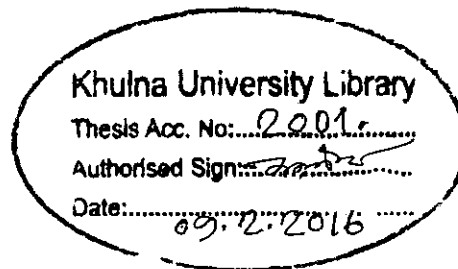


LEVEL OF SHRIMP FARMING KNOWLEDGE OF FARMERS IN BAGERHAT



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Fisheries and Marine Resource Technology Discipline

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Khulna, Bangladesh

January, 2009

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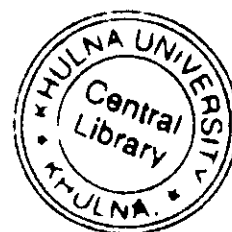
A Project Thesis

By

Molla Rabiul Islam

Examination Roll No: MS 070610

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This project thesis is submitted to the Fisheries and Marine Resource Technology
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Masters of Science in Fisheries and Marine Resource Technology

January, 2009

LEVEL OF SHRIMP FARMING KNOWLEDGE OF FARMERS IN BAGERHAT

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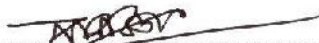
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STATEMENT OF ORIGINALITY

Level of Shrimp Farming Knowledge of Farmers in Bagerhat

The results presented in the project thesis with the above mentioned title are entirely of the candidate's own investigations and no part of the results has been accepted for any degree nor is it being concurrently submitted for any degree.



(Signature of the candidate)

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January, 2009.

Dedicated

To

***The Underprivileged & Neglected People of the World who
are Struggling Every Moment Just to Uphold Their
Lives....***

Acknowledgement

It is my great pleasure for being able to complete this thesis for which I am completely indebted to the Creator of this Universe, the **ALMIGHTY ALLAH**.

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Molla Rabiul Islam

Khulna University
January, 2009

Abstract

A total of 120 farmers from six upazila under Bagerhat district were selected for determination of their shrimp farming knowledge during the period from July to September, 2008. The shrimp farming knowledge consisted of six levels such as, remembering, understanding, problem identifying, analyzing, evaluating and innovating. The shrimp farming knowledge of the farmers on different aspect of culture practices such as, pond preparation, aquatic species of the pond, species selection and stocking density, water color monitoring, pond fertilization, feed and feeding, disease control, harvesting and restocking, risk management and shrimp marketing revealed that the selected farmers had medium level of knowledge on an average. A few portion of the shrimp farmers had high level of knowledge. Farmers' knowledge score on the subsequent levels of cognitive domain on remembering, understanding, problem identifying, analyzing, evaluating and innovating were found to be in diminishing order in all the components of shrimp farming practices. Among the six levels of knowledge, the farmers had highest score on remembering and lowest score on innovating. The personal characteristics of the farmers such as age, gender, education, major profession, annual income, land holding, training status, extension media contact and shrimp farming experience were observed to be significantly related with their shrimp farming knowledge.

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List of abbreviations and non-English words

Abbreviate Form	Elaborate Form
CARE	Co-operation for American Relief Everywhere
DFID	Department for International Development
DIFTA	Danish Institute of Fisheries Technology and Agriculture
DoF	Department of Fisheries
Fig.	Figure
Gher	Shrimp farm
GDP	Gross Domestic Product
HSC	Higher Secondary Certificate
MAEP	Mymensingh Aquaculture Extension Project
NGO	Non Government Organization
SSC	Secondary School Certificate

Chapter 1

Introduction

1.1. Background of the study

Bangladesh is very rich in her aquatic resources. Fisheries sector is playing a vital role regarding employment generation, animal protein supply and foreign currency earning and poverty alleviation. According to DoF (2005), fisheries sector is contributing 5.71% of the total export earning and 4.92% to the GDP.

The most spectacular development of shrimp farming has recently taken place in the south western part of Bangladesh especially in Khulna, Bagerhat, Satkhira and Patuakhali districts. Thousands of farmers have converted their paddy fields to 'farms – locally called gher' to accommodate a profitable shrimp culture practice (CARE, 1997).

The bangla term 'gher' is an enclosure made for shrimp cultivation by modifying rice-fields through building higher dikes around the field and excavating a canal several feet deep inside the periphery of the dikes to retain water during the dry season. According to DFID (1997), gher farming can be considered as a method of combining aquaculture and agriculture on one plot.

The south-western region of Bangladesh is known as the main zone of shrimp cultivation and about 75% of country's shrimp production is obtained from this region (Huq *et al.*, 2004). Bangladesh is an impressive contributor as a culture shrimp industry. Every year she earns a lot of foreign currency by exporting frozen shrimp products. The vast majority (more than 90%) of the shrimp exported from Bangladesh are captured from natural waters, with an estimated 60% from Khulna and Bagerhat area, 35% from Comilla and Noakhali areas and 5% from Cox's Bazar area (DIFTA, 1993).

In 2004-2005, Bangladesh earned 2571.72 crores taka by exporting fish and fish products, while the amount of earning from frozen shrimp alone was 2281.59 cores taka (DoF, 2005).

The role of shrimp cultivation in the improvement of nutrition and socio-economic conditions of fish farming communities' inland and coastal areas of Bangladesh can not

be over emphasized. In fact recent trend of shrimp culture in the country may provide hope for the rural poor, particularly as means of living to the displaced fishermen and fishing communities, for whom the culture of finfish, shellfish and other aquatic organisms rank among those occupations which have relatively greater potential of contributing to diets and higher income without disrupting their traditional life cycle. In Bagerhat region, most of the shrimp farmers are poor and they are very much interested in maximum production from less input. Farmers are hardly interested in using scientific culture technique that requires investment considerably. Shrimp yield in ghers can be increased by applying modern technology such as intensification of culture operation through regularization of gher size, increasing stocking density, adding aeration system, application of fertilization and feeds.

1.2 Problem statement

Having appropriate knowledge on shrimp farming is prerequisite to get maximum production. So, it is imperative to know how much knowledge is possessed by the farmers for running culture based extension programme successfully.

Before giving any policy directions towards increasing production, it is important to know the socio-economic characteristics of farmers, inputs used, their outputs, production costs, changes in socio-economic status, problems associated in shrimp farming under different management systems. Further, it is imperative to determine the level of adoption of fisheries technology by the farmers and their ability to utilize aquaculture knowledge which they have acquired from formal training and extension activities conducted by Department of Fisheries (DoF), and other agencies. Evaluation of the aquaculture knowledge and skill of the concerned farmers is not the mere objective but an understanding of the influence of characteristics of the farmers on their adoption of modern aquaculture practices are necessary to plan and implement a programme for increasing the production.

Now considerable effort is being undertaken through research and extension delivery system to increase production. But actual increase in production will depend on the activities of the farmers. The behaviour of the farmers is influenced by his personal,

economic social and physiological characteristics (Hossain *et. al.* 1992). Therefore, collection of information related to shrimp farming is an important factor for the promotion of shrimp farming development in our country.

1.3 Objectives of the Study

In view of the problem stated above, the present study was undertaken with the following objectives:

1. To determine the shrimp farming knowledge of farmers.
2. To find out the relationship of shrimp farming knowledge with age, gender, education, major profession, annual income, land holding, training, extension contact, farming experience and credit source of the farmers.

