EFFECTIVENESS OF UNION DIGITAL CENTER IN UTILIZATION OF AGRICULTURAL INFORMATION

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EFFECTIVENESS OF UNION DIGITAL CENTER IN UTILIZATION OF AGRICULTURAL INFORMATION

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CERTIFICATE

This is to certify that the thesis entitled **"EFFECTIVENESS OF UNION DIGITAL CENTER IN UTILIZATION OF AGRICULTURAL INFORMATION"** submitted to the Faculty of Agriculture, Sher-e-Bangla Agricultural University, Dhaka, in partial fulfillment of the requirements for the degree of Master of Science in Agricultural Extension, embodies the result of a piece of bona fide research work carried out by **Md. Sirazul Islam, Registration No. 14-06325** under my supervision and guidance. No part of the 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 investigation has been duly acknowledged.

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DEDICATED
TO
MY BELOVED
PARENTS

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TABLE OF CONTENTS

Chapter	Contents	Page
	ACKNOWLEDGEMENTS	v
	TABLE OF CONTENTS	6
	LIST OF TABLES	10
	LIST OF FIGURES	11
	LIST OF APPENDICES	11
	ABBREVIATIONS USED	12
	ABSTRACT	13
I	**INTRODUCTION**	**14**
1.1	Background of the Study	14
1.2	Justification of the Study	15
1.3	Statement of the Problem	16
1.4	Objectives of the Study	17
1.5	Assumptions of the Study	18
1.6	Limitations of the Study	18
1.7	Definition of Important Terms	19
II	**REVIEW OF LITERATURE**	**22**
2.1	Information Related to the Effectiveness of Union Digital Center in Receiving Agricultural Information by the Farmers	22
2.2	Relationships between Selected Characteristics of the Farmers with the Effectiveness of Union Digital Center (EUDC)	27
2.2.1	Age and EUDC	28
2.2.2	Level of education and EUDC	28
2.2.3	Family size and EUDC	29
2.2.4	Farm size and EUDC	29
2.2.5	Family income and EUDC	30
2.2.6	Innovativeness and EUDC	31
2.2.7	Extension media contact and EUDC	31
2.2.8	Agricultural knowledge and EUDC	32
2.2.9	Marketing awareness and EUDC	32
2.2.10	Aspiration and EUDC	32
2.3	Conceptual Framework	33

TABLE OF CONTENTS (Contd.)

Chapter	Contents	Page
III	**METHODOLOGY**	**36**
3.1	Locale of the Study	36
3.2	Research Design of the Study	39
3.3	Population and Sampling Procedure	40
3.4	Research Instrument	41
3.5	Data Collection	42
3.6	Variables and their Measurement Techniques	42
3.6.1	Measurement techniques of independent variables	43
3.6.1.1	Age	43
3.6.1.2	Level of education	43
3.6.1.3	Family size	43
3.6.1.4	Farm size	43
3.6.1.5	Family income	44
3.6.1.6	Innovativeness	44
3.6.1.7	Extension media contact	44
3.6.1.8	Agricultural knowledge	45
3.6.1.9	Marketing awareness	45
3.6.1.10	Aspiration	45
3.6.1.11	Constraints faced by the farmers	46
3.6.2	Measurement techniques of dependent variable	46
3.6.2.1	Information receive from UDC	47
3.6.2.2	Understanding of the received information	47
3.6.2.3	Application of received information	47
3.6.2.4	Development of Indices	47
3.7	Data processing	48
3.8	Statistical procedures	48
3.9	Statement of the Hypotheses	49
3.9.1	Research hypotheses	49
3.9.2	Null hypotheses	49

TABLE OF CONTENTS (Contd.)

Chapter	Contents	Page
IV	**RESULTS AND DISCUSSION**	**50**
4.1	Selected Characteristics of the Farmers	50
4.1.1	Age	51
4.1.2	Level of education	52
4.1.3	Family size	53
4.1.4	Farm size	53
4.1.5	Family income	54
4.1.6	Innovativeness	55
4.1.7	Extension media contact	55
4.1.8	Agricultural knowledge	56
4.1.9	Marketing awareness	57
4.1.10	Aspiration	57
4.1.11	Constraints faced	58
4.2	Effectiveness of Union Digital Center	58
4.2.1	Information receive	59
4.2.1.1	Overall information receive	60
4.2.2	Understanding of the received information	60
4.2.2.1	Overall understanding of the received information	61
4.2.3	Application of received information	62
4.2.3.1	Overall application of received information	63
4.2.4	Effectiveness of union digital center	63
4.2.5	Overall effectiveness of union digital center based on actual scores	65
4.3	Contribution of the selected characteristics of the farmers to the effectiveness of UDC in utilization of agricultural information	65
4.4	Constraints Faced Index in the effectiveness of Union Digital Center (UDC) in utilization of agricultural information	69

TABLE OF CONTENTS (Contd.)

Chapter	Contents	Page
V	**SUMMARY, CONCLUSIONS AND RECOMMENDATIONS**	**71**
5.1	Summary of the Findings	71
5.1.1	Individual characteristics of the farmers	71
5.1.2	Effectiveness of union digital center (EUDC)	72
5.1.3	Contribution of the selected characteristics of the farmers to the effectiveness of UDC in utilization of agricultural information	73
5.1.4	Constraints faced by the respondents to the effectiveness of Union Digital Center (UDC) in utilization of agricultural information	73
5.2	Conclusions	73
5.3	Recommendations	75
5.3.1	Recommendations for policy implications	75
5.3.2	Recommendations for further study	77
VI	**BIBLIOGRAPHY**	**78**

LIST OF TABLES

Table No.	Table Titles	Page
3.1	Distribution of population and sample of farmers of the selected villages	41
4.1	Characteristics profile of the respondents	51
4.2	Distribution of the respondents according to their age	52
4.3	Distribution of the respondents according to their level of education	52
4.4	Distribution of the respondents according to their family size	53
4.5	Distribution of the respondents according to their farm size	54
4.6	Distribution of the respondents according to their family income	54
4.7	Distribution of the respondents according to their innovativeness	55
4.8	Distribution of the respondents according to their extension media contact	56
4.9	Distribution of the respondents according to their agricultural knowledge	56
4.10	Distribution of the respondents according to their marketing awareness	57
4.11	Distribution of the respondents according to their aspiration	57
4.12	Distribution of the respondents according to their constraints faced	58
4.13	Distribution of the farmers according to their information receive on selected agricultural information with rank order	59
4.14	Distribution of the farmers according to their information receive scores	60
4.15	Distribution of the farmers according to their understanding of received information with rank order	61
4.16	Distribution of the farmers according to their information understanding scores	62
4.17	Distribution of the farmers according to their application of received information with rank order	62
4.18	Distribution of the farmers according to their information application scores	63
4.19	Distribution of index value for calculation of effectiveness of union digital center with rank order	64
4.20	Distribution of the farmers according to their effectiveness	65
4.21	Summary of stepwise multiple regression analysis showing the contribution of selected characteristics of the respondents to the effectiveness of Union Digital Center (UDC) in utilization of agricultural information	66
4.22	Rank order of 10 selected constraints faced by the respondents in receiving agricultural information from UDC	70

LIST OF FIGURES

Figure No.	Figure Titles	Page
2.1	Conceptual framework of the study	35
3.1	Map of Dinajpur district showing Khansama upazila	37
3.2	Map of Khansama upazila showing Alokjhari union	38
3.3	Research design of the study	39

LIST OF APPENDICES

Sl. No.	APPENDIX	Page
A	An English Version of the Interview Schedule	85
B	Correlation Matrix of the Dependent and Independent Variables	94

ABBREVIATIONS USED

AI	Application Index
AIS	Agriculture Information Service
BAU	Bangladesh Agricultural University
BBS	Bangladesh Bureau of Statistics
BCKV	Bidhan Chandra Krishi Viswavidyalaya
CIG	Common Interest Group
EUDC	Effectiveness of Union Digital Center
EUDCI	Effectiveness of Union Digital Center Index
FAO	Food and Agriculture Organization
FFS	Farmers Field Schools
FIAC	Farmers Information and Advice Center
ICT	Information and Communication Technology
IPM	Integrated Pest Management
MOF	Ministry of Finance
NATP	National Agricultural Technology Project
RI	Receive Index
SAAO	Sub-Assistant Agriculture Officer
UI	Understanding Index
UDC	Union Digital Center
UNDP	United Nations Development Program
USAID	United States Agency for International Development
WB	World Bank

ABSTRACT

Union Digital Center is being an important element of agricultural development in the 21st century. The objective of the study were to determine the effectiveness of Union Digital Center (UDC) in utilization of agricultural information by the farmers, to determine the contribution of the selected characteristics of the farmers to the effectiveness of UDC in utilization of agricultural information by the farmers and to know the problems faced by the farmers in receiving agricultural information from the UDC. Data were collected using interview schedule from a sample of 154 farmers out of 200 farmers from 8 villages of Alokjhari union of Khansama upazila under Dinajpur district who are the member of Common Interest Group (CIG) by simple random sampling procedure during 13 January to 15 February, 2016. Descriptive statistics and stepwise multiple regression were used for analysis. The effectiveness of UDC was determined on 10 selected agricultural information based on three dimensions viz. information receive, understanding and application. In terms of effectiveness the highest effective information was found on 'compost preparation' (EUDCI=166.94) followed by 'tree plantation' (EUDCI=161.26), 'recommended seed rate' (EUDCI=156.91), 'recommended varieties' (EUDCI=155.24) and so on. The lowest effective information was 'fruits processing techniques' (EUDCI=84.98) among the selected agricultural information. The highest proportion (49.4 percent) of the farmers had low effectiveness of UDC in utilization of agricultural information compared to 30.5 percent had medium effectiveness and 20.1 percent had high effectiveness. Among the influential variables level of education, family income, innovativeness, agricultural knowledge and aspiration were provided 53.1 percent contribution on the effectiveness of UDC. Among ten selected constraints faced by the farmers 'shortage of employee in Union Digital Center' (70.62 percent) ranked first and lowest one was 'Negative attitude and obstacles from local leaders' (27.25 percent). So, the findings indicate that UDC plays a moderate role in utilization of agricultural information. Agricultural knowledge was the main contributor to the improvement of effectiveness of UDC. The study findings recommend that DAE should take necessary steps for the improvement of farmers agricultural knowledge offering need based training and strengthening farmers through FFSs, IPM clubs etc.

