, beel, khal, floodplains, canals and thousands of small wetlands and ponds. Most of those water bodies are suitable for the freshwater fish culture. Total fish production of Bangladesh in 2020-21 was 46.21 lakh MT where aquaculture contributes 56.44% (DoF, 2021). Bangladesh is now acquired 3rd position in open water and 5th in inland water production (DoF, 2021). Fisheries sector contributes 3.52% of total GDP and 26.37% of the agricultural GDP (DoF, 2021). 18.5 million people have engaged in this sector in which numbers of fish farmers are around 13.86 million. Total pond area of Bangladesh in 2020-21 was 1.83 million ha and annual production was 4.77 MT/ha (DoF, 2021). Pond farming represents the backbone of aquaculture in Bangladesh, accounting for 85.8% of total recorded production and 57.7% of the area under farming (Abdullah & Chowdhury, 2016).

Fisheries play a significant role in the subsistence of rural and poor people in Bangladesh (Mazid, 2002). Fish farming has been proved a profitable and attractive business comparing to other agricultural cultivations. Consequently, many rice farmers are converting their fields into fish culture ponds (Islam et al., 2002; Islam et al., 2017). A large number of people have developed their socioeconomic conditions through fish farming activities in Bangladesh (Ara, 2005). Aquaculture practice has the potentiality to achieve self-sufficiency in the food sector and it also reduced poverty in Bangladesh (Al-Amin et al., 2012). Proper planning and development in any production sector, it needs up to date information on available resources. The implementation of the developmental program often turns to unsuccessful due to the lack of proper information (Ellis, 2000; Hasan et al., 2012).

Information sources play an important role to transfer the message of improved practices and other information from sources to the farmers. Fish farming in Bangladesh undergo several challenges. Fish production is more volatile than any other agricultural biological production (Tveteras, 1998). The message of improved fish production technologies has not yet been properly conveyed to the farmers and the rate of diffusion of new knowledge is inadequate. To increase the fish production the generation of technology and their diffusion to the farmers are important one. In addition the immediacy and effectiveness of technology diffusion are greatly demanded. The flow information should be understandable, well interpreted, accepted and liked by the farmers.

1.2 Statement of the Research Problem

Bangladesh fisheries have ample scope of development to strengthen the national economy. It is blessed with vast open water resources with a wide range of aquatic diversity. Major parts of the total population of this country are directly or indirectly involved with fish or fish related business. Fisheries are one of the major components of agricultural functions, playing a significant role in nutrition, employment, income generation, foreign exchange earnings and in the economy of Bangladesh as a whole. Pond farming represents the backbone of fish farming in Bangladesh. Although small pond fish farming is profitable, the level of yield remains under the potential due to number of reasons. It is assumed that a large number of fish farmers, in particular, pond fish farmers have less contact to technical information sources and in many cases they have lack of awareness on where to receive information for on aquaculture practices. As technical information is very important following appropriate technique, it may be important to look at the actual scenario of pond fish farmers about their use of information sources. As no systematic study has so far been conducted on this area, the present study has been undertaken to find out the answers of the following research questions:

i. What are the extent of information sources by fish farmers for pond fish farming?
ii. What are the characteristics that influence fish farmers to use information sources in pond fish farming?
iii. Is there any relationship between the extent of use of information sources by the fish farmers and their selected characteristics?

1.3 Specific Objectives

On the basis of the considerations stated above the following specific objectives are formulated for giving proper direction to the study:

i. To determine the extent of use of information sources by the farmers in pond fish farming;
ii. To assess and describe following selected socio-economic characteristics of fish farmers:
    - ✓ Age
    - ✓ Education

- ✓ Family size
- ✓ Fish farm size
- ✓ Fish farming experience
- ✓ Annual family income
- ✓ Training received in fish farming
- ✓ Knowledge on fish farming
- ✓ Usefulness of information source ; and

iii. To explore the relationships between the extent of use of information sources by the fish farmers and each of the selected characteristics.

1.4 Justification of the Study

The major focus of the study is to assess the use of Information sources. It is true that the fish farmers are the vital elements for the use of information sources and the fish farming are essential to meet our rising demand without harming aquatic environment and other resources. Fish production can be increased by pond farmers if they are able to identify available information sources and make maximum utilization of information sources to gain proper knowledge of the aquaculture technologies. Pond fish farming provides reasonable cash income to the people. Even though a part of the fish may be used for domestic consumption, it eventually contributes to the nutrition of family members. The study will generate important information on which type of information sources are being used by the pond fish farmers and which types of sources are more effective to them. The findings of the study will give a hypothetical thought all over the nation. The finding however, would also applicable for other areas of the country having similarities with the study area. Thus, the findings are expected to be useful to the extension workers and planners for preparation of programme for rapid diffusion of appropriate technologies for the pond fish farmers. . It is expected that this study will inspire other researchers to conduct same sorts of research in other parts of the country.

1.5 Significance of the Study

The contribution of the study provides solutions against the problem statements. These contributions are as follows:

- ➢ The study determined the extent of use of information sources by the pond fish farmers.

- The study explored the relationships of the selected characteristics of the farmers with their use of different information sources.

1.6 Assumptions of the Study

An assumption is the supposition that an apparent fact of principle is true in the light of the available evidence (Goode and Hatt, 1952). An assumption is taken as a fact or faith to be true without proof. While undertaking the study researcher made the following assumptions.

- The researcher who acted as interviewer was well adjusted to the socio environment of the study area.
- The respondents were capable enough to serve proper responses to the questions of the questionnaire.
- Views and opinions furnished by the respondents are representative of the whole population of the study.
- The responses given by the farmers were reliable, true and current.
- The interviewer was able to rate the responses of the fish farmers with adequate precision.
- The sample size was indicator of the whole population of the study area.
- The data collected by the researcher was free from biasness.

1.7 Limitations of the Study

The study was undertaken with a view to have an understanding of farmer's preference of information sources in pond fish farming of five selected villages of Banaripara upazila under Barishal district. In order to conduct the research in a meaningful and manageable way it become necessary in imposing certain limitations. Considering time, money and necessary resources available to the researcher the following limitations have been observed throughout the study:

- The study was confined to the five selected unions of Banaripara upazila under Barishal district. Numbers of farmers in the selected areas are large but only 96 farmers were considered for research purposes.
- The characteristics of farmers were many and varied, but only few characteristics were used in this study.

- The researcher had to depend as the data furnished by the selected respondents during the interview with them. There were no kinds of written documents in favor of the fish framer's opinion.
- Several data collection methods, scales and statistical tests have been utilized to measure the use of Information sources over a relatively short period of time.
- Unwillingness of fish farmers to provide information.
- The conceptual framework of the study emphasizes the use of information sources in the locality. It may not be applicable in all other areas of Bangladesh.

1.8 Definition of Important Terms

In this study, the particular terms have been frequently used. These are defined and interpreted below for clarity of understanding.

Information: Information is something that reduces uncertainty.

Information source: The term information sources define the media or channels through which different data are diffused among the farmers on various aspects including crops, livestock, fisheries, education and other similar matters.

Fish: Fish and fishes are cold blooded aquatic animals typically with backbone, internal gill (work as respiration) and fins (work as locomotion) depend primarily on water as a medium in which to live.

Fish farmers: Fish farmers are the part of human society whose livelihoods are fully or partially dependent on fishery activities.

Fish farming: Fish farming involves culturing fish commercially in tanks or enclosures such as, fish ponds usually for fish production.

Knowledge: Knowledge referred to the facts, information, and skills acquired through experience or education.

Respondent: Respondent referred to the fish farmers who were involved in small scale pond-fish farming and were interviewed as part of the sample of the study.

Pond-fish culture: Pond-fish culture referred to the practice of fish farming by the respondents of the study in their owned/shared/leased ponds.

Age: Age of a fish farmer referred to the period of time (years) spent by him starting from birth to the time of interview.

Education: Education referred to the development of desirable change in knowledge, skill, attitude and ability in an individual through reading, writing, working, observing and other related activities. It implies to the extent of formal schooling of a fish farmers at any kind of formal educational institutions.

Family size: It refers to the total number of persons including the fish farming in his family.

Fish farm size: Fish farm size refers to the pond area in which he carried out his fish farming activities owned by the fish farmers or obtained from others on lease system.

Farming experience: It is defined as how many years a farmer practically contacts with and observed of his farming system.

Annual family income: The term annual family income referred to the total earning of the respondent himself/herself from agriculture, livestock, fisheries and other accessible sources (business, service, daily labor etc.) during a year. It was expressed in Thousand Taka.

Training exposure: It referred to the total number of days that a respondent received training in his entire life from different organizations under different training programmes.

Usefulness of Information source: The degree to which a person believes that using a particular system would enhance his or her job performance. It means whether or not someone perceives that to be useful for what they want to do.

Individual Media: Individual media defines the recurrence of respondents' presentation to various individual information sources, for example, neighbors, companions, relatives, extension workers, local leader, and so on.