Chapter 2

Review of Literature

Literatures on aquaculture extension, training, evaluation and impact study are very meager. A limited number of studies have been undertaken on determination of aquaculture knowledge of the farmers. But no studies were found about shrimp farming knowledge. However, following relevant literatures are reviewed.

2.1 Farming knowledge and adoption of innovations

According to Sinha (1982) a farmer being businessmen, innovators, managers and decision makers ordinarily do not adopt new practices as soon as they hear about them. They pass through several mental stages from first hearing about them to final adoption. However, if the farmers are made to understand and properly convinced that any new practice or change will be beneficial rather than being harmful to them, there is no reason to believe that they will not accept the change.

Bloom (1956) developed a taxonomy that points out the ways the people learn. The cognitive domain emphasizes intellectual outcome of an individual. This cognitive domain is again divided into six levels such as, knowledge, comprehension, application, analysis, synthesis and evaluation.

Rudramoorthy (1964) mentioned that training is a process to bring about a continuous improvement in the quality of work undertaken by the staff and individuals.

Nuruzzman (2000) came to a conclusion that 60% of the farmers field school farmers had medium, 25% low and 15% high agricultural knowledge. The majority (55%) of the non-farmers field school farmers had low agricultural knowledge and rest 45% had medium agricultural knowledge.

Mannan (2001) in his study on assessment of knowledge about food and nutrition of the farmers under Proshika mung found that highest proportion (75%) of the respondents fell in the medium knowledge level, while 9% of the respondents fell in poor knowledge level, and 16% in the high knowledge category.

Ahmed (2004) assessed the adoption behaviour of fish farmers of Bhaluka upazila under Mymensingh district on fish culture technology in relation to farmers' fisheries knowledge and its application. Farmers' cognitive ability on different aspects of aquaculture practices indicated that almost all the trained farmers had high status on knowledge, comprehension and application level. In case of analysis, synthesis and evaluation level they belonged to medium category. Only a few respondents fell in low category. On the other hand, most of the non-trained respondents belonged to low category on different levels of cognitive domain.

Azad (2005) determined the impacts of Mymensingh Aquaculture Extension Project (MAEP) in relation to farmers' gain in knowledge, skill development and change of attitude on culture and management of fish ponds in Malandaha and Islampur upazila under Jamalpur district. After receipt of training, fish production of trained farmers increased by 84% over their initial production of 6.83 kg/dec/yr. Fish production of the trained farmers increased to a level of 10.0-18.00 kg/dec/yr averaging 12.55 kg/dec/yr. The selected farmers had favourable attitude towards semi-intensive aquaculture practices.

Alim (2004) studied the cognitive behaviour of the fish farmers on 10 components of carp polyculture practices in Jamalpur sadar upazila in relation to some selected personal characteristics and technological status of fish farmers. In case of trained farmers' cognitive capacity on knowledge, comprehension and application level were found to be high. The farmers were in medium category at analysis, synthesis and evaluation levels. Only few respondents were found to be in low category of cognitive domain. But on the other hand, most of the non-trained respondents were under low category on different levels of cognitive domain. Among the personal characteristics education, farm size, annual income, media exposure, organizational affiliation and receipt of formal training had significant relationship with the cognitive behaviour of fish farmers.

Guha (2006) reported that 35% farmers were found to have medium fisheries knowledge on 10 components of pond fish farming and 65% farmers were in high knowledge category but none of them were found to be low category of knowledge.

2.2 Relationship between Farmers' Characteristics and Knowledge of Innovations

2.2.1 Age and knowledge

Various authors analyzed to find out the relationship between age and knowledge of the farmers on crop, poultry, dairy, and shrimp production etc. but no significant relationship was found (Islam, 1993; Khan, 1996; Nandiwal *et al.*, 1999; Hossain, 2000; Saha, 2001; Rahman, 2001; Sarker, 2002; Sana, 2003). Some of the authors found the negative relationship between ages of the farmers with their gain in knowledge (Hansra and Chopra, 1986; Kashem, 1987; Rayapareddy and Jayaramaiah, 1989).

2.2.2 Gender and knowledge

Azam (2004) found a relationship between farmers' aquaculture knowledge with their respective gender. He showed that male farmers had higher level of knowledge than female farmers.

2.2.3 Education and knowledge

A good number of researchers took initiative to find out the relationship between education of the farmers and their knowledge on crop, poultry, dairy, and shrimp production etc. and they found that the education of the farmers had highly significantly positive relationship with their knowledge of innovation (Hansra and Chopra, 1986; Hazarika *et al.*, 1999; Hossain, 2000; Saha, 2003; Saha, 2001; Sana, 2003 and Sarker, 2002). Where as, some of the authors found that the concerned variable was not related to their knowledge gain (Islam, 1993; Khan, 1996).

2.2.4 Major profession and knowledge

There is no directly related review of major occupation and knowledge of innovations. Nandiwal *et al.* (1999) made an attempt on knowledge and adoption level of the farmers about rice production technology and found that knowledge of the farmers did not depend on occupation of the respondents.

2.2.5 Annual income and knowledge

Parveen (1995) reported that there was no relationship between income and awareness on environmental degradation. Hossain (2003) observed that income of the rural women farmers had negative relationships with their knowledge of modern fish culture cultivation.

2.2.6 Land holding

Mollah *et al.* (1990) made an attempt on input-output relationship in fish production under varied pond size. Returns on per pond basis under different pond size on fish production had a direct and positive relationship with input use, but on the basis of per unite area; pond efficiency was greater in medium size ponds.

2.2.7 Training experience and knowledge

Mannan (2001) concluded that the training received by the farmers had a positive significant relationship with their knowledge on food and nutrition. Sana (2003) found that training received by the farmers had a positive significant relationship with their knowledge on shrimp culture.

2.2.8 Extension media contact and knowledge

Islam (1991) reported that extension contact was significantly related with their agricultural knowledge. Haque (1993) also found a positive relationship between extension contact and adoption of improved practices. Khan (1996) found an insignificant relationship between extension contact of the farmers and their initial knowledge, final knowledge and also knowledge gain.

2.2.9 Farming experience and knowledge

The relationship between education of the farmers and their knowledge on crop, poultry, dairy, and shrimp production etc. analyzed by different authors revealed a significant and positive correlation with their knowledge of innovation (Krishnakumar *et al.*, 1999; Mundhwa and Patel, 1987). On the contrary, Sarker (2002) found that farming experience of the farmers was not related to farmers' knowledge.

2.2.10 Credit availability and knowledge

Beal and Sibley (1967) found a positive relationship between, credit availability and adoption of agricultural technology. However, Reddy and Kivlin (1968) from a study of three Indian villages concluded that credit availability was not significantly related to adoption of high yielding variety.

Chapter 3

Materials and Methods

The design of the study is described in the first section of this chapter, followed by a discussion of the population and sample variables of the study that were studied. The methods and procedures used in conducting the study are also explained.

3.1. Design of the study

The design of the study was for a descriptive survey research. That is, the study was designed to describe the shrimp culture knowledge of farmers in ponds and their characteristics. This study also attempted to discover whether there was a relationship between the level of shrimp culture knowledge of the farmers, and their selected characteristics. Data were collected by means of an interview schedule.