CHAPTER I

INTRODUCTION

1.1 Background of the study

Bangladesh is one of the leading developing countries of the World. About 71.90 percent of her population is living in rural area which is about 107 million people (World Bank, 2014). About three-fourths of the total population lives in rural areas, virtually all of them make their living exclusively or substantially from agriculture. Agriculture is one of the largest sectors of the economy in Bangladesh. The contribution of agriculture to Gross Domestic Product (GDP) in the economy of Bangladesh is 19.96 percent (MOF, 2015).

Agriculture is considered as a critical sector in the world economy. It contributes 28 percent of global GDP and provides employment to 25 percent of world's population (FAO, 2013). Out of the total 15.09 million farm holdings, the marginal, small, medium, large holdings account for 38.63, 49.86, 10.34 and 1.17 percent respectively. The landless holdings account for 14.03 percent of 28.17 million total holdings (BBS, 2015).

Bangladesh though an over populated country, it is blessed with fertile land. But due to poverty and limited application of modern technology and inputs it's per hectare yield of crops is still very low. There is a big gap between actual and potential yield of many crops and therefore, there is an ample scope to increase yield of many crops (Mondol, 2010).

Now a day, food security has become a major concern for the country's policymakers in the wake of unusual price like of food items in domestic and international markets. To achieve immediate gain, hybrid seeds are being introduced with private-public patronization (Islam, 2008).

In order to face the chronic food shortage, it is essential to increase agricultural productivity in Bangladesh. For this reason improved agricultural technologies should be used with great care. But in practice till today only one-third of the total cultivable land is covered by the modern technology. The overall development of the country and prosperity of her people is almost absolutely dependent on agriculture.

Due to increased population pressure in Bangladesh, till now the main thrust of the government is being consistently given on food production (Rahman, 2008). In order to increase production substantially, each and every farmer has to be given attention and proper guidance along with appropriate information. Government extension service is not efficient at

appropriate level due to lack of manpower and sufficient fund. To ensure food security, government should take immediate measures to strengthen extension system. Private sector initiatives with funding from national and international donor agencies and in association with government extension system have become very much essential.

Not only knowledge is needed, but an approach will also be needed to supply the right knowledge and tools to the right people at the right time and place. There is a global communication network which make the latest findings of science available almost immediately to research workers in any corner of the world, but what is urgently needed is such communication network at the service of the poor farmers (Swaminathan,1993).

Union Digital Centers (UDCs) are newly established one stop service outlets operating at all 4,501 *union parishads* (the lowest tier of local government) of the country (BBS, 2013). The basic aims of establishment of these centers are to provide facilitation and services in a cheap cost and to develop information data base for assurance of easy access to information at union level. Through use of ICT, UDC is able to bring various types of information related to government, livelihood and private services to the doorstep of citizens in rural areas. Operating under the Public-Private-Peoples' Partnership (PPPP) modality, these centers are run by local entrepreneurs, hosted by *union parishads* and supported by central administration. The entrepreneurs of the UDCs provide information to the village people for make consciousness about featured contents on agriculture, health, education, law and right of people, industry, business, employment, etc. The UDCs are basically situated within the union council complex, so that the rural people can take the advantage of the facilitation and services without any difficulty.

1.2 Justification of the Study

Bangladesh has an agrarian economy with almost 60 percent of the population still employed in the agriculture sector and that the country will make a course for self-sufficiency in food production by near future. The development of agriculture is synonymous to the development of Bangladesh due to its contribution in the economy and progress of the country. Transfer of appropriate technology is a big challenge for the country. This requires generation of technology, which can fit in the participation of overall farming situations depending upon the need of the potential users and their effective communication in such a way that they can be adopted in the shortest possible time (Khan, 2002). Different agricultural research and

extension organizations have undertaken a number of approaches and strategies to reinforce and reform the agricultural structure (Hasan, 2004).

The access to information programme being implemented by Prime Minister's Office (PMO) in Bangladesh with technical assistance from UNDP and USAID undertook the initiative to establish one stop information and service delivery at the lowest tier of the Government, i.e. *union parishad*. Government of Bangladesh established Union Digital Center in the year of 2009 (BBS, 2013).

About 4501 Union Digital Centers (UDCs) were established to facilitate and provide services on agricultural information as well as computer facilitation and training, internet browsing, email support, video conferencing, photography and other related technical information.

The Government of Bangladesh has given major emphasis in agriculture to increase food production through UDC more specifically Farmers Information and Advice Center (FIAC) provide necessary information for the farmers to change their production technology from traditional to advanced system. Peoples are getting information through two entrepreneurs of UDC who provide the technology related service. It helps people get most public services at the rural level through information technology.

Besides different agricultural research institute UDC also provide commercial services and social services to the farmers. All unions, the lowest tier of the local government, are now linked to the UDC working on dissemination of information related to agricultural practices to the farmers. However, there was a very few systematic research conducted on this aspect to ascertain the effectiveness of UDC. Hence, at present conducting a research study with a view to determining the effectiveness of UDC is become very necessary.

1.3 Statement of the Problem

There are several problems in agricultural sector to cultivate crop scientifically. The main problem is the lack of modern agricultural technology and scientific discoveries but the speed with which these technologies disseminated from its origin to ultimate users (AIS, 2007). Single extension worker has very limited scope to reach every farmer. Hence, there is a limited flow of information about the latest agricultural technologies. There are multiple ways available for the transfer of information from the research the farmers. With the availability of the multi-disciplinary information for the integrated development and

availability of technology-based multimedia information systems, opportunities are available for easy transfer of knowledge from the information generators to the information users.

Union Digital Centers provides the required information to the farmers to increase their crop production efficiency. Research is not available whether the aims and objectives have been fulfilled or what extent the objectives of UDC have been achieved. Keeping this in mind the present study was conducted to determine the effectiveness of union digital center in utilization of agricultural information by the farmers.

The study aimed to find out the answer to the following questions:

1. To what extent of effectiveness of UDC in receiving agricultural information by the farmers?
2. What are the relationships among the farmers selected characteristics with the effectiveness of UDC in utilization of agricultural information as perceived by the farmers?
3. What are the contribution of the farmers selected characteristics to the effectiveness of UDC in utilization of agricultural information as perceived by the farmers ?
4. What are the constraints faced by the farmers in receiving agricultural information from UDC?

1.4 Objectives of the Study

In view of the problems, stated above, the following objectives put forward for giving proper direction to the study:

1. To determine the effectiveness of union digital center in receiving agricultural information by the farmers
2. To determine and describe the selected characteristics of the farmers. The selected characteristics of the farmers include:
    i. Age
    ii. Level of education
    iii. Family size
    iv. Farm size
    v. Family income
    vi. Innovativeness
    vii. Extension media contact
    viii. Agricultural knowledge
    ix. Marketing awareness
    x. Aspiration

3. To determine the contribution of the selected characteristics of the farmers to the effectiveness of UDC in utilization of agricultural information as perceived
4. To know the problems faced by the farmer in receiving agricultural information from the UDC

1.5 Assumptions of the Study

The researcher made the following assumptions while undertaking the study.

1. The respondents were capable of furnishing proper responses to the questions included in the interview schedule.
2. The researcher who has acted as interviewer was well adjusted to the social and cultural environment of the study area. Hence, the data collected by the researcher from the respondents furnished their correct opinions.
3. The responses furnished by the respondents were reliable and valid. They expressed the truth about their convictions and awareness.
4. Views and opinions given by the respondents included in the sample of the study were the representative views and opinions of the whole population of the study area.
5. The information sought reveals the real situation to satisfy the objectives of the study.
6. The items, questions and scales included in the questionnaire were relevant and appropriate.
7. Data were normally and independently distributed.
8. The sampling procedures followed for this study, the analysis of data and interpretations etc. were free from all biases.

1.6 Limitations of the Study

In order to make the study meaningful and manageable from the point of view of the researcher, it was necessary to impose some limitations as stated below:

1. Since the findings of the study were based on the opinion expression capability and ability to recall of the respondents, the study was confined to both their ability to recall and also their sincerity and honesty in providing the needed information.

2. Some farmers of the study area received training from union digital center and some did not receive this type of training but according to the nature of the study, only trained farmers were selected as respondents.
3. There are many characteristics of the farmers but only ten of them were selected for this study.
4. For investigation of this study, the researcher depended on the data as furnished by the selected farmers during the time of data collection.
5. Effectiveness of UDC was measured by using 5-point rating scale on three dimensions only.
6. The landless farmers were excluded from the study because they were not directly concerned with the use of agricultural information.

1.7 Definition of Important Terms

For the purpose of clarity, certain terms frequently used throughout the entire study are defined and explained as follows:

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

Level of education referred to the development of desirable knowledge, skill and attitude in an individual through the experience of reading, writing, observation and relative activities.