Group Media: Group media defines as the recurrence of exposure of the respondents to various group of information, for example, group discussion meetings, farm demonstration meeting, method demonstration meetings and result demonstration meetings.

Mass Media: The mass media are the mean of communication or instrument or device through which messages are transmitted towards a generally extensive, heterogeneous, and mysterious crowd inside a moderately shorter coordinated structure the source of people's gathering. Mass media incorporated into the study were radio, TV, internet, face book/tweeter, you tube etc.

Mobile phone: A portable telephone that sends and receives radio signals through a network of short range transmitters located in overlapping cells throughout a region, with a central station making connections to regular telephone lines.

Internet: A global computer network providing a diversity of information and communication facilities, consisting of interconnected networks using standardized communication protocols.

CHAPTER 2

REVIEW OF LITERATURE

The aim of this chapter is to describe the review of past researches conducted in line of the major focus of this study. Literature having relevance to the present study has been reviewed in three sections. The first section deals with the literature on general context of use of information source, the second section deals with review of studies dealing with the relationship of selected characteristics with their use of information sources. Finally last section of this chapter deals with the conceptual framework of the study.

2.1 Review of Literature on General Context on Use of Information Sources

Jaynab (2016) observed that a highest proportion (77.40 %) of the respondents had medium use of information sources while only 12.9% and 9.7% had low and high use of information sources by the mango growers.

Farmers need information support from all stages of agriculture from production to marketing (Lio and Liu, 2006). Therefore, they use different information sources and media to access those information.

Rahman (2014) observed that a highest proportion (53.30 %) of the respondents had low use of information sources while only 46.70 % had medium use of information sources. Nobody of the respondents was found having high rate of use information sources about roof top gardening.

Studies have shown that the average small-scale farmer suffers from large information gaps for their farming, for instance, farmers may not have access to information on how to respond to new pests and diseases (Aker & Mbiti, 2014).

Mithon (2016) showed that a highest proportion (42.7 percent) of the respondents had medium use of information sources as compared to 30.5 percent and 26.8 percent having low and high use of information sources respectively at Mirpur-1 under Dhaka city.

Heeks and Molla (2009) studied on the role of information sources in agricultural production on Africa and reported that it played a significant role in a country's development. The results found that of information sources played significant role in enhancing agricultural production.

Kabir (2018) found that a largest proportion (45.29%) of the house owners fell in the medium media contact category, while 32.07 percent of them were in the low media contact category and about 22.64 percent constituted the high media contact category. Media contact is important for gathering information from many sources. High media contact is essential for creating awareness about new idea, practice and issues among the house owners at two distinct Thana under Dhaka city.

Rogers (1971) reported that the mass media can create awareness and speed information rapidly.

Jange and Patel (2001) pointed out that most of the farmers receiving information from farmers group on groundnut cultivation.

Patil et al. (2014) reported in a study that contact farmers received information on improved agricultural technology from neighbor farmers (59.18 percent), progressive farmers (56.12 percent), village extension worker (91.84 percent), agricultural officer (31.63 percent), group discussion (16.33 percent), radio (88.77 percent) and newspaper (60.20 percent).

Ania (2006) found in a study that extension officers were the most important information source while radio and television are considered as the most frequently used information sources by farmers.

Lucky (2012) stated that Radio and television can get information across to every nook and corner of rural areas where it is difficult to make direct contact.

Van den Ban and Hawkins (2008) also reported that in industrialized countries people spent more time with television and radio than printed world. Radio is the most important mass medium for farmers of less industrialized countries. The urban middle class in less industrialized countries also spent considerable time for watching television but it is not yet a very important media in rural areas of these countries.

Hossain (2012) reported that in both relatively progressive and less progressive village of Bangladesh preferred consulting with friends, relatives and neighbors more often than any other official sources for agricultural information.

Wangu (2014) remarked a majority of gardeners use social media to seek for a variety of agricultural information, mostly scientific, educational and technology based, including training information, agrochemicals and technological information.

Nuruzzaman (2013) revealed that 79.43 percent of farmers had medium use. 9.34 percent had low use and only 11.21 percent had high use of mass media. Preference of mass media varied for different technologies. Television was found to have first preference followed by radio, agricultural fair, folk song and poster respectively by the farmers.

Shamima (2011) revealed that 56.67 percent of the respondent had low use of information sources, while 36.67 had medium use of information sources and only 6.67 percent of fish farmers had high use of information sources in receiving information on small scale fish farming.

Lwoga and Ngulube (2008) revealed in a study that the farmers were able to improve their production, linkages to profitable markets, and reduce poverty by accessing agricultural knowledge and information through ICTs (such as, telecenters, cell phones and radio) in Tanzania.

Uddin (2015) revealed that about two third (64.5%) of the respondents had medium use of information sources in receiving agricultural information compared to 13.6 % and 21.8 % having low and high use of information sources in receiving agricultural information respectively at Homna upazilla of comilla district in Bangladesh.

Most of the farmers of Bangladesh suffer for information about modern agricultural knowledge. Information sources create opportunities for rural farmers to obtain farm- and market-related information and suggest where to market agricultural produce. Moreover, farmers can contact extension offices or other support services to meet up their information need for weather condition, agricultural technologies, input facilities, transport services and market condition (Aker and Mbiti, 2010, Aker, 2011).

Sarowaruddin (2017) revealed that 37.4 percent of the respondent had low use of information sources, while 32.7 had medium use of information sources and 29.9% percent of farmers had high use of information sources in receiving agricultural information.

2.2 Review Concerning the Relationship between Selected Characteristics of the Farmers and Use of Information Sources

2.2.1 Age and Use of Information Sources

Shamima (2011) reported that a significant positive relationship existed between farmer age and their extent of use of information sources on small scale pond fish farming.

Jaynab (2016) reported that a no significant negative relationship existed between farmer age and their extent of use of information sources in mango farming.

Ahmed (2012) it was observed that there was no significant relationship between age of the farmers and information sources used in agriculture by them.

Ali (2011) that age of the farmers had no significant relationship with adoption of mass media based information for decision-making in vegetable cultivation.

Ogutu et al. (2014) who reported that there was significant positive correlation between the age of the farmers and their use of information sources based market information service projects for accessing to agricultural market information.

Khan (2012) in his study concluded that there was no significant relationship between age and use of information sources by farmers in receiving information related to cultivation of selected winter vegetables.

Jannat (2015) revealed that age had significant relationship to the impact of using information media by the farmers.

Kafura (2015) reported that there was negative significant relationship between the age of the farmers and the level of use of information sources for agricultural purposes by them.

Sarowaruddin (2017) revealed that age had significant but negative relationship to the impact of using information media by the farmers.

Gulnaher (2018) revealed that age had positive significant relationship to the impact of using information media by the people in receiving information about rooftop garden.

2.2.2 Education and Use of Information Sources

Shamima (2011) reported that a significant positive relationship existed between education of the farmer and their extent of use of information sources on small scale pond fish farming.

Alam (2015) found that education showed significant and positive relationship with their use of information sources.

Sarowaruddin (2017) revealed that education had positive significant relationship to the impact of using information media by the farmers.

Nuruzzaman (2013) in his study observed that education of the respondents had significant positive relationship with their use of mass media in receiving agricultural information sources.

Uddin (2015) found that education had significant relationship on their use of information sources.

Gulnaher (2018) revealed that education had positive significant relationship to the impact of using information media by the people in receiving information about rooftop gardening.

Jaynab (2016) reported that a positive significant relationship existed between farmer education and their extent of use of information sources in mango farming.

Jannat (2015) revealed that level of education had significant relationship to the impact of using information sources by the farmers.

2.2.3 Family Size and Use of Information Sources

Kafura (2015) observed that there was no significant relationship between the family size of the farmers and the level of use of different ICT tools for agricultural purpose by them.

Ahmed (2012) observed that family size of the farmers had no significant relationship with ICT utilization in agriculture by them. However, there was different result also.

Ogutu et al. (2014) revealed that no significant relationship was observed between family size of farmers and their participation in ICT based market information service projects for accessing to agricultural market information.

Sarowaruddin (2017) revealed that family size had no significant relationship to the impact of using information media by the farmers.

Hossain (2010) concluded in his study that family size of the respondents had no significant relationship with their preference of information sources in receiving agricultural information.

Gulnaher (2018) revealed that family size had no significant relationship to use of information media by the people in receiving information about rooftop gardening.

Okello et al. (2012) found in a study that the family size of the farmers was a negatively significant for the use of the information sources for agricultural purposes.

2.3.4 Farm Size and Use of Information Sources

Shamima (2011) reported that a positive significant relationship existed between farm size and their extent of use of information sources on small scale pond fish farming

Hossain (2010) found that farms size of the farmers had a positive and significant relationship with their extent of use of commutation sources.

Das (2014) concluded in his study that farm size of the respondents had no significant relationship with their preference of information sources.

Alam (2015) found that effective farm size showed significant and positive relationship with their use of media.

Sarowaruddin (2017) revealed that farm size had no significant relationship to the use of information media by the farmers.