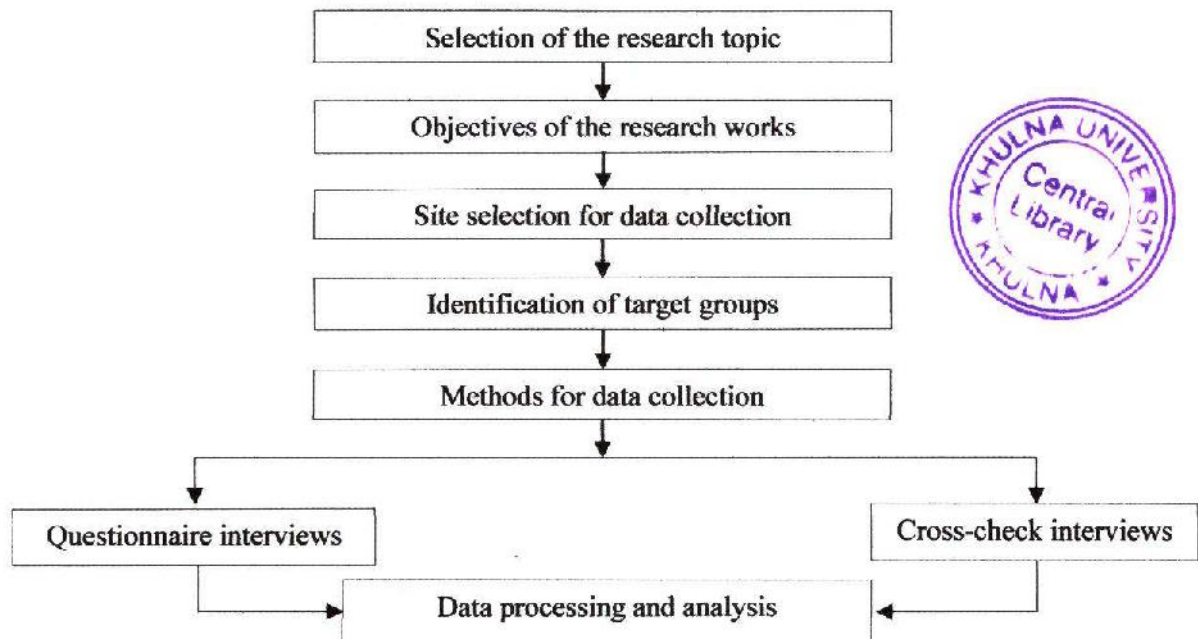


Fig. 1. Schematic diagram for the research works prepared

The present study was based on the methodologies usually used in socio-economic research (Fig. 1). Data were collected from 120 farmers among which 20 farmers from each upazilla.

3.2. Population of the study

The study was conducted in Fakirhat, Mollahat, Sadar, Rampal, Mongla and Morrelganj upazilla of Bagerhat district during the period from July 2008 through September 2008 (Fig. 2). Shrimp farmers of these upazillas were the target population of the study.