Family size referred to actual number of permanent members in a subject's family who live in a fixed dwelling unit and eat from the same cooking arrangement.

Farm size means the total area of land on which a farmer's family carries on farming operations in terms of full benefit to the family.

Family income referred to the total annual earnings of all the family members of a respondent from agriculture, livestock and fisheries and other accessible resources.

Innovativeness is the degree to which an individual or other unit of adoption is relatively earlier in adopting new ideas than other members of a social system (Rogers, 2003).

Extension media contact referred to one's becoming accessible to the influence of extension contact through different extension teaching methods or refers to the individual exposure to or contact with information sources.

Knowledge is operationally defined for the purpose of this investigation as 'those behaviors and test situations, which emphasized the remembering either by recognition or recall of ideas, material or phenomenon'.

Aspiration referred to the desire or ambition of an individual regarding his/her farm, family and environment. It leads to work hard and to acquire sufficient knowledge and skill on a particular aspect. Farmer's aspiration on agriculture might be an indication of his acquisition of knowledge and ability to solve his agricultural problems.

Marketing awareness has been defined in the present study as the degree to which a farmer aware towards purchasing his agriculture related inputs from open market like seed traders, insect or pest dealers etc.

Constraints means any difficult situation which requires some actions to minimize the gap between "what ought to be" and "what is".

Constraints faced referred to different problem faced by the farmers in receiving agricultural information from UDC.

Effectiveness means the usefulness or efficiency for the specific initiatives with viewing specific objectives. It may be defined as the degree to which a group or social system achieves its goal (Scharmerhorn *et al.* 1988). Effectiveness may be defined as the degree to usefulness of socio-economic development program emphasizing on agricultural activities.

Farmer means the principal decision maker involved in the management of a farm, not always be the head of the farm-household (Khan, 2004).

Information consists of data that have been processed and are meaningful to a user. Thus agricultural information consists of processed data related to various aspects of farming considered meaningful and useful to the farmers to increase farm output. Information denotes a difference in matter-energy that affects uncertainty in a situation where a choice exists

among a set of alternatives (Rogers and Kincaid, 1981).

Union Digital Center (UDC) is a broad aspect of information transfer to the local people about agriculture, information and communication technology and several social services. It is situated at union council premises and village people come to the union digital center for information without any cost. It is a new approach of extension work in the rural areas of Bangladesh.with information sources.

Farmers Information and Advice Center (FIAC) is that section of UDC which transfers only agricultural information to the farmers. It gives information on crop production, fisheries and livestock.

Technology involves the design and production of innovative and creative products to meet the needs and wants of others. Technology can be viewed as an activity that forms or changes culture (Borgmann, 2006). The word technology refers to the making, modification, usage, and knowledge of tools, machines, techniques, crafts, systems, and methods of organization, in order to solve a problem, improve a pre-existing solution to a problem, achieve a goal, handle an applied input/output relation or perform a specific function.

Objectives are concrete attainments that can be achieved by following a certain number of steps.

Hypotheses as defined by Goode and Halt (1952) a hypothesis is "a proposition which can be put to test to determine its validity. It may seem contrary to, or in accord with common sense. It may prove to be correct or incorrect. In any event, however, it leads to an empirical test."

Assumption is a supposition accepted as true to the investigator to be reasonable in the light of available evidence.

Correlation- when an increase or decrease in one variate is accompanied by an increase or decrease in the other variate, the two are said to be correlated and the phenomenon is known as correlation.

Regression is a statistical measure that attempts to determine the strength of the relationship between one dependent variable (usually denoted by Y) and a series of other changing variables (known as independent variables).

CHAPTER II

REVIEW OF LITERATURE

A comprehensive review of literature is the basic needs of a scientific investigation. This chapter deals with a brief review of previous research studies relating to the present study and to formulate and construct a framework that will be fitting for accurate understanding of the research. The aim of this study was to have an understanding of effectiveness of Union Digital Center (UDC) in receiving agricultural information by the farmers and then relationships with the selected individual characteristics. No systematic study had so far been conducted on this aspect in Bangladesh, only a few researchers have worked on UDC. However, available literature was reviewed in this Chapter to search out related works conducted in home and abroad. This Chapter is divided into three sections, the first section deals with the general findings on effectiveness of UDC and second section is devoted to a discussion on the findings of research studies exploring relationships between the selected characteristics of the farmers and effectiveness of UDC. The third section deals with the conceptual frame work of the study. Hence the literatures presented here are directly or indirectly related with the dependent variable of the present study and are presented in the following sections:

2.1 Information Related to the Effectiveness of Union Digital Center in Receiving Agricultural Information by the Farmers

Effectiveness is the capability of producing a desired result. When something is deemed effective, it means it has an intended or expected outcome, or produces a deep, vivid impression. On the other hand, effectiveness is defined as “the accuracy and completeness of users’ tasks while using a system (Wikipedia, 2014).

Effectiveness of any project on people or other pertinent aspect has a problem of conceptualization. The term may be variously perceived depending on one’s orientation, purpose and field of investigation. Relevant literatures have been reviewed to clarify the concept of effectiveness and the factors that are likely to influence it. However the problem is that the word effectiveness is relatively a new concept for the field of worker and client of extension and rural extension work (Hasanullah, 1989).

Singh *et al*. (2014) were found that a majority of trainees perceived that knowledge and skills were enhanced as a result of training. The overall effectiveness of training was found to be 54.6 percent which came under medium effectiveness category.

Ali (2014) revealed that 43.38 percent of the respondents had low use, 33.67 percent had medium use and only 22.95 percent had high use of communication media. Television was found to have highest uses followed by newspaper, radio, poster and other communication media.

Chandrappa *et al.* (2014) concluded that in rural area, scientific orientation, training effectiveness and achievement motivation exhibited maximum direct and indirect effects to the respondents. Respondents got training which enhances their management efficiency. Knowledge level about improved dairy husbandry practices had the maximum direct effect and scientific orientation showed maximum indirect effect on management efficiency of peri- urban respondents.

Sharmin (2013) found that 52 percent of the farmers had medium use of communication media and 48 percent had high use of communication media in commercial fish culture.

Sajesh (2013) concluded that major factors influencing the effectiveness of farming groups were found to be level of education, social participation, economic motivation, group dynamics, functional linkage and support from the promoting institution.

Ismail (2013) in his study observed that effectiveness through contact with radio, television, newspapers and magazine. The percentages of respondents were 98, 92, 77 and 48 respectively. Of the listeners and watchers, 95 and 59 percent used their own radio and television sets respectively.

Gupta *et al.* (2013) found that 54 percent trainees received information of training during visiting the village of KVK trainers and 46 percent trainees received information of training programme through Dashpur krishi samacha/Local newspaper. Majority of the respondents (92 percent) learn new techniques through visited front line demonstration plot and crop cafeteria at KVK instructional farm.

Egbule and Njoku (2013) in their study found that mass media have performed poorly in disseminating requisite agricultural information to farmers, although there is a positive correlation between mass media usage and farm yield. Common service center are more effective than other channel.

Perianayagam and Arokiasamy (2012) reported that women's education and exposure to mass media are more effective developmental indicators that bear a highly significantly positive relationship between contraception and negative fertility through all regions.

Udawat (2012) found that significant improvement in the knowledge of respondents as a result of exposure to effective training package as the pre-test scores increased from 26.83 to 67.86 with the gain in knowledge of about 41.03 percent.

Joshi and Laharia (2012) reported that effectiveness of about 70 percent of the items of Krishi Darshan Programme of Delhi Door Darshan Kendra was considered 'Timely'. Because of untimely telecast these telecasts might not have much practical utility and it was found that almost all the items were highly relevant.

Rashid (2012) reported that about two-fifths (41.96 percent) of the women beneficiaries had medium contact with communication sources while 32.14 percent low and 25.90 percent had high contact. The highest proportion (41.07 percent) of women beneficiaries had medium application of information while 33.93 percent had low application and 25 percent had high application. On the other hand, the highest proportion (38.39 percent) of the farmers had medium use of communication sources compared to 33.93 percent low and 27.68 percent high.

Dinampo (2012) observed that farmers were found to prefer an interpersonal media rather than mass media. Among mass media, first preference was radio followed by printed materials and audio visual sources.

Mekabutra (2011) reported that the obtained effectiveness among the mass media that offered more knowledge in agriculture was radio, followed by television and newspaper respectively. Considering knowledge gained from mass media that were applicable to their work, farmers opined that television provided about 83.5 percent, radio 78.0 percent and newspaper 77.0 percent.

Jha *et al*. (2011) in his study found that the extension services rendered by Tata Kisan Sansar were found to be medium in effectiveness by majority of the farmers (54 percent) and 46 percent of farmers found the extension service to be high in effectiveness.

Mondol (2010) in his study observed that the highest proportion (39.51 percent) of the farmers had medium use of mobile phone in receiving farm information from the SAAOs compared to 35.80 percent having low and 24.69 percent high use of mobile phone.

Mondol (2010) revealed that among the seven communication sources neighbors and friend was the highest and Upazila Fisheries Officers was the lowest sources of information used by the farmers.

Mid-term review of the Fifth Malaysia Plan (2009) quoted by Ailing-Ton (2010) emphasized on accelerating transfer of technologies to small holders to improve their productivity and efficiency. Technologies transfer could be achieved through publications, newspapers, radio and television networks, interpersonal methods as exemplified programme launched in 1983 by the Ministry of Agriculture which has contributed to increase farmer's communication through printed media. The advent of information technologies had benefited Malaysia in the transfer of technologies by reducing costs in terms of time.

Oojobi (2009) found in a study that the private sources of agricultural information of Nigerian farmers were friends, other farmers, local leaders, traditional meetings, extension agents, radio, demonstration, television agricultural shows and printed materials.