Roy (2006) in his study concluded that farm size of the respondents had no significant relationship with the effectiveness of mass media.

Jaynab (2016) reported that positive significant relationship existed between farm size and their extent of use of information sources in mango farming.

2.2.5 Experience and Use of Information Sources

Shamima (2011) reported that a negative but not significant relationship existed between experience on fish culture of the farmer and their extent of use of information sources on small scale pond fish farming.

Jaynab (2016) reported that negative but no significant relationship existed between farmer experience and their extent of use of information sources in mango farming.

Kafura (2015) noted that there was negative significant relationship between the farming experience of the farmers and the level of use of different ICT tools in agriculture by them.

Ogutu et al. (2014) revealed that no significant relationship was observed between the farming experience of the farmers and their participation in ICT based market information service projects for accessing to agricultural market information.

Gulnaher (2018) reported that positive significant relationship existed between farmer experience and their extent of use of information sources in rooftop gardening.

Sarowaruddin (2017) revealed that experience had significant but negative relationship to the use of information media by the farmers.

2.2.6 Annual Income and Use of Information Sources

Hossain (2010) in his study observed that income of the farmers had a positive and significant relationship with their extent of use of information sources.

Barman (2009) concluded that the annual income of the farmers had positive significant relationship with their use of mass media.

Alam (2015) found that annual family income showed significant and positive relationship with their use of cell phone.

Jaynab (2016) reported that no significant relationship existed between annual family income and their extent of use of information sources in mango farming.

Ahmed (2012) observed that there was no significant relationship between the annual income of the farmers and utilization of ICT in agriculture by them.

Sarowaruddin (2017) revealed that annual family income had positive significant relationship to the use of information media by the farmers.

Ali (2011) that income levels of the farmers are more likely to affect the adoption of mass media based information for decision-making in vegetable cultivation.

Islam (2009) in his study concluded that there was no relationship between farm size of the farmers and their extent of use of information sources in winter vegetable cultivation.

Gulnaher (2018) reported that no significant relationship existed between annual family income and their extent of use of information sources in rooftop gardening.

2.2.7 Training Received and Use of Information Sources

Shamima (2011) reported that a positive but not significant relationship existed between training received by fish farmer on fish farming and their extent of use of information sources on small scale pond fish farming.

Kafura (2015) observed that there was no significant relationship between the training exposure of the farmers and the level of use of different information sources for agricultural purposes by them.

Das (2014) that formal training of a member positively influences the use of information sources to access agricultural information by them.

Meera et. al. (2008) revealed in different studies that farmers extent of use of information sources and training course had positively significant.

Sarowaruddin (2017) revealed that farm size had no significant relationship to the use of information media by the farmers.

2.2.8 Knowledge and Use of Information Sources

Hossain (2010) reported that a significant positive relationship existed between agricultural knowledge of the resource of poor farmers and their extent of use of information sources.

Jaynab (2016) reported that positive significant relationship existed between knowledge about mango farming and their extent of use of information sources in mango farming.

Das (2009) in his study concluded that there was a negative significant relationship between farmers knowledge of Radio and Television and their extent of use of Information sources:

Jannat (2015) revealed that agricultural knowledge had significant contribution to the impact of using ICT by the farmers.

Ahmed (2012) observed that agricultural knowledge of the farmers had no significant relationship with the utilization of ICT in agriculture by them.

Gulnaher (2018) reported that positive relationship existed between knowledge on rooftop gardening and their extent of use of information sources in rooftop gardening.

Reza (2007) found that positive significant relationship between agricultural knowledge of the farmers and the effect of use of ICT as perceived by them.

Shamima (2011) reported that a positive significant relationship existed between knowledge of fish farmer on fish farming and their extent of use of information sources on small scale pond fish farming.

Mollah (2006) concluded in his study that agricultural knowledge of the farmers had a significant relationship with their use of communication media.

Sarowaruddin (2017) revealed that agricultural knowledge had positive significant relationship to the use of information media by the farmer.

2.2.9 Usefulness of Information Sources and Use of Information Sources

Iqbal (2016) revealed that usefulness of information sources had positive significant relationship to the use of information media by the farmer.

Habibur (2020) reported that usefulness of ICTs had positive significant relationship to the use of ICTs.

2.3 Conceptual Framework of the Study

The conceptual framework is the researcher understanding of how the particular variables in study connect with each other. Thus, it identifies the variables required in the research investigation. It is the researcher's "map" in pursuing the investigation. From the past studies and literature it is observed that various personal characteristics affected respondents on use of

information sources but it is quite impossible to deal with all the characteristics. No literature was found directly related with the use of information sources and the contribution of the selected characteristics of the fish farmers on their use of information sources. Based on these considerations a conceptual framework has been developed for this study where the researcher mainly attempted to highlight two concepts, namely selected characteristics of the fish farmers (age, education, family size, fish farm size, fish farming experience, annual income, training received in fish farming, knowledge on fish farming and usefulness of use of information sources) as and the focus issue (use of information sources). The conceptual framework has been given in the next page:

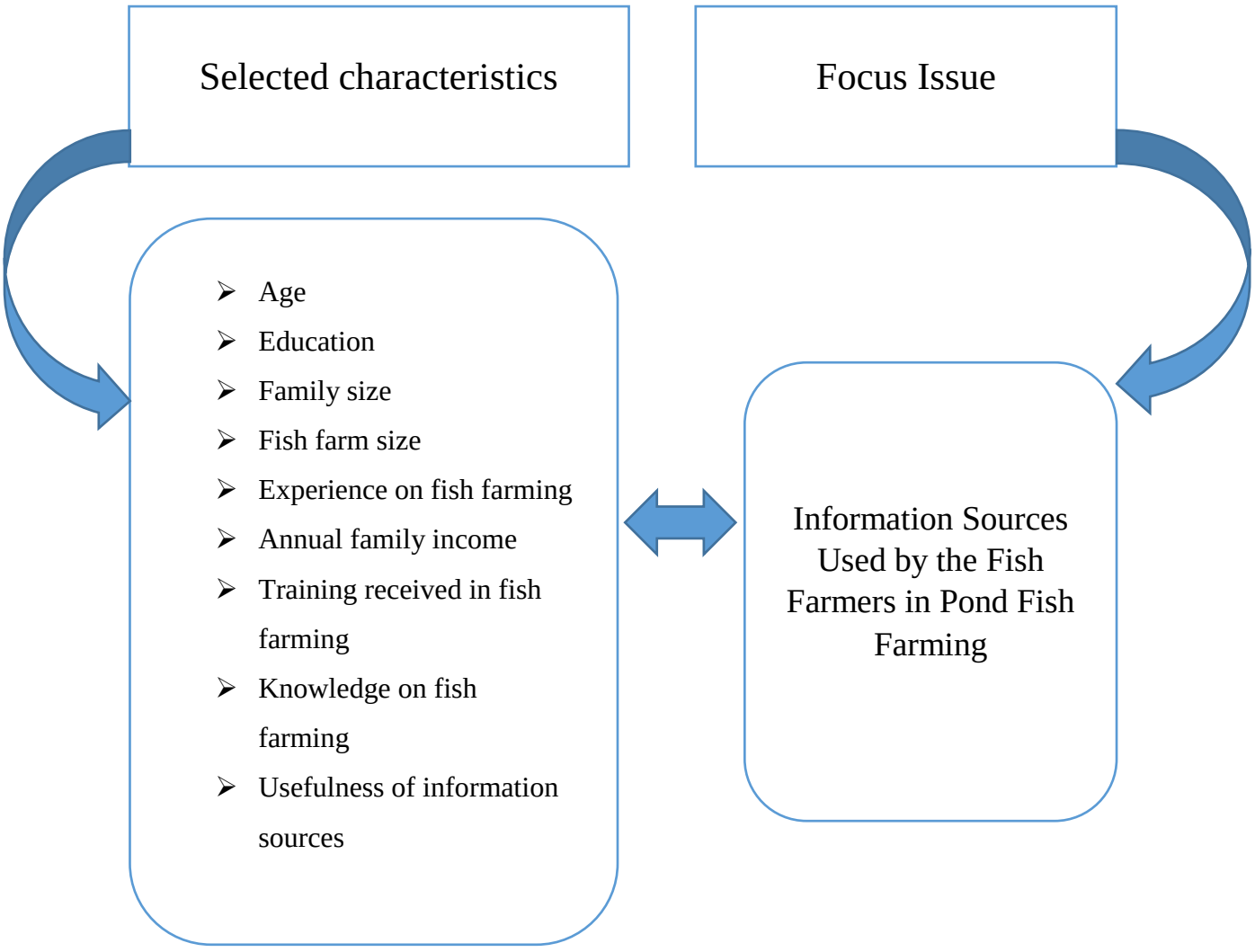

Figure 2.1 A Conceptual Framework of the Study

CHAPTER 3

METHODOLOGY

Methodology is one of the most important parts for data collection and analysis in any scientific research. It must have a careful consideration before conducting a study. The researcher has responsibility to properly describe what sorts of research design, methods and procedures would be followed in collecting valid and reliable data and analyzing it and interpreting those to arrive at correct summary and meaningful conclusion. This chapter also mentioned the operational format and comparative reflection of some variables, statistical methods used in the study.