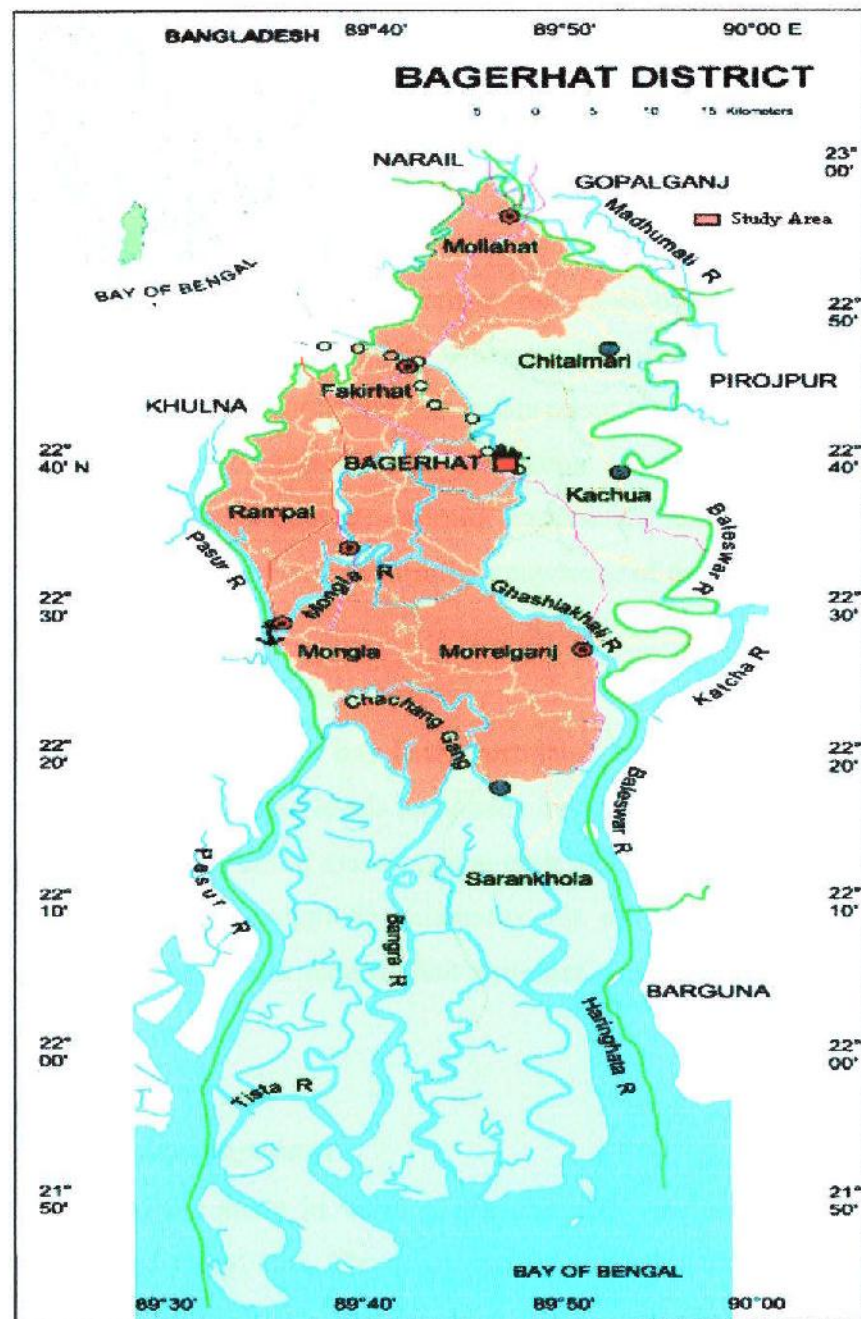


Fig. 2: Selected area of the study

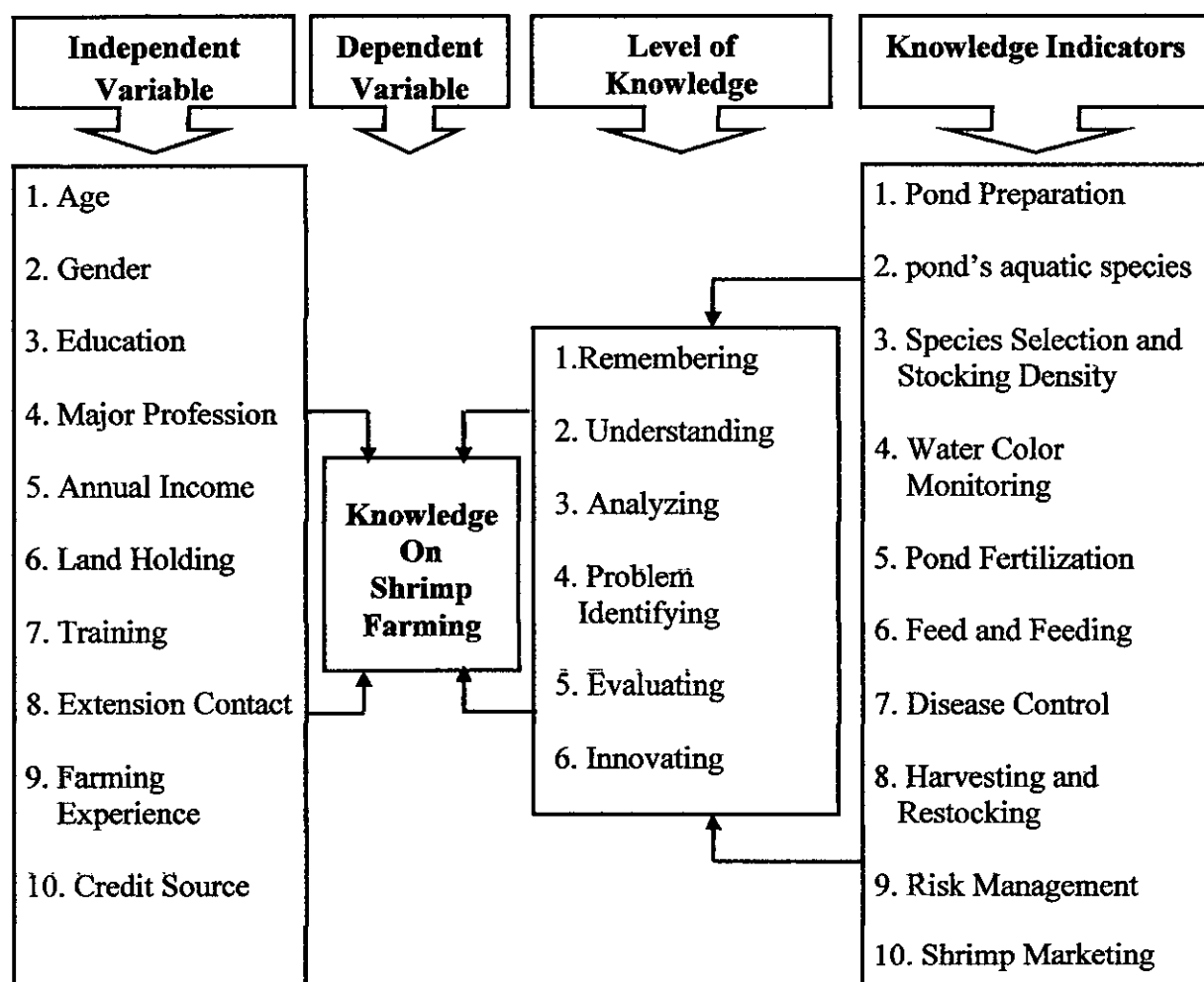


Fig. 3: Conceptual Framework of the Study

3.7. Data collection

Data were collected by personal interview method from the respondents. The interviews were conducted with the respondents in their homes during their leisure time. While starting interview with any respondent, utmost care was taken to establish rapport with him so that he/she did not feel hesitant or hostile to furnish proper information. No difficulty was faced to collect data from the farmers.

3.8. Data Analyzing Procedure

The knowledge of the selected shrimp farmers were determined based on six level of cognitive domain of learning as postulated by Bloom (1956). These six levels of cognitive domains are remembering, understanding, problem identifying, analyzing, evaluating and innovating. The responses of the farmers towards the selected questions were quantified by means of scoring system as outlined in Table 1.

Table 1: Scoring system for determination of farmer's response

<i>Response quality</i>	<i>Score</i>	<i>Grade</i>	<i>Status</i>
76 to 100 percent correct answer	4.0	A	High knowledge
51 to 75 percent correct answer	3.0	B	Medium knowledge
26 to 50 percent correct answer	2.0	C	Low knowledge
Below 25 percent correct answer	1.0	D	Poor knowledge
Wrong answer	0	F	No knowledge

The responses of each question of the concerned respondent were graded according to the above mentioned scale. The score of respondent for a certain question representing each level of cognitive domain could vary from 0 to 4 as per scoring system outlined in Table 1. Then the total score of a respondent against a particular component of shrimp farming practices could range from 0 to 24, as there were 6 sub-levels of knowledge under each component. The total score of a respondent covering all the 10 components of shrimp farming practices could vary from 0 to 240. From each technical area, six questions representing 6 sub-levels of cognitive domain were asked to the farmers.

Attempts were made to find out the relationship between the personal characteristics of the respondent with their knowledge. For this purpose a null hypothesis was set which means that "There is no relationship between the selected characteristics of the shrimp farmers and their knowledge on semi-intensive system of shrimp culture".

The personal characteristics of the respondent included were age, gender, education, major profession, annual income, land holding, training experience, extension contact, farming experience, credit source.

After data collection, data were verified to eliminate errors and inconsistencies. Any kind of inconsistencies in the data were searched and avoided out from the relevant data. Data were processed and finally analyzed using Microsoft Excel & SPSS. The data of local units were converted into international units before data analysis.

3.9. Definition of the terms

For clarity of understanding, certain terms frequently used in the study are defined and interpreted as follows:

3.9.1. Age: Age of the farmers was measured as the period of time in actual years from his/her birth to the time of interview.

3.9.2. Gender: Shrimp farmers are classified into two types on the basis of sex, male and female.

3.9.3. Education: Education is the production of desirable change in human behavior, that is, change in knowledge, change in skill and change in attitude of an individual through the experience of reading, writing and relative activities. It is measured in terms of grades passed by him. Education level of the farmers was assessed according to their schooling level.

3.9.4 Major profession: Profession refers to the earning pattern of a respondent like shrimp cultivation, services, agriculture etc. Major occupation of a respondent refers to the activities through which his/her maximum income comes to maintain his family cost.

3.9.5. Annual income: It refers to the total earning of a farmer from shrimp farming during a year. It was expressed in taka.

3.9.6. Land holding: Land holding refers to the pond that was used for shrimp farming.

3.9.7. Training: Training refers to prepare somebody for doing certain job. In this study, it refers to preparation of the farmers for shrimp culture. Department of fisheries conduct training for the farmers. Farmers participate in these training programs.

3.9.8. Extension contact: Extension contact refers to one's becoming accessible to influence of extension program through various extension-teaching methods. Farmers contact with thana fisheries officer, fisheries extension officer. Fisheries extension officer visits farmers' ponds during the culture period.

3.9.9. Farming experience: Farming experience means the experience, which was gained by an individual from direct farming activities. This was expressed in terms of years i.e. a score of one was given for each year of farming. In this study farming experience means shrimp farming.

3.9.10. Credit source: Credit availability of a respondent refers to the degree to which a farmer needs credit for shrimp cultivation and whether he received it during one year prior to data collection.

3.10. Measurement of dependent variables / knowledge indicators

Extent of knowledge on shrimp farming was measured based on content and level of knowledge. The contents included ten technical aspects of shrimp culture such as:

1. Pond preparation
2. Aquatic species of the pond
3. Species selection and stocking density
4. Water Colour Monitoring
5. Pond Fertilization
6. Feed and Feeding
7. Disease Control
8. Harvesting and Restocking
9. Risk Management
10. Shrimp Marketing

Chapter 4

Results

4.1. Chosen Characteristics of Farmers

The characteristics of the shrimp farmers consisted of their socio-demographic, socio-economic, socio-communicative and socio-psychological which are age, gender, education, major profession, annual income, land holding, training received, exposure to extension media, farming experience and credit source. Every characteristic constituted independent variables, which are mentioned below.