Panya (2009) found that farmers thought that proportion of knowledge provided by television were 83.3 percent, radio 78 percent and newspaper 77 percent. They watched the programmes on channel Seven (62 percent) and read Thai Rath (84 percent). They also mentioned that knowledge gamed from radio, television and newspaper about insecticide, pesticide. They learned how to use fertilizer and learned of animal husbandry respectively.

Roggeveen *et al.* (2008) revealed that it is rely on the homophile principle and hybrid organization theory to provide conceptual grounding, and utilize a company dataset of customer post-call evaluations to offer an initial test of the hypotheses.

Irfan *et al.* (2006) observed in their study that 97.5 percent, 91.7 percent, 64.2 percent and 51.7 percent farmers regarded their fellow farmers, pesticide agencies, television, and extension field staff, respectively as their major sources of agricultural information.

Mollah (2006) found that the highest extent of use of communication media by the farmers was found in contact with Sub-Assistant Agricultural Officer was followed by television in relation to rice production technologies.

Singh and Dhillon (2006) reported that the majority of the respondents attended training programs, consulted farm literature, attended expert lectures and farmer fairs, and consulted university scientists to obtain the latest agricultural information. Majority of the respondents evaluated the information before dissemination to farmers, compared it against their past experience and discussed it with colleagues and specialists, laid out demonstrations, and considered the socio-economic conditions of the area.

De-la-Vaga (2004) found that in terms of availability of mass communication media channels, radio and TV were the most available. A great majority of the respondents listen the radio every day and consider it as their main source of news. The communication channels they preferred credible were radio, interpersonal sources and TV.

Alam (2004) in his study concluded that majority (48 percent) of the farmers belonged to moderately effective category, while 37 percent to very effective category and rest 15 percent less effective category in respect of timeliness and scope of application. Thus about 85 percent of the farmers opined that farm information received from printed materials as effective to very effective.

Farouque (2004) in his study observed that the farmers had the highest contact with the neighbors, friends and relatives, and ideal farmers. Little less than three-fifths (58 percent) of the farmers had medium contact while 32 percent had low and only 10 percent had high contact.

Prameela and Ravichandran (2004) in their study found that majority of the farm women regularly contacted Assistant Agricultural Officers (75.33 percent) and Agricultural Officers (67.33 percent). They also found that neighbors (78.67 percent), friends (73.33 percent), progressive farmers (23.33 percent), contact farmers (13.33 percent) and input dealers (13.33 percent) were the popular channels of communication.

Sarker (2004) found that the majority (69 percent) of the farmers of his study area possessed radio set of their own and used it. The other 31 percent listened to other farmers' radio, 21 percent from neighbor set, 5 percent of the tea stall and 5 percent of the farmers listened radio sets of friends and relatives. The research found that farmers had an easy access to agricultural radio programme. This indicated that information regarding useful agricultural technologies could be made available to the farmers through radio.

Nuruzzaman (2003) in his study observed that selected mass media like television had been more effective in receiving agricultural information than other mass media like radio, folk song agricultural fair, poster, newspaper, and leaflet or bulletin.

Anisuzzaman (2003) found that radio seems to be a powerful media in the mass contact method. Progressive farmer and contact farmer frequently used communication media TV. Result demonstration and printed materials are also important media communicating agricultural information. Least used media were newspaper and field tour.

Islam (2003) concluded that the highest proportion of the respondents (44.55 percent) belonged to medium media exposure category and 38.18 percent belonged to low exposure and 17.27 percent belonged to high exposure group. He also found that among 15 media, radio ranked in 6, television 7 and fair 8. Agricultural publications 15 and the rank 1 to 5 were for individual media.

Ponnusamy (2003) observed that personal localite channels such as friends and neighbours (74.47 percent) and input dealers (89.36 percent) were the major sources of information.

Sher-Muhammad (2002) conducted a study on effectiveness of the communication methods/media used by Novartis Pesticide Company in Pakistan. It was revealed from their study that neighbours, friends and relatives were the major sources through which majority of the respondents (89.16%) become aware of Novartis. Agricultural media campaigns appeared to be the most effective communication methods followed by literature, lecture meetings, exhibitions, demonstrations and movies.

2.2 Relationships between Selected Characteristics of the Farmers with the Effectiveness of Union Digital Center (EUDC)

This section focuses on the linkage of farmers characteristics usually vary from one person to another and those as variables play vital role in making difference regarding effectiveness of Union Digital Center (UDC) in receiving agricultural information by the farmers. The previous relationships between farmers characteristics and the effectiveness of UDC are discussed below.

2.2.1 Age and EUDC

Talukder (2013) revealed that age of the farmers had no significant relationship with the use of Union Information and Service Center.

Sajesh (2013) in his study concluded that age had positively significant relationship with the factors affecting effectiveness of collective farming and factors discriminating the effectiveness of women's joint liability groups in agriculture.

Islam (2005) found that age of the farmers had no significant relationship with the effectiveness of printed materials by the farmers in receiving farm information.

Alam (2004) observed that age of the farmers had negative and significant relationship with their opinion of the farmers on effectiveness of printed materials in getting farm information.

Nuruzzaman (2003) found that age of the farmers had negative and significant relationship with effectiveness of mass media in receiving agricultural information.

Anisuzzaman (2003) observed that age of the farmers had no significant relationship with the communication media Radio, TV, Newspaper in adoption of improved rice production technologies.

Miah (2002) also found that the age of farmers had positive and significant relationship with flow of agricultural information.

2.2.2 Level of education and EUDC

Ali (2013) observed that education of the farmers had positive and significant relationship with the use of communication media in receiving agricultural information.

Talukder (2013) revealed that family education of the farmers had positive and significant relationship with the use of Union Information and Service Center.

Ko and kim (2008) found that the RTV ratings of the respondents were not significantly related to their educational background. However, older watchers indicated a greater rend to watch RTV programmes.

Islam (2005) found that education of the farmers had positive and highly significant relationship with their effectiveness of printed materials in receiving farm information.

Khan (2006) observed that education had positive significant relationship with the effectiveness of group approach in dissemination of farm information to the farmers.

Farouque (2004) revealed that the educational qualification of the farmers had positive and significant relationship with use of different extension media in receiving information for livestock management.

Alam (2004) found that education of the farmers had positive and highly significant relationship with their opinion of the farmers on effectiveness of printed materials in getting farm information.

Giri (2002) observed that the educational qualification of the farmers had positive and significant relationship with communication behavior.

2.2.3 Family size and EUDC

Sajesh (2013) in his study concluded that family size had positively significant relationship with the factors discriminating the effectiveness of women's joint liability groups in agriculture and factors affecting effectiveness of collective farming.

Hossain (2007) observed that there was no significant relationship between family size of the farmers and their opinion on the effectiveness of Hridoye Mati-O-Manush Television program in disseminating agricultural information.

Karim (2005) found that family size of the farmers had no significant relationship with the use of communication sources.

Alam (2004) revealed that family size of the farmers had no significant relationship with the use of communication media.

Anisuzzaman (2003) observed that family size of the farmers had no significant relationship with the communication media like Radio, TV and Newspaper in adoption of improved rice production technologies.

Pradhan (2003) observed that family size of the farmers had no significant relationship with the impact of mass media.

2.2.4 Farm size and EUDC

Ali (2013) observed that farm size of the farmers had positive and significant relationship with the use of communication media in receiving agricultural information.

Sajesh (2013) in his study concluded that farm size had positively significant relationship with the factors discriminating the effectiveness of women's joint liability groups in agriculture and factors affecting effectiveness of collective farming.

Talukder (2013) revealed that farm size of the farmers had positive and significant relationship with the use of Union Information and Service Center.

Hossain (2007) observed that there was significant relationship between farm size of the farmers and their opinion on the effectiveness of Hridoye Mati-O-Manush Television program in disseminating agricultural information.

Islam (2005) found that farm size of the farmers had no significant relationship with their use of printed materials by the farmers in receiving farm information.

Haque *et al.* (2004) revealed that farm size of the respondents had positive and significant relationship with the extent of use of information sources in producing modern variety of rice.

Anisuzzaman (2003) observed that farm size of the farmers had no significant relationship with the communication media like Radio, TV and Newspaper in adoption of improved rice production technologies.

2.2.5 Family income and EUDC

Sharmin (2013) found that annual family income had positive significant relationship with the use of communication media.

Sajesh (2013) in his study concluded that annual income had no significant relationship with the factors affecting effectiveness of collective farming and factors discriminating the effectiveness of women's joint liability groups in agriculture.

Talukder (2013) revealed that family income of the farmers had positive and significant relationship with the use of Union Information and Service Center.

Islam (2005) found that annual income of the farmers had no significant relationship with effectiveness of printed materials in receiving farm information.

Alam (2004) found that annual family income of the farmers had positive and highly significant relationship with their opinion of the farmers on effectiveness of printed materials in getting farm information.

Anisuzzaman (2003) observed that annual income of the farmers had no significant relationship with the communication media like Radio, TV and Newspaper in adoption of improved rice production technologies.

2.2.6 Innovativeness and EUDC

Sajesh (2013) concluded that innovativeness had significant relationship with the factors discriminating the effectiveness of women's joint liability groups in agriculture and factors affecting effectiveness of collective farming.

Talukder (2013) revealed that innovativeness of the farmers had positive and significant relationship with the use of Union Information and Service Center.

Ali (2013) observed that innovativeness of the farmers had positive and significant relationship with the use of communication media in receiving agricultural information.

Islam (2005) found that innovativeness of the farmers had positive and significant relationship with effectiveness of printed materials in receiving farm information.