3.1 Locale of the Study

Barishal district is selected purposively as it is a potential district of Bangladesh for fish farming. There are ten upazillas in Barishal district, among them Banaripara upazilla were selected purposively. The area of Banaripara upazila is 134.86 sq km, located in between 22°45' and 22°52' north latitudes and in between 90°02' and 90°13' east longitudes. There are eight union parishads in this upazila. Those are: Iluhar, Udaykati, Chakhar, Baisari, Banaripara, Bisarkandi, Salia Bakpur and Saidkati. Out of eight unions, five were randomly selected as the locale of the study. The selected unions were Banaripara, Salia bakpur, Chakhar, Saidkati and Baisari. A map of Barishal district showing Banaripara upazila and a map of Banaripara upazilla showing study areas have been shown in figure 3.1 and 3.2 respectively.

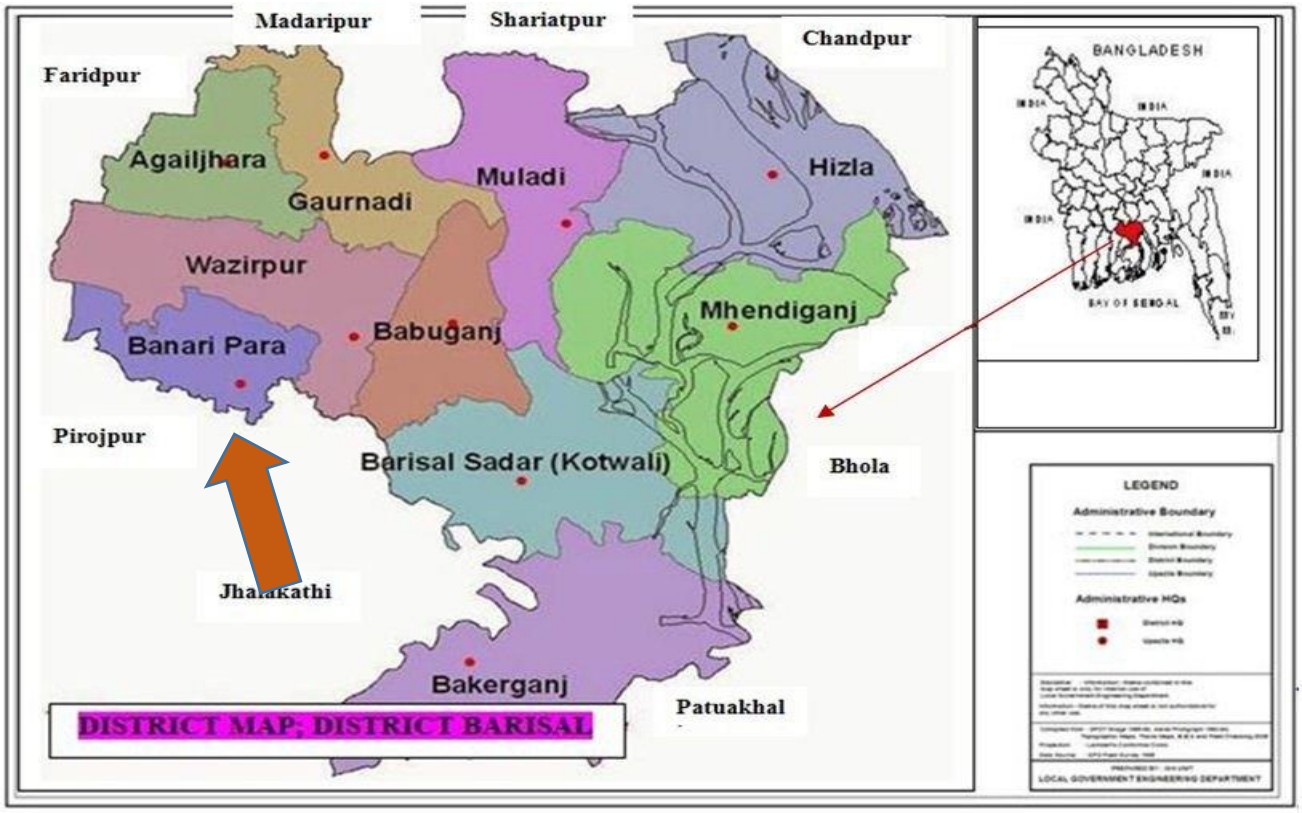

Figure 3.1: A Map of Barishal District Showing Banaripara Upazila

Figure 3.2 : A Map of Banaripara Upazilla Showing Study Area

3.2 Research Design of the Study

Research design means the plan of structure and strategy of inspection on imagined so as to get answer to research question control variance (Kerlinger, 1973). Designing the research for the study was taken in a scientific method. At first, researcher gathered and analyzed other paper. Reviews were studied to choose appropriate variables and preparation and pre-testing of the research instruments were done before ultimate data collection. Then, the collected data was analyzed and report was done. The maps of the study areas were depicted. The researcher himself with the cooperation of upazila fisheries officer (UFO), collected an updated list of all the farmers of the selected villages of respective union. The total numbers of fish farmer in these areas were 956 which constituted the population of the study.

3.3 Research Instruments

In a social research interview schedule is the popular instrument for data collection. In order to collect valid and reliable data an interview schedule was prepared. It was carefully designed and keeping the objectives of the study in mind. Both open and closed forms of question were used to collect information. Simple, direct question and scales were included in the interview schedule for collecting information. Data were collected personally by the researcher himself through face to face interview from the selected fish farmers keeping in mind the objectives of the study. Necessary cooperation was received from the Upazilla Fisheries Officer (UFO) and staff of Banaripara Fisheries Office. Interview schedule was pre-tested in actual field situations before using it for final data collection among 15 respondents of the study area. Reliability test was done. Necessary corrections, modification and additions were made in the interview schedule on the basis of pre-tested result. The interview schedule was then translated into Bengali and printed in its final forms. A copy of the interview schedule in English version is plotted in Appendix-A.

3.4 Population and Sample of the Study

The fish farmers of the study area were considered as population on the study area. There were 956 fish farmers in the study area. Ten percent of the population was selected following proportionate random sampling method from each of the selected unions as sample. Sample was stood 96. Simultaneously a reserved list of 15 farmers was made in order to use in case of non-

availability of sampled farmers. The detailed distribution of population and sample are showed in Table 3.1.

Table 3.1 Distribution of the sample of pond fish farmers in the study area

Name of union	Total no. of pond fish farmers	Sample	Reserve list
Banaripara	152	15	2
Saliabakpur	184	18	3
Chakhar	237	24	4
Soyodkathi	220	22	3
Baishari	165	17	3
Total	956	96	15

3.5 Collection of Data

Data were collected by researcher herself through personal interview process. The interview was conducted with the respondents in their homes during their leisure time. To obtain valid and reliable information the researcher made all possible efforts to explain the purpose of the study. Rapport was established with the respondents before interview and objectives were clearly explained by using local language to obtain possible help, so that the fish farmer did not feel hesitant to furnish proper data. The question was explained whenever any respondent felt difficulty in understanding them properly. Excellent co-operation was obtained from all respondents in the study area during the interview schedule. The entire process of collecting data took 30 days from June 16 to July 15, 2021.

3.6 Variables and Their Measurement Techniques

A variable is any measurable characteristic which can assume varying or different values in successive individual cases (Ezekiel and Fox, 1959). A well-organized research usually contains at least two important elements. In any scientific research, the selection and measurement of variables is very important. The researcher reviewed the literature to widen his understanding about the nature and scope of the variables relevant to this research. The selected individual characteristics of the fish farmers were the independent variables (namely, age, education, family size, fish farm size, experience on fish farming, annual income, training on fish farming,

knowledge on fish farming, usefulness of information sources). Use of information sources by the pond fish farmer was the main focus of the study was considered as the dependent variable.

3.7 Measurement of the Selected Characteristics of the Fish Farmers

The socio-economic characteristics of the fish farmers might have influence on use of information sources. These characteristics were age, education, family size, fish farm size, fish farming experience, annual family income, training received in fish farming, knowledge on fish farming, usefulness of information sources. Measurement of all these characteristics are discussed in the following sub-sections.

3.7.1. Age

The age of a fish farmer was measured in terms of actual years from his birth to the time of interview on the basis of the fish farmer's statement. Age defines the significance of biological maturity of an individual. The contribution of age on use of various technologies has not been well established but it is used in social research to understand the demographic character of a population. A score of 1 (one) was assigned for each year of his age. This variable appears in item no. 1 in the interview schedule (Appendix-A).