4.1.1. Age of the farmers

The age of the farmers ranged from 19 to 76 years with an average of 41.37 years (Appendix 1). According to their age distribution, farmers were divided into four categories as <25 years, 25-40 years, 41-55 years and >55 years. As shown in the Fig. 4 highest portion of the farmers were in the age class 25-40 years and lowest portion in age class <25 years.

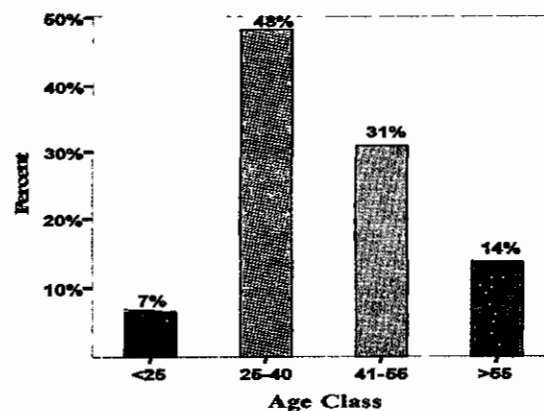


Fig. 4: Age class distribution of farmers

4.1.2. Gender of the farmers

Fig. 5 indicates that female involvement in shrimp farming was comparatively very low than that of male.

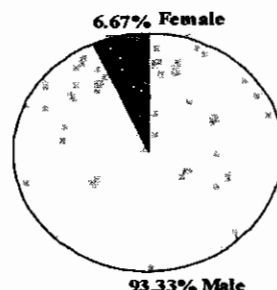


Fig. 5: Ratio of male and female farmers

4.1.3. Education of the farmers

The education of the farmers was assessed on the basis of schooling. The farmer who could not sign his/her name was defined as can not sign and who could sign his/her name only was defined as can sign. Among the sampled farmers, highest percentage of respondents had education level of below SSC and lowest percentage of farmers had education level of above SSC (Fig. 6).

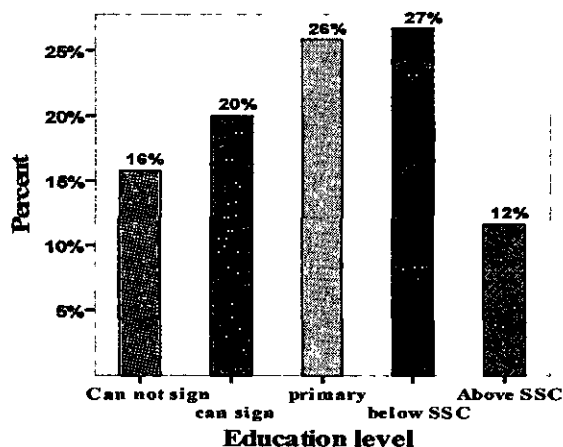


Fig. 6: Distribution of farmers according to education level

14.1.4. Major profession

Regarding professional status, the farmers were grouped as having shrimp farming, crop farming, service holder, business operator and others. Fig. 7 indicates that highest portion of the respondents had shrimp farming as a major professional pursuit.

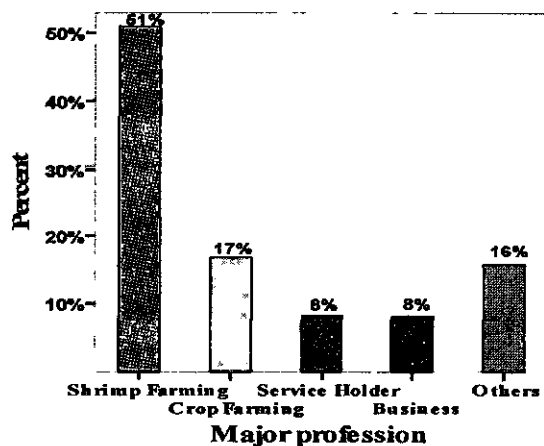


Fig. 7: Major professional status of farmers

4.1.5. Annual income

Highest portion of the farmers had annual income ranging from 25,000-50,000 taka and lowest portion of the farmers had annual income above 1, 00,000 taka (Fig. 8).

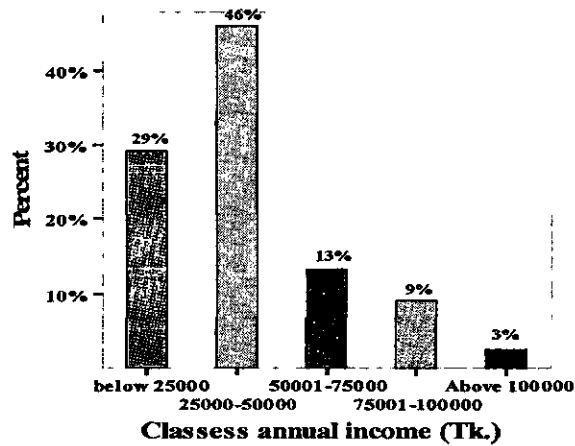


Fig. 8: Status of annual income of farmers

4.1.6. Land Holding

Land holding referred to the land which was owned by a farmer. In the study area, maximum land holding area was 330 decimals and lowest area of land holding was 17 decimals with an average of 84.82 decimals (Appendix 1). Highest percentage of the farmers had land area ranging from 50-150 decimals and lowest percentage of the farmers had land area above 300 decimals (Fig. 9).



Fig. 9: Land holding (decimal) of the farmers

4.1.7. Training received

In the study area non-trained shrimp farmers were more than trained farmers (Fig. 10).

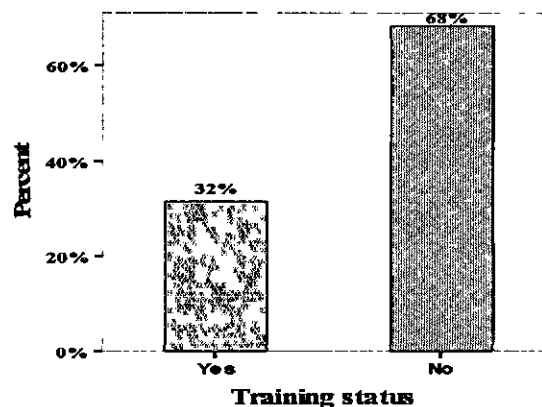


Fig. 10: Training status of the farmers

4.1.8. Extension media contact

The number of the farmers of having extension contact was fewer than those of having no extension contact (Fig. 11).

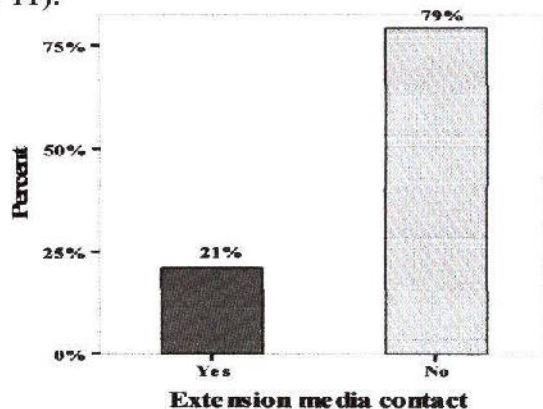


Fig. 11: Distribution of farmers with extension contact

4.1.9. Farming Experience

Shrimp farming experience of the farmers ranged from 1 to 15 years with an average of 5.15 years (Appendix 1). Highest portion of the farmers had farming experience of 3 years and 5 years (Fig. 12).