Farouque (2004) revealed that the innovativeness of the respondents had positive and significant relationship with use of different extension media in receiving information for livestock management.

Anisuzzaman (2003) observed that innovativeness of the farmers had a positive and significant relationship with the communication media in adoption of improved rice production technologies.

2.2.7 Extension media contact and EUDC

Sajesh (2013) concluded that extension media contact had positive significant relationship with the factors discriminating the effectiveness of women's joint liability groups in agriculture and factors affecting effectiveness of collective farming.

Hossain (2007) observed that extension media exposure had positive significant relationship with the opinion on the effectiveness of Hridoye Mati-O-Manush Television program in disseminating agricultural information.

Khan (2006) observed that extension media exposure had positive significant relationship with the effectiveness of group approach in dissemination of farm information to the farmers.

Haque (2006) observed that the extension contact of the rice growers had significant and positive relation with the adoption of modern varieties.

Rashid (2006) exposed that the extension communication exposure had positive significant relationship with participation in agricultural activities.

Alam (2004) found a positive significant relationship between extension media contact and use of mass media sources of information.

2.2.8 Agricultural knowledge and EUDC

Agricultural knowledge of the farmers had positive and significant relationship with their (i) flow of agricultural information (Miah, 2002), (ii) use of different extension media in receiving information for livestock management (Farouque, 2004), (iii) use of communication sources (Karim, 2005), (iv) use of mobile phone (Barman *et al*., 2009), and
(v) use of interpersonal communication sources (Mondol, 2010).

2.2.9 Marketing awareness and EUDC

Chandrappa *et al*. (2014) showed that marketing awareness had positive and significant relationship with effectiveness of training program in respect to management efficiency of respondents, irrespective of the localities.

Talukder (2013) revealed that marketing awareness of the farmers had no relationship with the use of Union Information and Service Center.

Bahal and Burman (2012) found that marketing awareness of the farmers showed positive and highly significant relationship with use of communication channel.

Mondol (2009) observed that marketing awareness of the farmers had positive and significant relationship with the use of communication channel.

2.2.10 Aspiration and EUDC

Chandrappa *et al*. (2014) showed that aspiration had positive and significant relationship with effectiveness of training program in respect to management efficiency of respondents, irrespective of the localities.

Mondol (2009) observed that aspiration of the farmers had positive and significant relationship with the use of communication channel.

Barik (2001) revealed that aspiration of the farmers had positive and highly significant relationship with impact of communication channel.

2.3 Conceptual Framework

Conceptual framework (theoretical framework) is a type of intermediate theory that attempt to connect to all aspects of inquiry (e.g. problem definition, purpose, literature review, methodology, data collection and analysis). Theoretical frameworks can act like maps that give coherence to empirical inquiry. Because theoretical framework is potentially so close to empirical inquiry, they take different forms depending upon the research questions or problem (Wikipedia, 2012).

Theoretical framework is the foundation for understanding the research and linkage among the different variables. It helps as a guiding principle for analyzing the research issues. In this section a brief description on concept of effectiveness of union digital center (EUDC) by the farmers and its cause-effect relationship with the selected characteristics of the farmers is presented.

Every occurrence of phenomenon is the outcome of a number of variables which may or may not be interdependent or interrelated with each other. Variables together are the causes and the resultant phenomenon is effect and thus, there are cause-effect relationships everywhere in the universe.

During fundamental arrangement for the dependent and independent variables the conceptual framework was kept in mind. This study concerned with the effectiveness of UDC in receiving agricultural information by the farmers as a dependent variable and the eleven (11) selected characteristics of the farmers such as age, level of education, family size, farm size, family income, innovativeness, extension media contact, agricultural knowledge, marketing awareness, aspiration and constraints faced by the farmers as independent variables.

The EUDC was dignified in three dimensions (information receive, understanding and application). On the other hand, 10 information of agriculture namely recommended varieties, recommended seed rate, recommended irrigation, recommended doses of fertilizer, integrated pest management (IPM) practices, modern cultivation technology, compost preparation, post- harvest management of vegetables, fruits processing techniques and tree plantation were included in this study for determine the agricultural information which are covered crop cultivators only.

On the other hand, livestock and fish farmers were not included in this research. Several problems which hinder smooth information transfer were kept in mind and their probable suggestions to overcome the problems suggested by them also identified. Based on these discussions the conceptual framework of this study has been formulated. The solid one-way arrows indicate the cause-effect relationships which have been investigated and the broken one-way arrows indicate the relationships which have not been investigated in the present research work (Figure 2.1).

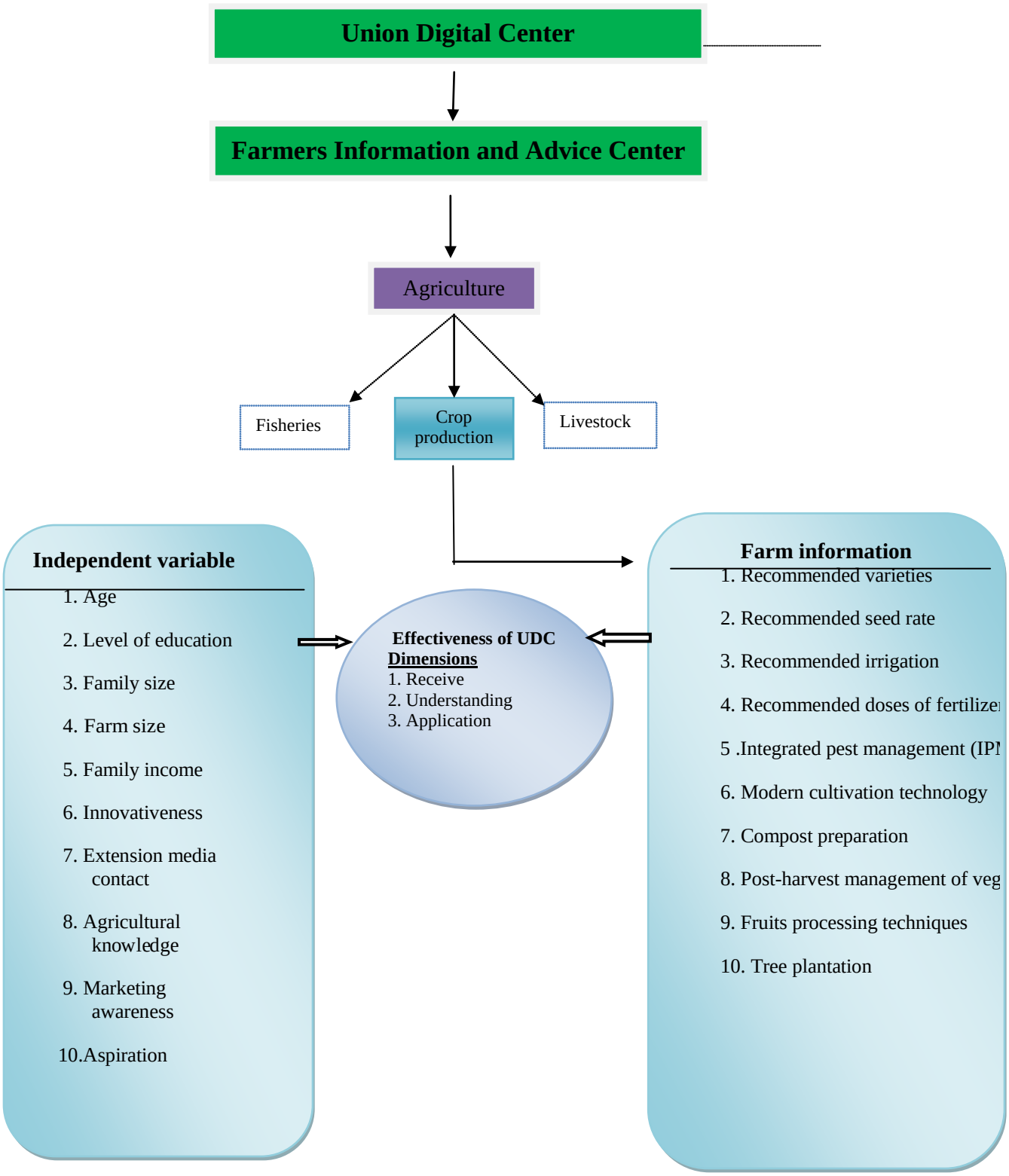

Figure 2.1 Conceptual framework of the study

CHAPTER III

METHODOLOGY

The method and procedure used in the study are presented in this chapter. The principal method used in this study was field survey using structured interview schedule. In any scientific research methodology play an important role. To perform a research work systematically, careful consideration of appropriate methodology is a must. It should be such that it would enable the researcher to collect valid and reliable information to arrive at correct decisions. The methods and procedures followed in conducting this study have been described in this Chapter in the following sections.

3.1 Locale of the Study

The present study was conducted in a union named Alokjhari under Khanshama Upazila of Dinajpur district. Most of the farmers of this area are directly and/or indirectly engaged in agricultural activities and few people are service holders and businessmen. There are eight villages in this union. The study was conducted in these eight villages.