3.7.2 Education

The education of a fish farmer was measured by the number of years of successful schooling. A score of one (1) was assigned for each year of schooling completed. For example, if a respondent passed up to class 5, his education score was assigned as 5. If a respondent did not know how to read and write his education score was assigned as zero (0). A score of 0.5 was given to that respondent who could sign his name only. If a fish farmer did not go to school but studied at home or adult learning center, his knowledge status was determined as the equivalent to a formal school student. This variable appears in item no.2 in the interview schedule (Appendix-A).

3.7.3 Family Size

Family size of a fish farmer was measured by counting total number of persons in his family include himself and other person living and being dependent fully or partially on his income. The total number of persons was considered as his family size score .This variable appears in item no. 3 in the interview schedule (Appendix-A).

3.7.4 Fish Farm Size

The fish farm size of a farmer referred to the total area of pond either owned by a farmer or obtained from others on lease during the study period, on which he carried out farming operations, the area being in terms of full benefits to family. The total farm size in hectare was considered as farm size score of the farmers. Here a score of 1 (one) was assigned for 1 hectare of the farm size. The farm size was determined on the basis of responding data providers. This characteristic included in item no.4 in the interview schedule (Appendix A).

3.7.5 Experience in Fish Farming

Experience in fish farming operationalized by computing the total duration of involvement by a respondent in fish farming. It was measured in years. This variable appears in item No. 5 of the interview schedule (Appendix A).

3.7.6 Annual Family Income

Annual income of a farmer is referred to as his/her annual gross income from agricultural and non-agricultural sectors during the last one year. The income was expressed in '000'BDT (Bangladeshi taka). A score of 1 was assigned for each 1000 BDT to compute the annual family income score of the farmers. This variable appears in item No. 6 of the interview schedule (Appendix A).

3.7.7 Training on Fish Farming

Training of a respondent was measured by the total number of days for which a respondent attended in different training programs on fish farming. If a respondent took 2 days training on any aspect of fish farming then his training received score would be 2. This variable appears in item No. 7 of the interview schedule (Appendix A).

3.7.8 Knowledge on Fish Farming

Knowledge on fish farming of a fish farmer was measured by asking 15 questions regarding fish farming. A score of 2(two) was assigned for each correct answer and zero (0) for wrong or no answer. Score was also assigned for partially correct answer. The knowledge score of fish farmers on fish farming range from 0 to 30, where zero indicating very poor knowledge and 30 indicate the very high level of knowledge on pond fish farming. The total obtained score of each

farmer was counted for analysis the distribution overall knowledge of farmers. This issue has presented in item no. 8 of the interview schedule (Appendix A).

3.7.9 Usefulness of Information Source in Pond Fish Farming

Score on usefulness of information source of a respondent was computed on the basis of his belief on how they are benefitted by using information source against six statements in their fish farming activities. Each farmer was asked to indicate his benefit of using information sources with five alternative responses like most useful, moderately useful, no opinion, less useful and not useful at all, were assigned as 4, 3, 2, 1 and 0 respectively.

Usefulness of information source score was determined by summing the scores of all 6 items. Thus, the score range from 0 to 24, where '0' indicates not at all and '24' indicates highest level of usefulness. This characteristic appears in item no.9 in the interview schedule (Appendix -A).

3.8 Measurement of Use of Information Sources

Extent of use of information sources by the pond fish farmers in pond fish farming was the focus variable of the study. Ten information sources of different nature were selected to measure the extent of use of information sources in receiving information on pond fish farming. The farmers were asked to indicate their extent of use of information sources with five alternative responses as regularly, frequently, occasionally, rarely and never and score were assigned to the alternative responses as 4, 3, 2, 1 and 0 respectively. Use of information sources by the farmers were computed by summing up all the scores obtained by them. The possible range of use of selected information sources score was 0-40, while 0 indicated no use and 40 indicated highest use of selected information sources. This characteristic appears in item no. 10 in the interview schedule (Appendix -A).

3.9 Measurement of Rank Order of Use of Information Sources

To ascertain the use of information sources in receiving information by the fish farmers, Media Use Index (MUI) was computed for each media. Media Use Index (MUI) was computed by using the following formula:

$$MUI = u_{rg} \times 4 + u_f \times 3 + u_o \times 2 + u_r \times 1 + u_n \times 0$$

Where, MUI = Media Use Index

u_{rg} = No. of respondents used media regularly

u_f = No. of respondents used media frequently

u_o = No. of respondents used media occasionally

u_r = No. of respondents used media rarely

u_n = No. of respondents used media not at all

Media Use Index (MUI) for each media use could range from 0 to 384, where 0 indicating no media use and 384 indicating highest media use by the pond fish farmers.

3.10 Statement of the Hypotheses

A hypothesis is a conjectural statement of the relation between two or more variables which can be put to a test to determine its validity. Hypothesis are always in declarative sentence form and they are related, either generally or specifically from variables to variables (Kiplinger, 1973). In broad sense hypotheses are divided into two categories: (a) Research hypothesis and (b) Null hypothesis.

3.10.1 Research Hypotheses

Research hypothesis states a possible relationship between the variables being studied or a different between experimental treatments that the researcher expects to emerge. The research hypothesis was formulated: 'there were significant relationships between the selected characteristics fish farmers and their use of information sources for fish farming'.

3.10.2 Null Hypotheses

The null hypothesis was formulated as there were no significant relationships between the selected characteristics of fish farmers and their use of information sources for fish farming.

3.11 Data Processing

3.11.1 Editing

The collected raw data were examined thoroughly to detect errors and omissions. As a matter of fact the researcher made a careful tenderness 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 early.

3.11.2 Coding and Tabulation

Having consulted with the research supervisor and co-supervisor, the researcher 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.

3.11.3 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 focus 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 4.

3.12 Statistical Analysis

The collected data were analyzed according to the objectives of the study. For regulating the qualitative data were converted into quantitative data by means of suitable scoring technique. The analysis was performed using SPSS (Statistical Package for Social Sciences) computer package and the statistical measures such as range, means, standard deviation, number and percentage distribution were used to describe the variables. Pearson's Product Moment coefficient of correlation (r) was used to describe the relationships between the variables. In this study five percent (0.05) and one percent (0.01) level of probability were used for rejecting the null hypothesis.

CHAPTER 4

RESULTS AND DISCUSSIONS

In this Chapter, the findings of the study and interpretation of the results have been presented according to the objectives of the study. The chapter has been divided into three sections. The first section deals with the selected individual characteristics of the fish farmers while the second section deals with the use of information sources. Finally, the third section deals with the relationships between the farmers selected characteristics and their use of information sources.

4.1 Selected Characteristics of the Fish Farmers

Effective use of information sources plays a vital role in the gross production. Farmers use selected information sources when they find those useful and cost effective. Farmer's individual characteristics play a vital role in using those information sources. A particular information source might be beneficial but the farmer may not accept due to his socio-economic condition or other factors. The individual characteristics of the fish farmers might have great impact on their use of the information sources. This section deals with the distribution and categorization of the fish farmers based on their various characteristics. The characteristics of the fish farmers were selected to find out their relationships with the use of selected information sources. These characteristics of the pond farmers are described in this section. Table 4.1 reveal the salient features of the characteristics of the fish farmers and separate tables are provided while presenting categorizations, discussing and /or interpreting results concerning each of the characteristics in this chapter.

Table 4.1: Salient features of the selected characteristics of the fish farmers (n=96)

SL NO.	Individual Characteristics	Measuring unit	Range		Mean	Standard deviation
			Minimum	Maximum		
1	Age	Years	26	73	42.88	8.56
2	Education	Year of schooling	0	18	8.896	3.84
3	Family size	No of member	3	11	6.23	1.638
4	Farm Size	Hector	.040	.405	.159	.072
5	Experience	No. of year	2	20	8.42	3.57
6	Annual Income	('000' Tk)	120	480	241.15	71.25
7	Training	No. of days	0	7	2.02	1.771
8	Knowledge on fish farming	Score	10	27	19.44	3.98
9	Usefulness of information sources	Score	10	21	15.25	1.830
10	Use of information sources	Score	7	24	13.43	3.472

4.1.1 Age

The observed age of the farmers ranged from 26 to 73 with the average of 42.88 and the standard deviation of 8.56. Based on the age scores, the fish farmers were classified into three categories that shown in Table 4.1.1.

Table 4.1.1 Distribution of the farmers according to their age

Categories	Farmers(n=96)		Mean	SD
	Number	Percentage		
Young(Up to 35 years)	27	28.13	42.88	8.56
Middle-aged (36-50 years)	46	47.92		
Old(Above 50 years)	23	23.95		
Total	96	100		

Data showed that the highest proportion (47.92 percent) of the fish farmers were middle aged compared to 28.13 percent being young and only 23.95 percent old. That means majority (76.05 percent) fish farmers in the study area were young to middle aged. Young to middle aged people are usually more interested to use information sources. However, they might have valuable opinion in regard to use of selected information sources. This means that selected information sources are used by comparatively younger farmers in the study area.