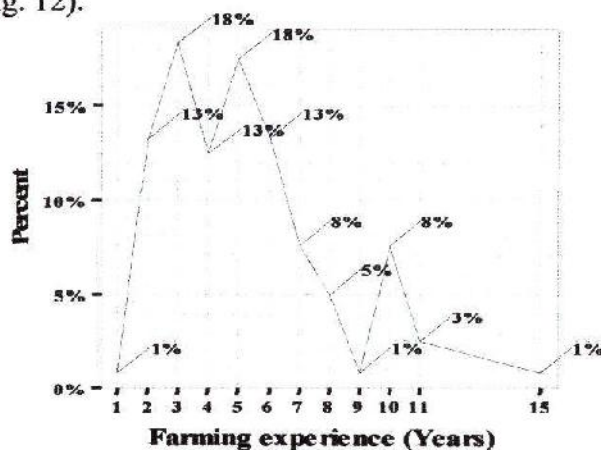


Fig. 12: Shrimp farming experience of farmers

4.1.10. Credit Source

Highest portion of the farmers had own credit and credit source of lowest portion of farmers was Bank (Fig. 13).

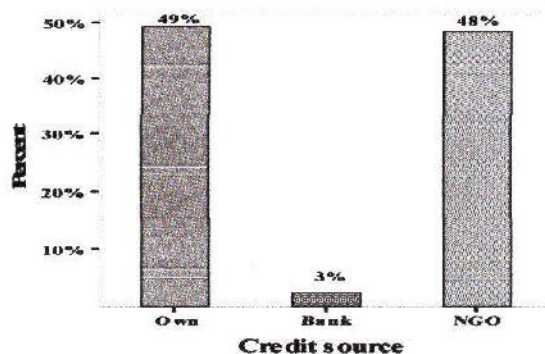


Fig. 13: Credit source of farmers

4.2 Knowledge of farmers on shrimp farming

According to the total shrimp farming knowledge score, farmers were classified into four categories such as, poor (below 60), low (60-120), medium (121-180) and high level of knowledge (181-240). Table 2 indicates that most of the farmers had medium knowledge where as, lowest portion of farmers had poor knowledge.

Table 2: Distribution of knowledge score

Level of knowledge score	No of Farmers	Percent
Poor (Below 60)	7	5.8
Low (60 to 120)	42	35.0
Medium (121 to 180)	61	50.8
High (181 to 240)	10	8.3
Total	120	100

The component-wise average shrimp farming knowledge score of the respondents has been presented in Table 3. As per the scoring system, the score of a farmer under each of the 10 components of shrimp farming practices could vary from 0 to 24. Total of the component-wise average score of the farmers was 122.94 out of the possible score 0-240 which could be remarked as medium knowledge category. Among the 10 cultural components, farmers had lowest score of knowledge on disease control (Table 3).

Table 3: Shrimp farming knowledge of the farmers on 10 selected components (n =120)

Knowledge indicators	Mean Knowledge score (out of the possible score 0-24)
Aquatic species of the pond	13.12
Pond Preparation	12.58
Species Selection & Stocking Density	12.69
Water Color Monitoring	11.84
Pond Fertilization	12.20
Food & Feeding	13.36
Disease Control	9.27
Harvesting & Restocking	13.13
Risk Management	11.13
Shrimp Marketing	13.62
Total	122.94 (out of the possible score 0-240)

It is noteworthy that the possible score of the sub-level indicators was 0-40. The respondents were very good in remembering level of knowledge profile and their level were very poor in case of innovating (Fig. 14).

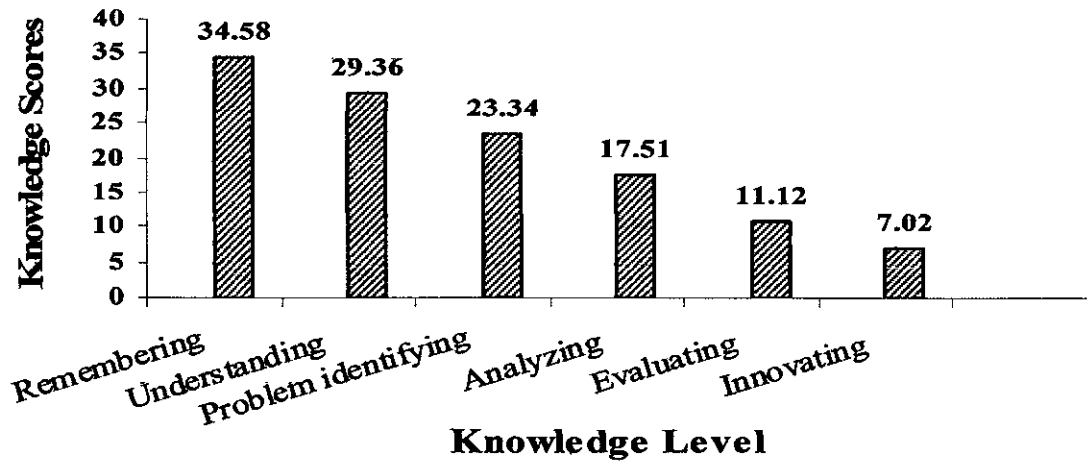


Fig. 14: Knowledge score of the farmers on sub-level indicators

4.3. Relationship between independent characteristics and knowledge score on shrimp farming

Selected characters of farmers had a relationship with shrimp farming knowledge. age, gender, education, major profession, annual income, land holding, training received, exposure to extension media, farming experience and credit source showed some relationship with knowledge.

4.3.1. Age and Knowledge score

The relationship between age of the farmers and their knowledge score on shrimp farming has been presented in Fig. 15. The knowledge score of the farmers of different age classes were moderately different. The highest knowledge score was found in the age class of 41-55 years. Knowledge score increased gradually with increasing the age of the respondents up to and/or equal to 55 years. But it decreased after 55 years.

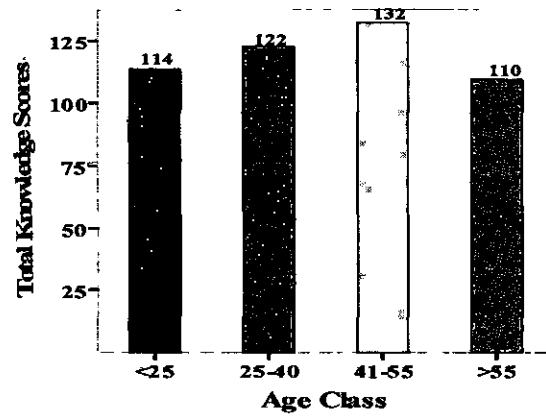


Fig. 15: Relationship between age and knowledge score

4.3.2. Gender and Knowledge score

The relationship between gender of the farmers and their knowledge score on shrimp farming has been presented in Fig. 16. The knowledge score of the male was greater than female.

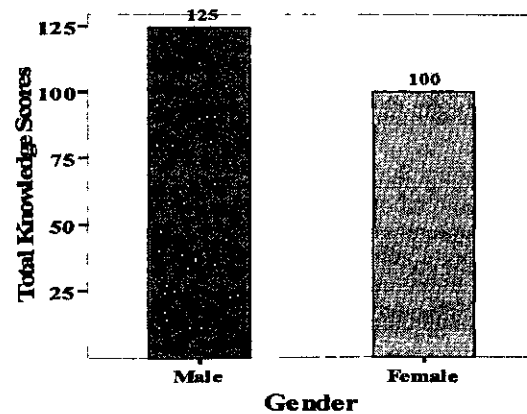


Fig. 16: Relationship between gender and knowledge score

4.3.3. Education and Knowledge score

Fig. 17 indicates that knowledge score was gradually increased with upgrading education level. So there was a positive relationship between education level and knowledge score.