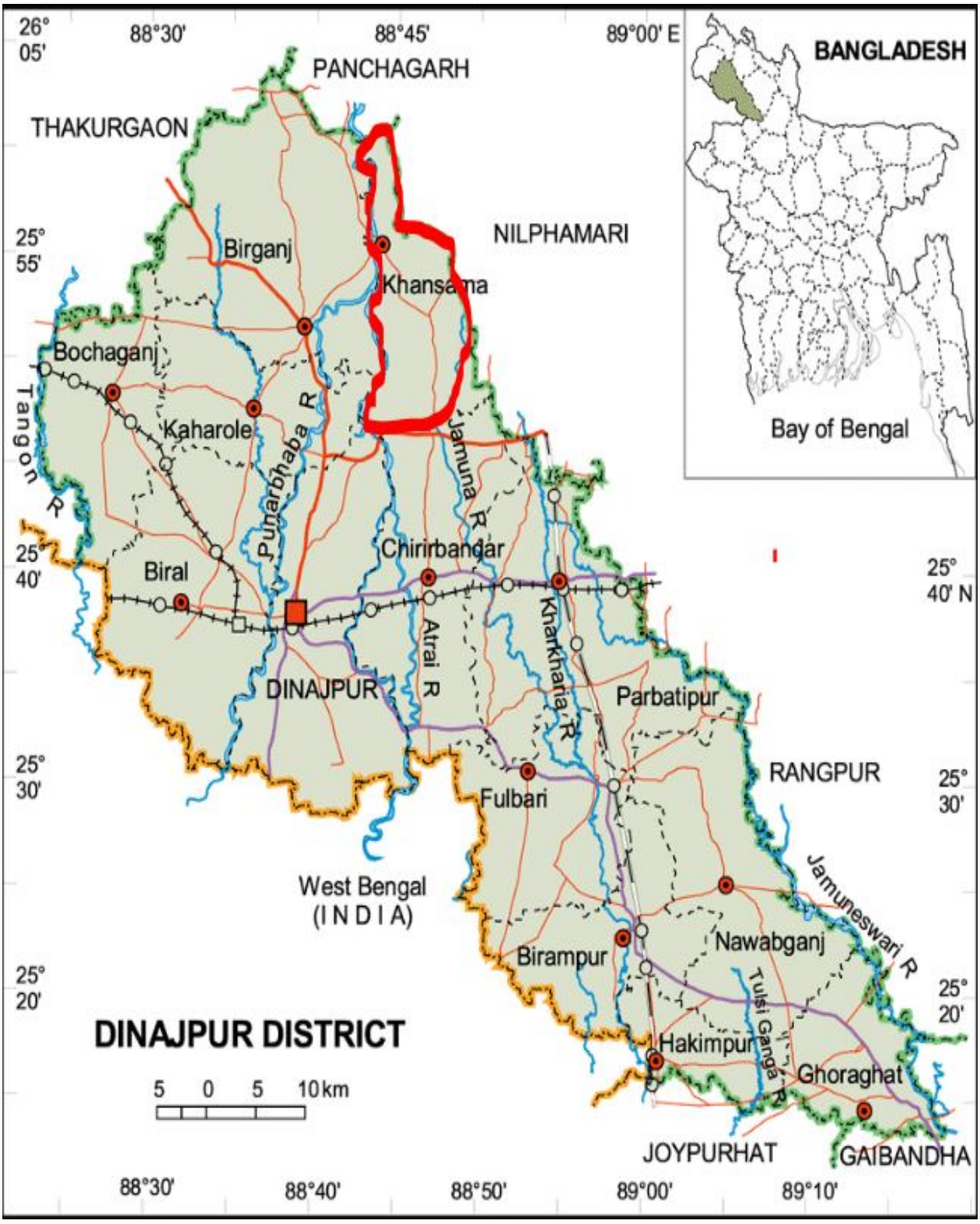

Figure 3.1 Map of Dinajpur district showing Khansama upazila

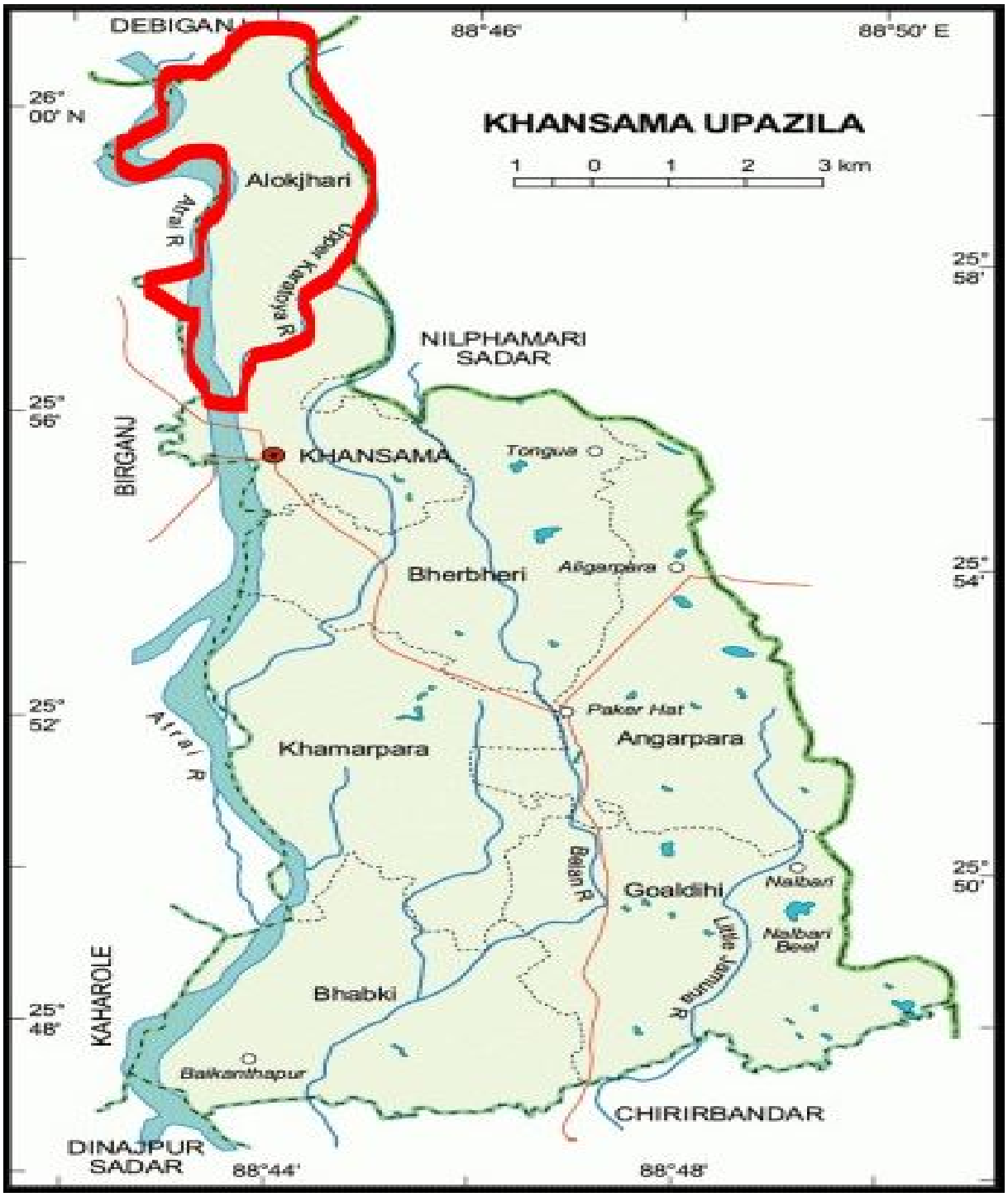

Figure 3.2 Map of Khansama upazila showing Alokjhari union

3.2 Research Design of the Study

Research design is a comprehensive master plan of the research study to be undertaken. It is the arrangement of conditions for collection and analysis of data in a manner that aims to combine relevance to the research purpose with economy in procedure. The research design followed in the present study is ex-post-facto, because of uncontrollable and non-manipulating variables. The ex-post-facto research being a systematic empirical inquiry the scientist has no direct control over independent variables (Kerlinger, 1973).

Designing the research for the present study was taken in a scientific manner. Firstly, different research themes are collected and analyzed followed by research problem formulation. Reviews were studied to select appropriate variables and preparation of questionnaire. Pretesting of the interview schedule was done before final data collection. Finally data were collected, analyzed and report was prepared. An explanatory and cross sectional research design was used in this research which has been presented in Figure 3.3.