4.1.2 Education

The education score of the pond owners ranged from 0-18, with an average of 8.896 and standard deviation 3.85. Based on their education scores, the fish farmer's educational status was classified into five categories. The distribution of the fish farmers according to their education is shown in Table 4.1.2.

Table 4.1.2 Distribution of the fish farmers according to their education

Categories	Farmers (n=96)		Mean	SD
	Number	Percent		
Illiterate (0)	3	3.13	8.896	3.85
Can Sign only (0.5)	4	4.17		
Primary(1-5)	20	20.83		
Secondary Level(6-10)	36	37.50		
Above Secondary(above 10)	33	34.37		
Total	96	100		

Data presented in table 4.1.2 indicated that the highest proportion (37.50 percent) of the farmers had secondary education, 34.37 percent had above secondary, 20.83 percent had primary education, 4.17 percent could sign only and only 3.13 percent was illiterate. Education broadens the horizon of outlook of respondents and expands their capability to analyze any situation related to pond fish culture. It was found that 7.3 percent of the farmers were under illiterate and can sign name only categories. These farmers may face difficulty in getting any type of information on fish farming. An educated individual is likely to be more responsive to use information sources.

4.1.3 Family Size

The observed range of family size of the farmers ranged from 3 to 11 with the average of 6.23 and the standard deviation of 1.64. Based on the family size scores, the farmers family size were classified into three categories that shown in Table 4.1.3.

Table 4.1.3 Distribution of the fish farmers according to their family size

Categories	Farmers (n=96)		Mean	SD
	Number	Percent		
Small (up to 4)	15	15.63	6.23	1.64
Medium (5-7)	61	63.54		
Large (above 7)	20	20.83		
Total	96	100		

Data showed that 63.54 percent of the farmers belong to medium sized family, 20.83 percent had large sized family and 15.63 percent had small sized family. It could be said that most (84.37%) of the fish farmers had medium to large sized family.

4.1.4 Fish Farm Size

The observed score on fish farm size of the farmers ranged from 0.040 to 0.405 with the average of 0.159 and the standard deviation of 0.073. Based on fish farm size score, the fish farms were classified into three categories that shown in Table 4.1.4.

Table 4.1.4 Distribution of the fish farmers according to their fish farm size

Categories (Hector)	Farmers (n=96)		Mean	SD
	Number	Percent		
Small pond(up to 0.12)	37	38.54	0.16	.073
Medium pond(0.13-0.24)	46	47.92		
Large pond(above 0.24)	13	13.54		
Total	96	100		

Data presented in table 4.1.4 that the majority (47.92 percent) of the farmers had medium sized fish farm, while 38.54 percent and 13.54 percent had small and large sized fish farm

respectively. Thus, overwhelming majority (86.46 percent) of the pond owners had small to medium sized fish farm.

4.1.5 Experience in Fish Farming

The observed score on fish farming experience of the farmers ranged from 2 to 20 with the average of 8.42 and the standard deviation of 3.57. Based on fish farming experience score, the farmers were classified into three categories that shown in Table 4.1.5.

Table 4.1.5 Distribution of the fish farmers according to their Farming experience

Categories (year)	Farmers (n=96)		Mean	SD
	Number	Percent		
Low experience (up to 5)	28	29.17	8.42	3.57
Medium (6-10)	44	45.83		
High (above 10)	24	25		
Total	96	100		

Highest proportion (45.83 percent) of the farmers had medium experience on fish farming, while 29.17 percent and 25 percent had low and high experience on fish farming respectively. Thus, above three fourth (75 percent) of the fish farmers had low to medium fish farming experience.

4.1.6 Annual Family Income

Annual family income of the farmers ranged from 120 to 480 with the average of 241.15 and the standard deviation of 71.25. Based on the annual family income score, the fish farmers were classified into three categories that shown in Table 4.1.6.

Table 4.1.6 Distribution of the farmers according to their annual family income

Categories ('000' BDT)	Farmers		Mean	SD
	Number	Percent		
Low income(up to 150)	31	32.29	241.15	71.25
Medium income (151-300)	50	52.08		
High income (above 300)	15	15.63		
Total	96	100		

Data indicated that the highest proportion (52.08 percent) of the farmers had medium income when 32.29 percent farmers had low income and 15.63 percent farmers had high income. Thus, overwhelming majority (84.37 percent) of the fish farmers had low to medium income from their pond fish farming.

4.1.7 Training on Fish Farming

The observed score of training received on fish farming of the farmers ranged from 0 to 7 with the average of 2.02 and the standard deviation of 1.77. Based on this, the farmers were classified into three categories that shown in Table 4.1.7.

Table 4.1.7 Distribution of the fish farmers according to their training on fish farming

Categories	Farmers (n=96)		Mean	SD
	Number	Percent		
No training (0day)	22	22.92	2.02	1.771
Low (up to 3 days)	62	64.58		
Medium(above 3 days)	12	12.50		
Total	96	100		

Majority (64.58 percent) of fish farmers received low training while one eighth (12.50%) of them received medium training. None of them had high training. However above one-fifth (22.92 percent) fish farmers had no training on fish farming.

4.1.8 Knowledge on Pond Fish Farming

The observed score of knowledge on fish farming of the farmer ranged from 10 to 27 with the average of 19.44 and standard deviation of 3.98. Based on the theoretical scores, the fish farmers were classified into three categories as: low level knowledge (up to 15), medium level knowledge (16 to 22), high level knowledge (above 22). The distribution of the farmers according to their knowledge level is shown in Table 4.1.8.

Table 4.1.8 Distribution of the fish farmers according to their knowledge on pond fish farming

Categories	Farmers (n=96)		Mean	SD
	Number	Percentage		
Low (up to 15)	16	16.66	19.44	3.98
Medium (16-22)	58	60.42		
High (above 22)	22	22.92		
Total	96	100		

Data reveal that the majority (60.42 percent) of the fish farmers had medium level knowledge followed by 22.92 percent and 16.66 percent had high and low level of knowledge respectively. The result indicated that more than half of the farmers had medium level knowledge on fish farming.

4.1.9 Usefulness of Information Sources on Pond Fish Culture

The observed usefulness of information scores of the respondents ranged from 10 to 21. The average usefulness of using information source score was 15.25 and the standard deviation was 1.83. Based on the usefulness of information sources score, the fish farmers were classified into three categories such as low usefulness (up to 8), medium usefulness (9-16) and high usefulness (17-24) as shown in Table 4.1.9.

Table 4.1.9 Distribution of the fish farmers according to their usefulness of information sources

Categories	Farmers (n=96)		Mean	SD
	Number	Percentage		
Low (up to 8)	0	0	15.25	1.83
Medium (9-16)	57	59.38		
High (17-24)	39	40.62		
Total	96	100		

The above Table 4.1.9 shows the opinion of the respondents about the usefulness of information sources that the highest proportion (59.38 percent) of the fish farmer had medium level

usefulness where 40.62 had high level of usefulness of information sources. The result indicated that more than half of the farmers felt medium level of usefulness of information sources.

4.2 Information Sources Used by the Pond Fish Farmers

The observed score of use of information sources by the farmers ranged from 7 to 24 with an average of 13.43 and standard deviation of 3.472 (Table 4.1). The categories and distribution of the respondents were shown in Table 4.2.

Table 4.2 Distribution of the fish farmers according to their use of Information sources

Categories	Farmers (n=96)		Mean	SD
	Number	Percentage		
Less use (up to 13)	63	65.63	13.43	3.472
Moderate use (14–20)	28	29.16		
Frequent use (21-40)	5	5.21		
Total	96	100		

Table 4.2 shows that the highest proportion (65.63 percent) of the farmers had low use of information sources, 29.16 percent had medium use of information sources and the lowest 5.21 percent farmers had high use of information sources. Thus, overwhelming majority (94.79 percent) of the fish farmers had less to moderate extent of use of information sources.

Apart from the assessment of media use level, the researcher make a rank order of the media used by the farmer which is described below:

4.2.1 Rank Order of the Use of Information Sources in Receiving Information

Rank order of the selected ten information sources in receiving information by the pond fish farmers is presented in Table 4.2.1. The Media Used Index (MUI) indicate that, fisheries officer ranked the 1st and reading fisheries books/magazines/leaflets as last position.

The use of media in receiving information by the pond fish farmers according to descending order of MUI fisheries officer ranked first followed by neighbor, experienced farmer, Training Center, NGO Worker, Fish fry or fingerlings / fish feed Dealer, Mobile internet/social media,

Group discussion, Watching fisheries programme on TV and Reading fisheries books/ magazines/ leaflets (Table 4.2.1).