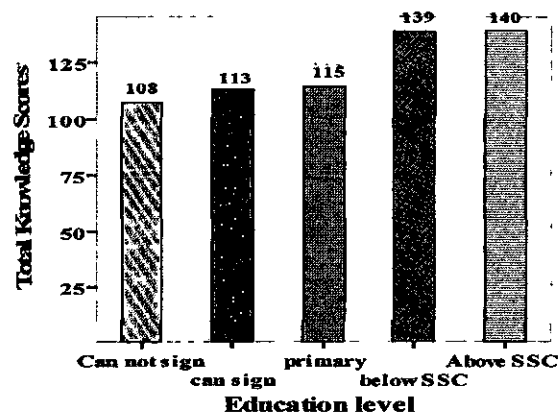


Fig. 17: Relationship between education and knowledge score

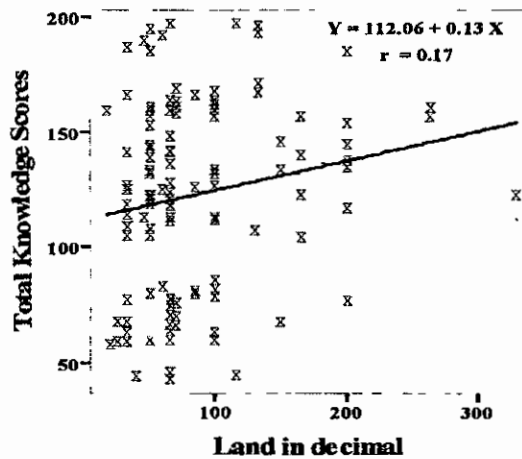


Fig. 20: Relationship between land in decimal and knowledge score

4.3.7. Training and Knowledge score

Trained farmers had higher knowledge score than non-trained farmers (Fig. 21).

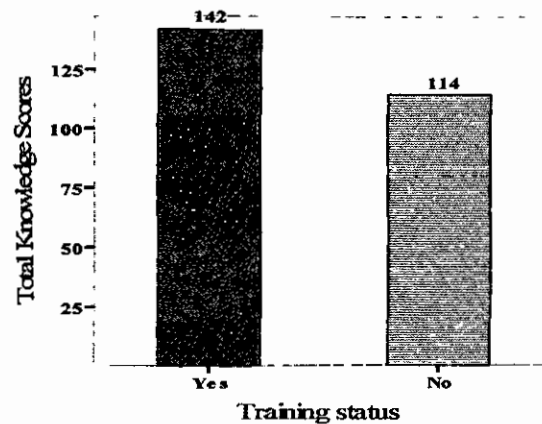


Fig. 21: Relationship between training status and knowledge score

4.3.8. Extension contact and Knowledge score

Fig. 22 shows that the farmers having extension contact had higher knowledge score than those of having no extension contact.

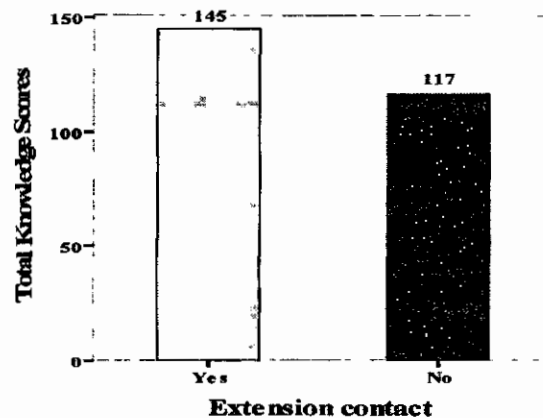


Fig. 22: Relationship between extension contact and knowledge score

4.3.9. Farming Experience and Knowledge score

There was a positive relationship between farming experience and knowledge score as the correlation co-efficient value, r is 0.1 (Fig. 23). So it can be said that knowledge score of the farmers increased gradually with upgrading the period of farming practice.

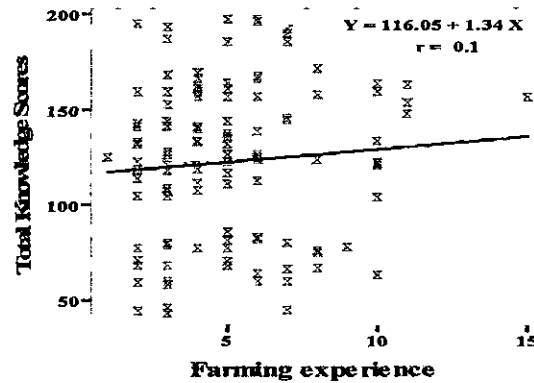


Fig. 23: Relationship between farming experience and knowledge score

4.3.10. Credit source and Knowledge score

Fig. 24 indicates that the farmers whose credit sources were bank had higher knowledge score than others.

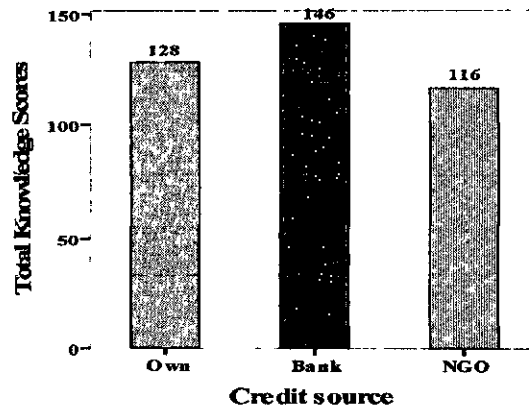


Fig. 24: Relationship between credit source and knowledge score

Chapter 5

Discussion

The ascending trend of knowledge score with the age up to 55 years of the farmers were due to the reasons that they were usually venturesome, innovative, and energetic having a modern out look and potentiality to provide leadership in the society. On the other hand, aged people (above 55 years) lack of energy and enthusiasm due to decline in health and having a traditional out look and also dependent upon other members of the family. Similar findings were noted by Azam (2004). But Azad (2005) and Guha (2006) noted that there was no significant relationship between age of the respondents and their cognitive domain of learning.

In the present study, male farmers had higher knowledge level than female farmers. It might be happened for some reasons such as dependency on husband or male members of the family for input purchasing, religious restriction, household maintenance, low level of education status etc. Similar findings were noted by Azam (2004).

Education is a pre-requisite for acceptance and adoption of aquaculture practices. Education helps a farmer to gain necessary ideas and judge the profitability of aquaculture enterprises in socio-economic development. In the present study, shrimp farming knowledge of the farmers was positively correlated with farmers' educational status. It was found that the educated farmers had more knowledge on shrimp farming practices. A very much similar findings were noted by Ahmed (2004), Alam (2004), Alim (2004) and Azad (2005).

The farmer whose major profession was shrimp farming had higher level of knowledge than others. It might be happened for their highly affiliation to shrimp farming with more attention than the farmers of non-major profession. But no significant relation between major profession and shrimp farming knowledge was found by Alim (2004) and Azad (2005).