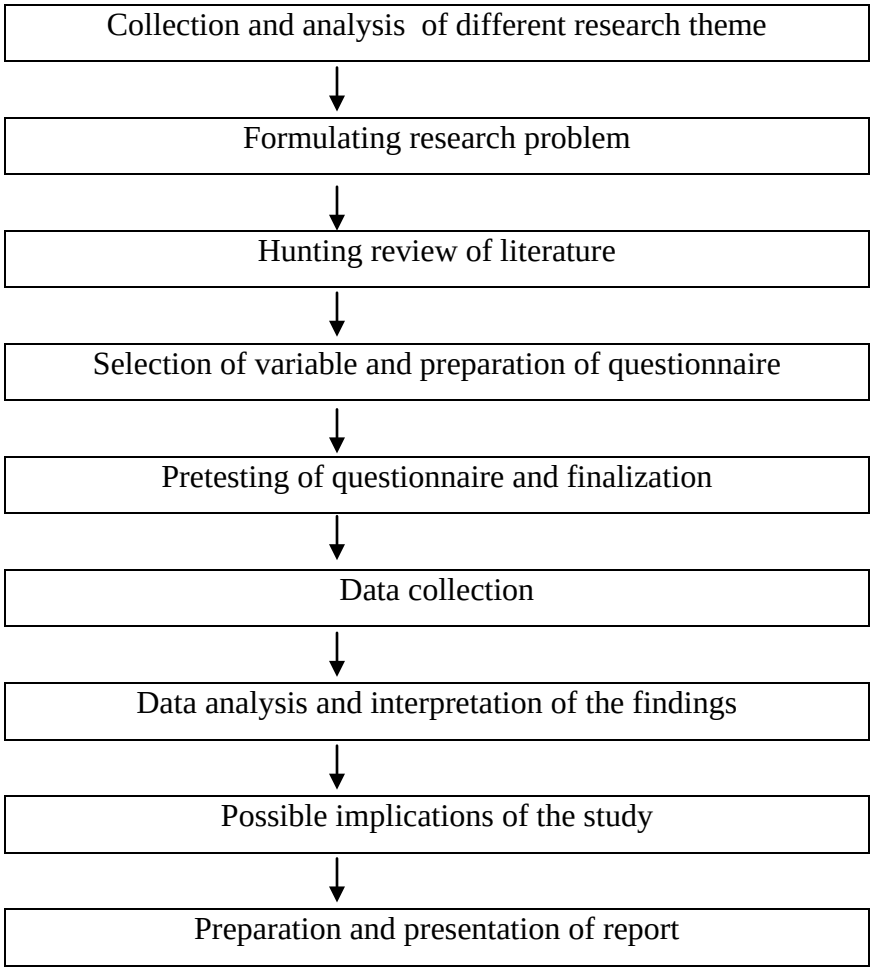

Figure 3.3 Research design of the study

3.3 Population and Sampling Procedure

The farmers of Alokjhari union who were the members of Common Interest Group (CIG) under the National Agricultural Technology Project (NATP) of Department of Agricultural Extension (DAE) were constitute the population of the study. There were 10 CIGs in this union and each CIG consist of 20 members. Thus, the population were 200. According to Yamane's (1967) formula, sample size was determined as 154. In calculating sample size from the following formula, 5% precision level, 50% degree of variability and value of Z = 2.57 at 99% confidence levels were chosen. Then 154 farmers were selected with the help of calculator from the population.

The formula is shown below -

$$n = \frac{Z^2 P(1-P)N}{Z^2 P(1-P) + Ne^2}$$

Where,

n = sample size

N = population size

e = the level of precision

z = the value of the standard normal variable given the chosen confidence level

p = the proportion or degree of variability

Simple random sampling method was used in order to select the sample. A reserve list of 23 farmers which is about 15 percent of the sample size was prepared so that these farmers could be used for interview in case of unavailability of any farmer included in the original sample in spite of utmost effort during collection of data.

An up-to-date list of CIG farmers was collected from upazila agriculture office of Khansama upazila under Dinajpur district. The distribution of population and sampling is given in Table 3.1.

Table 3.1 Distribution of population and sample of farmers of the selected villages

Villages	Population (CIG members)	Sample size	Reserve List
1. Alokjhari	38	31	4
2. Joyganj	5	3	1
3. Shushuli	20	15	2
4. Sajapur	17	13	2
5. Jahangirpur	22	17	3
6. Gobindapur	38	28	4
7. Gobindapur Rampara	20	15	2
8. Basuli	40	32	5
Total	200	154	23

3.4 Research Instrument

An interview schedule was prepared mostly with close form questions. Simple questions and statements were included in the schedule to obtain information regarding the research topic. Open ended questions were also used to give respondents opportunity to give their opinion and suggestions regarding receiving agricultural information from UDC.

Scales were developed for suitable scores in effectiveness of Union Information and Service Center and also characteristics of the farmers namely age, level of education, family size, farm size, family income, innovativeness, extension media contact, Agricultural knowledge, marketing awareness, aspiration and constraints faced by the farmers.

An English version of the interview schedule is presented in "Appendix-A". The schedules was pre-tested in actual field situation before using the same for final collection of data among 15 respondents of the study area. Necessary correction, additions and alternations were made in the interview schedule on the basis of results of pre-test. The modified and corrected interview schedule was then printed in final form for data collection.

3.5 Data Collection

The face to face interviewing method was used for data collection. Data were collected from the selected 154 farmers with using data collecting instrument. Necessary co-ordination was obtained from the Sub-Assistant Agriculture Officers (SAAOs) and the Common Interest Group (CIG) members. During the visit the aims and objectives of the study were explained to most of the respondents. This helped the researcher to have a friendly orientation to the group members. Before going to the respondents for interview, advanced information were taken with the help of Sub-Assistant Agriculture Officers (SAAOs). Brief information regarding the nature and purpose of the study were given to the respondents before actual interview. Questions were asked systematically and explanations were made whenever it was necessary. The informations were duly checked in order to minimize errors. Some data were recorded in local unit. These were subsequently converted to appropriate standard units. The respondents were interviewed at their leisure time so that they could give accurate information in a cool mind. The investigator faced no serious problems. To build rapport and motivation in the interview situations, the researcher endeavored to provide conditions that maximum trust maintained each respondents interest and minimized status difference. Data were collected during 13 January to 15 February, 2016.

3.6 Variables and their Measurement Techniques

A well-organized piece of research usually contains at least two important elements are an independent variable and a dependent variable. In any scientific research, the selection and measurement of variables constitutes a significant task. In these connections the researcher reviewed the literature to widen his understanding about the nature and scope of the variables relevant to this piece of research.

The selected 11 characteristics of the farmers namely age, level of education, family size, farm size, family income, innovativeness, extension media contact, agricultural knowledge, marketing awareness, aspiration and constraints faced were considered as independent variables. On the other hand, effectiveness of Union Digital Center was selected as dependent variable of the present study.

3.6.1 Measurement techniques of independent variables

3.6.1 .1 Age

The age of the respondents was measured in terms of years from his/her birth to the day of interviewing. A unit score was assigned for each year of one's age. It was measured in a complete year on the basis of responses of the respondents.

3.6.1.2 Level of education

Level of education was measured in terms of one's year of schooling. If a respondent didn't not know how to read and write his score was given as zero (0). A score of 0.5 was assigned to that respondent who could sign his/her name only. Besides this, a respondent was given actual score of one for every year of schooling i.e. 1 for class I, 2 for class II and so on. Similarly if a respondent passed the final examination of class V his/her level of educational score was taken as five.

3.6.1.3 Family size

The family size of the respondent was measured on the basis of the number of family members including himself, his wife, children and other dependents living in the same family. For example, if a respondent had five members in his/her family the score of the family size was taken as five.

3.6.1.4 Farm size

Farm size of a respondent was measured in terms of hectares by using the following formula:

$$FS = A_1 + A_2 + A_3 + \tfrac{1}{2}(A_4 + A_5)$$

Where,

FS = Farm size

A_1 = Homestead area including pond

A_2 = Own land under own cultivation

A_3 = Land taken on lease from others

A_4 = Land given to other on share cropping basis

A_5 = Land taken from other on share cropping basis

3.6.1.5 Family income

The family income of a farmer was measured on the basis of his/her family's yearly earnings from crops (rice, maize, wheat, potato etc.), fish, land lease, business, service and others. The family income was expressed in Taka. In measuring the variable, total earning in Taka of a respondent were converted into unit score. A score of one (1) was assigned for each '1000' Taka of the annual income of a respondent.

3.6.1.6 Innovativeness

Innovativeness of a respondent was measured by computing an innovativeness score on the basis of his/her adoption of 10 selected modern agricultural technologies.

Duration of adoption of a new technology was measured as follows:

Nature of adoption	Score assigned
No adoption at all	0
Adoption above 5 years of hearing	1
Adoption between 4-5 years of hearing	2
Adoption between 2-3 years of hearing	3
Adoption within one year of hearing	4

Innovativeness score of a respondent could range from 0 to 40 where 0 indicated no innovativeness and 40 indicated highest innovativeness.

3.6.1.7 Extension media contact

The extension media contact score was computed for each respondent on the basis of his/her extent of contact with 15 selected extension media. For measuring the extension media contact score were assigned for the extension media 0, 1, 2, 3 and 4 for the extent of contact 'not at all', 'rarely', 'occasionally' 'frequently' and 'regularly' respectively. Extension media contact score was determined by summing the scores of all the 15 communication media. Extension media contact score could range from 0 to 60, where 0 indicated no media contact and 60 indicated the highest media contact.

3.6.1.8 Agricultural knowledge

For measuring the knowledge on agriculture, a knowledge scale was developed. For this, each respondent was asked 20 questions covering the different aspects of Agriculture. Each question had a predetermined assigned score of 2, making a total score of 40. For correct responses to all the 20 questions, a respondent could secure a total score of 40. Otherwise for wrong responses to all the questions he/she could get a score of zero (0). For partial correct responses, scores was assigned accordingly. The sum of total scores for all the 20 questions yielded the knowledge score of a respondent. Thus, knowledge on agriculture score of the respondents could range from 0 to 40, where 0 indicated very low knowledge and 40 indicated very high knowledge on agriculture.

3.6.1.9 Marketing awareness

The marketing awareness of a farmer was measured on ten items of statements, five of these items being stated positively and other five negatively. A 5-point Likert scale was used to measure the extent of agreement-disagreement by checking any one of the responses 'strongly agree', 'agree', 'undecided, 'disagree', and 'strongly disagree'. For positive statements, scores assigned to the responses were 5, 4, 3, 2 and 1 respectively. For negative statements, the scoring system were reversed. The range of scores for the scale could range from 10 to 50 where 10 indicated very low marketing awareness and 50 very high marketing awareness. The marketing awareness score of an individual was the sum of scores for all the statements in the scale (Mondol, 2009).

3.6.1.10 Aspiration

The aspiration was measured by computing an 'aspiration score' on the basis of ten items measuring scale. Among the ten statements, five were positive and five were negative. For computing the aspiration of the respondent against each item, a 5-point Likert scale was used as follows: 'strongly agree', 'agree', 'undecided', 'disagree' and 'strongly disagree'. For positive statements, scores assigned to the responses were 5, 4, 3, 2 and 1 respectively. For negative statements, the scoring system were reversed. Thus, the possible aspiration score of the respondents could range from 10 to 50, where 10 indicated very low aspiration and 50 indicated very high aspiration.