Table 4.2.1 Rank order of use of media in receiving information on pond fish farming

Sl. No	Name of Information Sources	MUI Score	Rank
1.	Fisheries Officer	223	1st
2.	Neighbor	196	2nd
3.	Experienced farmer	174	3rd
4.	Training Center	153	4th
5.	NGO Worker	144	5th
6.	Fish fry or fingerlings / fish feed Dealer	120	6th
7.	Mobile internet/social media	82	7th
8.	Group discussion	64	8th
9.	Watching fisheries programme on TV	69	9th
10.	Reading fisheries books/magazines/leaflets	26	10th

Table 4.2.1 shows that the highest use of information sources in receiving information by the pond fish farmers was fisheries officer. Fisheries officer helps the pond fish farmers on different purposes such as fish diseases, water quality, artificial feed, different, farming technologies etc. In case of fisheries officer there is a feedback opportunity. Farmers can take information from the fisheries officer again when the problem is not solved. Fisheries officer acts like bridge between the fish farmer and different scientific research and technology. That might be caused for highest use in receiving information. The lowest use of media in receiving information by the pond fish farmers was reading fisheries books/magazines/leaflets. This might be happened because mostly the pond fish farmers are not well educated to understand them and also most of them do not have any interest to read them. For all of this, the study areas were less aware in using fisheries books/magazines/leaflets as there source of information.

4.3 Relationship between the Selected Characteristics of the Farmers and Their Use of Information Sources on Pond Fish Farming

The purpose of this section is to deal with the relationships of the selected characteristics of the pond fish farmers with their use of information sources. The characteristics include age, education, family size, fish farm size, annual fish farming income, fish farming experience, training received in fish farming, knowledge on fish farming and usefulness of information sources. Pearson's Product Moment co-efficient of correlation (r) was used to test a null hypothesis concerning the relation between any two variables. Five percent (0.05) and one percent (0.01) level of significance was used as the basis for acceptance or rejection of a null hypothesis. Results of co-efficient of correlation between each of the selected characteristics of the fish farmers and their use of information sources have shown in table 4.4. In addition, a correlation matrix has been presented in Appendix-B.

Table 4.3 Relationships between the focus issue and the selected characteristics of the farmers.

Focus variable	Independent Variable	Correlation co-efficient values (r)	Tabulated value of "r" with 94 df	
			0.05	**0.01**
Information sources used by fish farmers in pond fish farming	Age	-0.192	0.205	0.267
	Education	0.325**		
	Family size	0.124		
	Farm Size	0.247*		
	Experience on fish farming	-0.159		
	Annual family Income	0.240*		
	Training on fish farming	0.338**		
	Knowledge on fish farming	0.269**		
	Usefulness of information sources	0.356**		

"**" indicates correlation is significant at the 0.01 level (2-tailed) and

"*" indicates correlation is significant at the 0.05 level (2-tailed).

4.3.1 Age and Farmer's Use of Information Sources

The computed "r" (-0.192) value was smaller than that of the tabulated value (r = 0.205) with 94 degree of freedom at 0.05 level of probability as shown in Table 4.4. It leads to the following observation:

- The age of fish farmers had no significant and negative relationship with their use of information sources.
- The concerned null hypothesis could be accepted.
- The use of information sources for pond fish farming not influenced by the age of fish farmers.

4.3.2 Education and Farmer's Use of Information Sources

The computed "r" (0.325) value was higher than the tabulated value (r = 0.267) with 94 degree of freedom at 0.01 level of probability as shown in Table 4.4 and it directed to the following observations:

- The relationship between education of the fish farmers and use of information sources showed significant and positive trend.
- Hence, the concerned null hypothesis could be rejected.
- The use of information sources for pond fish farming positively influenced by education.

4.3.3 Family Size and Farmer's Use of Information Sources

The computed "r" (0.124) value was smaller than that of the tabulated value (r = 0.205) with 94 degree of freedom at 0.05 level of probability as shown in Table 4.4 and observations were:

- The relationship between family size of the fish farmers and use of information sources showed non-significant and positive trend.
- Hence, the concerned null hypothesis could be accepted.
- The use of information sources was not influenced by the family size of fish farmers.

4.3.4 Farm Size and Farmer's Use of Information Sources

The computed "r" (0.247) value was higher than that of the tabulated value (r = 0.205) with 94 degree of freedom at 0.05 level of probability as shown in Table 4.4. The findings showed that:

- There had significant and positive relationship between farm size of the fish farmers and use of information sources.
- Hence, the concerned null hypothesis could be rejected.
- The use of information sources was high when the farm size of fish farmers was high.

4.3.5 Experience on Fish Farming and Use of Information Sources

The computed "r" (-0.159) value was smaller than the tabulated value (r = 0.205) with 94 degree of freedom at 0.05 level of probability as shown in Table 4.4, where observations were:

- Relationship between fish farming experience and use of information sources was non-significant but negative.
- Hence, the concerned null hypothesis could be accepted.
- Considering the findings, it could be said that use of information sources not influenced by the experience of fish farmers.

4.3.6 Annual Family Income and Use of Information Sources

The computed value of "r" (0.240) was higher than the tabulated value (r = 0.205) with 94 degree of freedom at 0.05 level of probability as shown in Table 4.4.and the findings were:

- There had significant and positive relationship between annual family income of the fish farmers and use of information sources
- Hence, the concerned null hypothesis could be rejected.
- The use of information sources positively affected by farmers annual fish farming income.

4.3.7 Training on Fish Farming and Use of Information Sources

The computed "r" (0.338) value was larger than the tabulated value (r = 0.267) with 94 degree of freedom at 0.01 level of probability as shown in Table 4.3.and the observation were:

- The relationship between training received of the fish farmers and use of information sources was significant and positive.
- The concerned null hypothesis could be rejected.

- Considering the findings it can be concluded that the higher training receiver fish farmers, the higher use of information sources.

4.3.8 Knowledge on Fish Farming and Their Use of Information Sources

The co-efficient of correlation (r) between the concerned variables was computed and found to be 0.269 presented in Table 4.3 The computed value (r = 0.269) was found to be greater than the Table value of (r = 0.267) with 94 degrees of freedom at 0.01 level of probability., Which led to the following observations:

- The relationship showed a positive direction and significant relationship between knowledge and use of information sources.
- The concerned null hypothesis was rejected.
- The farmer who has more knowledge on fish farming have higher attitude for use of information sources.

4.3.9 Usefulness of Information Sources and Their Use of Information Sources

The co-efficient of correlation (r) between the concerned variables was computed and found to be 0.356 presented in Table 4.4 The computed value (r = 0.356) was found to be greater than the Table value of (r = 0.267) with 94 degrees of freedom at 0.01 level of probability., Which led to the following observations:

- The relationship showed a positive direction and significant relationship between usefulness of using information sources and use of information sources.
- The concerned null hypothesis was rejected.
- The use of information sources is influenced by its usefulness.

CHAPTER 5

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Summary of the Findings

The major findings of the study have been summarized in three sections. The first section deals with the selected characteristics of the farmers. The second section shows the farmer's use of information sources. Finally the third section deals with the relationships between the selected characteristics and use of information sources.

5.1.1 Selected Characteristics of the Farmers

Age: The highest percentage (47.92 percent) fish farmers had middle aged compared to 28.13 percent of the farmers were young aged and 23.95 percent were old aged. This means that information sources are used by comparatively younger farmers in the study area.

Education: The highest proportion (37.50 percent) of the farmers had secondary education, 34.37 percent had above secondary education, 20.83 percent had primary education, 4.17 percent can sign only and only 3.13 percent was illiterate. It was revealed that educated farmers were likely to be more receptive to the modern facts and idea.

Family Size: Majority (63.54 percent) of the respondents belong medium family, 15.63 percent had large family and 15.63 percent had small family. That means majority had medium to large family.

Fish Farm Size: The highest percent (47.92 percent) of the farmers had medium farm size, 38.54 percent had small farm size, while only 13.54 percent had large farm size. That means near about half of the farmers had medium farm size and they were more interested to use information sources.

Fish Farming Experience: About 45.83 percent had medium farming experience, while 29.17 percent and 25 percent had low and high farming experience respectively.

Annual family income: Fish farmers have both agricultural and non-agricultural income source. There the highest proportion (52.08 percent) of the farmers had medium income where 32.29

percent farmers had low and 15.63 percent farmers had high income. Thus, majority (84.37 percent) of the fish farmers had low to medium income from their pond fish farming.

Training received in fish farming: About 22.92 percent fish farmer didn't receive any training when low and medium extent of training received by the farmers followed by 64.58 and 12.50 percent respectively. It could be said that majority of the farmers received any kind of training.

Knowledge on Fish Farming: Highest proportion (60.4 percent) of the fish farmer had medium level knowledge when 22.9 percent and 16.7 percent had high and low level of knowledge respectively.

Usefulness of information sources: The highest proportion (59.38 percent) of the fish farmer had medium level usefulness where 40.62 had high level of usefulness of information sources.

5.1.2 Farmer's Use of Information Sources

The average use score of the pond farmers was 13.43 and standard deviation of 3.472. About 65.6 percent of the pond farmers had low use of information sources, while 29.2 percent farmers had moderate use of information sources and only 5.2 percent farmers had high use of information sources. Thus, a proportion of 94.8 percent of the pond farmers had low to medium use of information sources.

5.1.2.1 Rank Order of the Use of Information Sources in Receiving Information

As per Media Used Index (MUI), fisheries officer ranked the 1st and reading fisheries books/magazines/leaflets etc. as last position.