There was a positive relationship between annual income per decimal land and knowledge score of farmers. So it can be said that knowledge level of the farmers increased gradually with increasing the amount of income. Similar findings were noted by Azam (2004).

Knowledge score was positively correlated with the holding of land. So it can be said that knowledge level of the farmers increased gradually with increasing the amount of land holding. Similar results were noted by Azam (2004).

Training is a strong weapon in development of knowledge, skill and attitude of a person on some specific task. Training brings about desirable changes in the cognitive, psychomotor and affective behaviour of the farmers and helps them to perform their job effectively and efficiently. Results of the present study showed that shrimp farming knowledge of the farmers was significantly correlated with the training. The trained farmers had higher knowledge on shrimp farming practices than the non-trained farmers. The similar findings were also noted by Alim (2004), Azad (2005) and Guha (2006).

Extension media contact was significantly correlated with farmers' knowledge on shrimp farming practices. The farmers having extension media contact had higher knowledge on shrimp farming practices than the farmers who did not get the touch of extension media. Similar types of findings were noted by Siddeque (2002), Alim (2004), Azad (2005) and Guha (2006) in their research work in Jamalpur and Gazipur district.

Knowledge score was positively correlated with farming experience of farmers. So it can be said that knowledge score of the farmers increased gradually with upgrading the period of farming practice.

In the study area, the credit source of the farmers were own, "bank loan" and "NGOs" The farmers whose credit sources were bank had higher knowledge score than others. Similar results were noted by Azam (2004).

Knowledge has a broad meaning. It is an expression and indication of intellectual capability of a person which is reflected in his/her ideas, thoughts, views, belief and actions. Like other knowledge, shrimp farming knowledge of a fish farmer comprise of an interrelated and integrated sequence of various steps involved in cultivation of shrimp and allied species beginning from pond preparation and ending in harvesting and marketing of shrimp. Shrimp farming knowledge of the farmers is influenced by a variety of interrelated factors such as, social, environmental, physical, economical and technical traits. The Shrimp farming knowledge of the farmers of Fakirhat, Mollahat, Sadar, Rampal, Mongla and Morrelganj upazilla under Bagerhat district were determined based

on 10 components of shrimp culture. The farmers in the surveyed areas were found to have medium level of shrimp farming knowledge on most of the components of shrimp farming. They had high level of knowledge on the remembering and understanding sub-levels of the cognitive domain of shrimp farming activities. The reasons for having much better score on the above two aspects of cognitive behavior of the farmers appeared to be due to easier and simple nature of the questions as asked to the farmers. The present results coincide with the views of Alim (2004), Ahmed (2004), Azad (2005) and Guha (2006).

Farmers' knowledge score on the subsequent sub-levels of cognitive domain on remembering, understanding, problem identifying, analyzing, evaluating and innovating were found to be in diminishing order in all the components of shrimp farming practices. Descending low score of the respondents in the above sub-level of knowledge seemed to be related with the difficulty and complexity of questions as put forward to the farmers which required much thinking, greater aptitude, psychological and intellectual exercise on the specific technical matters. Downward trend of knowledge score of the farmers as observed in the study are comparable to those reported by Alim (2004), Ahmed (2004), Azad (2005) and Guha (2006) in their field level of studies.

The DoF and the local NGO's have a greater role and responsibility to undertake appropriate plan and programme to train up the fish farmers with a view to providing them with new knowledge, develop skill and building up of positive attitude so that the farmers become encouraged and motivated to practice shrimp farming for their socio-economic development. Before recommending any aquaculture technology to the fish farmers, it is important to consider their socio-techno-economic and educational background.

Chapter 6

Recommendations and Conclusion

The farmers of the study area were found to possess medium level of shrimp farming knowledge on an average. A small proportion of the farmers had high level of knowledge. This is not a desirable situation for the promotion and development of shrimp farming practices.

As the DoF entrusts with the responsibility of disseminating and popularizing aquaculture technologies in the country, therefore, DoF should take comprehensive plans and programmes to educate the farmers through providing training and extension support. The NGO's may also come forward to supplement the government effort to strengthen shrimp farming activities for the socio-economic development of the rural farmers.

Chapter 7

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Appendix 1

<i>Independent variables</i>	N	Minimum	Maximum	Mean	Std. Deviation
Age of the farmers		19	76	41.37	12.197
Land in decimal	120	17	330	84.82	55.504
Farming experience		1	15	5.15	2.617

Appendix 2

Date

Questionnaires

A. Personal characteristics of the respondents

1. Name of the Farmer _____

2. Address _____

3. Age: _____

4. Gender

☐ Male

☐ Female

5. Education

☐ Can not sign

☐ Can sign

☐ Primary level

☐ Below SSC

☐ Above SSC

6. Major profession

☐ Shrimp farming

☐ Crop farming

☐ Service holder

☐ Business

☐ Others

7. Annual income _____

8. Land holding _____

9. Training received

☐ Yes

☐ No

10. Extension media contact

☐ Yes

☐ No

11. Farming experience _____

12. Credit source

☐ Own

☐ Bank

☐ NGO

B. Knowledge of shrimp farming components

1. Pond preparation

SL No	Subject	Grade	Sub-levels score
1	Predatory species that live in fish ponds		
2	Liming		
3	Use of chemicals		
4	Controlling system of predatory animal		
5	Dyke construction / repairing		
6	Bottom drying		

2. Aquatic species of the pond

SL No	Subject	Grade	Sub-levels score
1	Characteristics of a good ponds		
2	Unwanted species		
3	Way of making ponds suitable for shrimp culture		
4	Plankton		

3. Species selection and stocking density

SL No	Subject	Grade	Sub-levels score
1	Surface, column and bottom feeder		
2	Stocking density		
3	Preferable sizes of fry for stocking		
4	Acclimatization of fry before stocking		

4. Water Color Monitoring

Sl No.	Subject	Grade	Sub-levels score
1	Preferable color of water for shrimp culture.		
2	Turbidity		
3	Method of color development in pond water		
4	Process of monitoring water color when Secchi disc is not available.		
5	Process of controlling algal bloom in pond		

5. Pond Fertilization

SL No	Subject	Grade	Sub-levels score
1	Chemical fertilizer		
2	Organic fertilizer		
3	Rate of fertilizing		
4	Time of applying fertilizer		

6. Feed and Feeding

SL No	Subject	Grade	Sub-levels score
1	Commonly used feed		
2	Supplementary and complete feed		
3	Rate of feeding and feeding interval		
4	Time of feeding		
5	Preparation of shrimp feed		

7. Disease Control

SL No	Subject	Grade	Sub-levels score
1	shrimp disease Common symptoms of shrimp disease		
	Probable measurement if shrimp is affected by disease		
5	Prevention of shrimp from getting disease		

8. Harvesting and Restocking

SL No	Subject	Grade	Sub-levels score
1	Methods of shrimp harvesting		
2	Types of gears		
3	Time of harvesting		
4	Mode of harvesting (Partial / full)		
5	Restocking after every harvesting		

9. Risk Management

SL No	Subject	Grade	Sub-levels score
1	Probable risks		
2	Probable steps while neighbor's pond became affected with diseases		
3	Keeping the pond free from outbreak of diseases		
4	Way of saving the shrimp during the time of flood		
5	Protection against poaching		

10. Shrimp Marketing

SL No	Subject	Grade	Sub-levels score
1	Price		
2	Selling spot		
3	Transportation and communication		
4	Preservation facility/ use of ice		

C. Comment

Signature of the surveyor