5.1.3 Relationships between the Selected Characteristics of the Farmers and Use of Information Sources

Correlation coefficient analysis indicated that age, family size and fish farming experience did not show significant relationships with the use of information sources. On the contrary, education, fish farm size, annual income, training received in fish farming, knowledge on fish farming and usefulness of use information sources showed significant and positive relationships with the use of information sources.

5.2 Conclusions

Based on findings of the study and the logical interpretations in the light of relevant facts the researcher has drawn the following conclusions:

1. Individual contact sources such as fisheries officer, experienced farmer, neighbor, training center, fish fry/ fish feed dealer, NGO worker were the commonly used information sources in receiving information on pond fish farming. Group discussion and mass media had rarely used by the farmers. It might be concluded that although the pond fish farmers used a variety of information sources for receiving information, fisheries office were more frequent used by them.
2. This study found out that, majority of fish farmers had low use of information sources for receiving information on pond fish farming, while 34.4 percent farmers had moderate to high use of information sources. Thus, it can be concluded that such low use may not improve the fish farming profile of the pond fish farmers effectively and efficiently.
3. As per Media Used Index (MUI), fisheries officer ranked the 1st and Reading fisheries books/magazines/leaflets etc. as last position.
4. Correlation test showed that education, fish farm size, annual income, training received in fish farming, knowledge on fish farming and usefulness of use information sources had significant and positive relationships with the use of information sources. Therefore, it can be concluded that these characteristics of the fish farmers significantly contribute to influencing the use of information sources.
5. Age, family size and fish farming experience did not showed significant relationship with the use of information sources. So it could be concluded that these characteristics of the farmers did not significantly contribute to influence the use of information sources.

5.3 Recommendations

5.3.1 Recommendations for Policy Implication

Based on the findings and conclusions drawn from the findings of the study, the following recommendations are made:

1) It is observed that 94.8 percent of the pond farmers had low to medium extent of use of information sources. Reasons behind the low and medium use of information sources

used by the farmers on pond fish farming, it is need to be identified and necessary attempt should be made to overcome this situation.

2) It was revealed that farmers of higher educated level were more used to receive information from different information sources. It may be recommended that special attention should be given by the extension providers to the illiterate and less educated farmers, so that they become aware about the benefit of use of information sources.
3) Training had significant positive relationship with the use of information sources. Therefore, it may be recommended that DoF and other related organizations should conduct more training programs.
4) There were variations in the use of information sources by the farmers on pond fish farming. Therefore, it is necessary to available the information sources near to the farmers.

5.3.2 Recommendations for Further Study

The following recommendations could be made for further research works:

1. The present study was conducted among the farmers of selected area under Banaripara upazila of Barishal district. Similar studies may be conducted in other parts of the country to generalize the findings.
2. Use of information sources on pond fish farming may be influences by another factor, which needs to be identified by further study.
3. This study showed that Age, family size and fish farming experience of the farmers had no relationships with the use of information sources. Hence, further studies are necessary to find out the relationships between the concerned variables to make the present findings valid.

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APPENDIX- A

ENGLISH VERSION OF THE INTERVIEW SCHEDULE

Department of Agricultural Extension & Information System

Sher-e-bangla Agricultural University

Dhaka-1207

An Interview schedule for data collection for the research on

"Information Sources Used by the Fish Farmers in Pond Fish Farming"

(This interview schedule is entitled to a research study. Collected data will only be used for research purpose and will be published aggregately)

Name of the respondent: Serial No:

Village: Union:

Upazila: District:

Contact no:

Please answer the following question

1. Age: How old are you? ..... Years

2. Education: Please describe your education qualification

a) Can't read and write
b) Can sign only
c) Primary level (1-5)
d) Secondary level (6-10)
e) Up to Secondary level

3. Family size: Please state your total family member (Including yourself)

Types of family member	Number of family members
Male	
Female	
Total	

4. Fish Farm Size: Please mention here about your farm size

Sl No.	Use of Land	Measuring Unit	
		Local Unit	Hectare
1	Own pond under fish farming		
2	Pond taken on lease		
Total			

5. Experience in pond fish farming: Please mention the following information about your farming Experience.

How long have you been engaged in fish farming? …….. Years.

6. Annual Family Income: Please mention your family income in taka from each of the following sources for last one year.

Income from agricultural sector (A)			
Sl No.	Sources	Monthly Income	Annual Income
1	Agriculture		
2	Livestock		
3	Fish		
Subtotal (A)			
Income from non-agricultural sector (B)			
Sl No.	Sources	Monthly Income	Annual Income
4	Service		
5	Business		
6	Day labour		
7	Other		
Subtotal (B)			
Total (A+B)			

7. Training exposure: Do you have participated in any fisheries training, till today

Yes…… No……..

If yes, mention the following information

SL.	Subject of training	Duration of training(Days)
1.		
2.		
3.		

8. Knowledge of farmer about pond fish farming: Please answer the following questions:

SL No.	Question	Score (0 to 2)	
		Assigned	Obtained
1.	What is fish farming?		
2.	What factors matters for pond preparation before pond farming?		
3.	How do you manage pond water quality?		
4.	Why artificial feeds are used in pond?		
5.	How do you prepare the formulated fish feed?		
6.	Why fertilizers are used in pond?		
7.	Mention three commonly fertilizers.		
8.	Why do you apply lime in pond?		
9.	How do you control predator fish?		
10.	How do you treat fish fry during releasing in pond?		
11.	Mention three common problems in fish culture.		
12.	Can you identify the common diseases of fish?		
13.	Mention three common diseases of fish.		
14.	Which measures are taken by you to overcome the common fish diseases?		
15.	Do you know about integrated fish culture?		

9. Usefulness of Information source on pond fish culture

Sl No.	Statements	Extent of agreement				
		Most useful (4)	**Useful (3)**	**No opinion (2)**	**Less useful (1)**	**Not useful at al (0)**
1.	Use of information sources provide me better access to farming					
2.	Information sources provide me suggestion about water quality management					
3.	Information source help me to know about good quality fish fry/fingerlings					
4.	Information sources provide me better solution about fish disease					
5.	Knowledge is increased significantly by using information media					
6.	I can up to date myself about my farming using information sources					

10. Use of information sources: Please indicate the extent of media you used as information source

Sl. No	Source of Information	Extent of use				
		Regularly (4)	**Frequently (3)**	**Occasionally (2)**	**Rarely (1)**	**Never (0)**
Personal media						
1.	Fisheries Officer	7-8 times/ year	5-6times / year	3-4 times/ year	1-2 times/ year	0
2.	Fish fry or fingerlings / fish feed Dealer	4 times/ 6 month	3 times/ 6 month	2 times/ 6 month	1 times/ 6 month	0
3.	NGO Worker	4 times/ 6 month	3 times/ 6 month	2 times/ 6 month	1 times/ 6 month	0
4.	Experienced farmer	7-8 times/ 6 month	5-6 times / 6 month	3-4 times /6 month	1-2times/ 6 month	0
5.	Neighbor	7-8 times/ 6 month	5-6times/ 6 month	3-4 times/ 6 month	1-2 times/ 6 month	0
Group media						
6.	Group discussion	7-8 times/ year	5-6times/ year	3-4 times/ year	1-2times / year	0
7.	Training Center	4-5 times/ life	3 times/ life	2 times/ life	1 times/ life	0
Mass media						
8.	Watching fisheries programme on TV	Regularly	4-5times / week	2-3 times/ week	1 times/ week	0
9.	Reading fisheries books/magazines/leaflets	7-8 times/ year	5-6 times/ year	3-4 times/ year	1-2 times/ year	0
10.	Mobile internet/ social media	Regularly	4-5times / week	2-3 times/ week	1 times/ week	0

Thank you very much for your kind cooperation and participation to the interview.

…….

Signature of the interviewer with date

APPENDIX-B

Correlation matrix

Variables	X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8	X_9	Y
X_1	1									
X_2	-.565**	1								
X_3	.159	-.268**	1							
X_4	.340**	-.183	.225*	1						
X_5	.771**	-.485**	.231*	.405**	1					
X_6	.483**	-.180	.212*	.832**	.519**	1				
X_7	-.066	.278**	.057	.500**	.060	.546**	1			
X_8	.159	.155	.027	.445**	.276**	.472**	.335**	1		
X_9	.106	.008	.030	.272**	.072	.333**	.247*	.156	1	
Y	-.192	.325**	.124	.247*	-.159	.240*	.338**	.269**	.356**	1

*Correlation is significant at the 0.05 level (2-tailed).

** Correlation is significant at the 0.01 level (2-tailed).

X_1 = Age

X_2 = Education

X_3 = Family size

X_4 = Farm size

X_5 = Experience on pond fish farming

X_6 = Annual income

X_7 =Training

X_8 =Knowledge on pond fish farming

X_9 =Usefulness of information sources

Y = Information sources used by fish farmer on pond fish farming