3.6.1.11 Constraints faced by the farmers

As many as 10 constraints in connection with UDC were included in constraint facing scale in the interview schedule after pre-testing of the schedule. The respondents were asked to give their response as 'not at all', 'low', 'medium' and high' for each constraint include in constraint facing scale based on their extent of constraint facing in receiving agricultural information from UDC. The weights for 'not at all', 'low ', 'medium' and 'high ' constraints faced responses were 0, l, 2 and 3 respectively. Thus, constraints faced in UDC score could range from 0 to 30, while 0 indicated no constraints and 30 indicated very high constraints in UDC. Then, score for particular constraints were measured by Constraints Faced Index (CFI) as follows:

CFI = (C_h x 3) + (Cm x 2) + (Cl x 1) + (Cn x 0)

Where,

CFI = Constraints Faced Index

C_h = Number of respondents faced high constraints

Cm = Number of respondents faced medium constraints

Cl = Number of respondents faced low constraints

Cn = Number of respondents faced no constraints

Score of constraints faced in receiving agricultural information of a respondent was computed by adding all the scores obtained by those responses from all the ten constraints items. Thus, the constraints faced in receiving agricultural information by the farmers could range from 0 to 462 where '0' indicated no constraints and '462' indicated highest constraints in receiving agricultural information from UDC.

3.6.2 Measurement techniques of dependent variable

Effectiveness of Union Digital Center (EUDC):

To measure the Effectiveness of Union Digital Center (EUDC) the scores of selected three dimensions of information such as information receive, understanding and application were added. The first dimension included involvement of the farmers in receiving information, the second one ensured understanding of the received information and the third dimension covers the information application on their farming activities. Each of the dimensions was measured separately with 5- point rating scale against the selected agricultural information.

3.6.2.1 Information receive from UDC

Information received from the UDC were calculated by computing information receive sub-scores (IRS) for each of the farmers. The weights assigned to the scale were 0 for ‘none’, 1 for ‘low’, 2 for ‘moderate’, 3 for ‘high’ and 4 for ‘very high’. The IRS of a farmer were obtained by adding the score obtained by selected agricultural activities. Thus, the IRS of a respondent were from 0 to 40, where 0 indicating non-receive and 40 indicating very high receive of agricultural information from UDC.

3.6.2.2 Understanding of the received information

It was assumed that the understanding of information may be less than information received. The understanding of the received information by the farmers were calculated by computing information understanding sub-scores (IUS) for each of the farmers. The weights assigned to the scale were 0 for ‘none’, 1 for ‘low’, 2 for ‘moderate’, 3 for ‘high’ and 4 for ‘very high’. The IUS of a farmer was obtained by adding the score obtained by selected agricultural activities. Thus, the IUS of a respondent could range from 0 to 40, where 0 indicated no understanding and 40 indicated very high understanding of the received information from UDC.

3.6.2.3 Application of received information

The third dimension of the dependent variable means after understanding of agricultural information how much information they applied in their farm. It was assumed that the application of information may be less than understanding of information. The application of information by the farmers were calculated by computing information application sub-scores (IAS) for each of a farmer. The weights assigned to the scale were 0 for ‘none’, 1 for ‘low’, 2 for ‘moderate’, 3 for ‘high’ and 4 for ‘very high’. The IAS of a farmer was obtained by adding the score obtained by selected agricultural activities. Thus, the IAS of a respondent could range from 0 to 40, where 0 indicated no application and 40 indicated very high application of the received agricultural information from UDC.

3.6.2.4 Development of Indices

For making comparative analysis of the 10 selected agricultural information with respect to receive, understanding and application an overall Effectiveness of Union Digital Center Index (EUDCI) was calculated.

EUDCI was calculated by adopting the following formula (Mondol, 2009):

$$\text{EUDCI} = \frac{P_n \times 0 + P_l \times 1 + P_m \times 2 + P_h \times 3 + P_{vh} \times 4}{4}$$

Where,

P_n = Percentage of farmers for none effectiveness
P_l = Percentage of farmers for low effectiveness
P_m = Percentage of farmers for moderate effectiveness
P_h = Percentage of farmers for high effectiveness
P_{vh} = Percentage of farmers for very high effectiveness

For making comparative analysis of the 10 agricultural information in respect of receive, understanding, and application a comparative index was calculated. Thus, the value of receive index (RI) for each of the 10 agricultural activities could range from 0 to 100, where 0 indicated no-receive and 100 indicated very high receive of the agricultural information. A similar procedure was followed to calculate the understanding index (UI) and application index (AI). The EUDC for the selected agricultural information were the summation of RI, UI, and AI value. Thus, the possible value of EUDCI could range from 0 to 300, where 0 indicated no effect and 300 indicated very high effectiveness of UDC in utilization of agricultural information as perceived by the farmers.

3.7 Data processing

After completion of field survey, all the data were coded, compiled and tabulated according to the objectives of the study. Local units were converted into standard units. All the individual responses to questions of the interview schedule were transferred in to a master sheet to facilitate tabulation, categorization and organization. In case of qualitative data, appropriate scoring technique was followed to convert the data into quantitative form.

3.8 Statistical procedures

The data were analyzed in accordance with the objectives of the study. Qualitative data were converted into quantitative data by means of suitable scoring technique wherever necessary. The statistical measures such as range, means, standard deviation, number and percentage distribution were used to describe the variables. To find out the contribution of the selected characteristics of the respondents with the effectiveness of the UDC, regression was used. Pearson's Product Moment Coefficient of Correlation (r) test was initially done. Full model regression analysis was also done.

Due to misleading results from multi-collinearity, stepwise multiple regression was used to find out the contribution of the independent variables to the dependent variable. One percent level of probability was used as the basis for rejection/acceptance of null hypothesis.

For determining severity of the constraints, rank order was made based on the descending order of the Constraints Faced Index (CFI).

3.9 Statement of the Hypotheses

3.9.1 Research hypotheses

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

"Each of the selected characteristics of the farmers had contribution to the effectiveness of UDC in utilization of agricultural information as perceived by them."

3.9.2 Null hypotheses

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

"Each of the selected characteristics of the farmers had no contribution to the effectiveness of UDC in utilization of agricultural information as perceived by them."

CHAPTER IV

RESULTS AND DISCUSSION

This chapter deals with the findings and discussion of present research work. Necessary explanations and appropriate interpretations have also been made showing possible and logical basis of the findings. In this Chapter the findings of the study and interpretation of the results have been presented in four sections according to the objectives of the study. The first section deals with the selected personal characteristics of the farmers. The second section deals with the effectiveness of Union Digital Center (UDC) by the farmers in receiving agricultural information. The third section deals with the contribution of the selected characteristics of the farmers to the effectiveness of UDC in utilization of agricultural information as perceived by them and the fourth and last section deals with the problems faced by the farmers in receiving agricultural information.

4.1 Selected Characteristics of the Farmers

A variety of attributes that aggregate in human life influenced on their activity directly and indirectly. For this reason, it can be assumed that different characteristics of farmers may influence the effectiveness of Union Digital Center in receiving their agricultural information and hence 10 selected characteristics (i.e. age, level of education, family size, farm size, family income, innovativeness, extension media contact, agricultural knowledge, marketing awareness, aspiration and constraints faced by the farmers) were considered as independent variables in this regard. The characteristics of the farmers were classified into suitable categories for description and interpretation in relation to the effectiveness of UDC (Table 4.1).

Table 4.1 Characteristics profile of the respondents

SL. No	Characteristics	Measuring Unit	Range		Mean	Standard deviation
			Possible	Observed		
01	Age	No. of year	Unknown	24-66	41.55	9.59
02	Level of education	Year of schooling	Unknown	0-14	7.17	3.83
03	Family size	No. of members	Unknown	2-12	5.75	1.93
04	Farm size	Hectare	Unknown	0.06-6.43	1.08	1.01
05	Family income	(‘000’ Tk.)	Unknown	88-999	421.98	210.39
06	Innovativeness	Score	0-40	14-38	27.71	5.13
07	Extension media contact	Score	0-60	3-47	27.38	7.98
08	Agricultural Knowledge	Score	0-40	13-36	26.09	4.56
09	Marketing awareness	Score	10-50	20-48	34.97	8.46
10	Aspiration	Score	10-50	20-48	35.61	8.25
11	Constraints faced	Score	0-30	4-23	11.22	4.96

4.1.1 Age

The age of the farmers ranged from 24 to 66, the mean being 41.55 and the standard deviation is 9.59. According to age the farmers were classified into three categories are ‘young aged’ (up to 35), ‘middle aged’ (36-50) and ‘old aged’ (>50) based on their observed score (Table 4.2).

Table 4.2 Distribution of the respondents according to their age

SL.	Categories	Number	Percentage
1	Young aged (≤35)	50	32.5
2	Middle aged (>35-50)	80	51.9
3	Old aged (>50)	24	15.6
Total		154	100

Data in Table 4.2 revealed that more than half (51.9 percent) of the respondents were middle aged compared to 32.5 percent of the respondents belonged to the category of young age and 15.6 percent were in the old aged category. These findings indicated that the majority of the farmers were middle aged. The findings may be due that the farmers were selected based on the list of common interest groups where most of the respondents are young to middle aged (84.4 percent). Young and middle aged peoples are generally become more innovative, energetic and can take any decision easily. They have broader outlook and have much social participation as well as communication with UDC.

4.1.2 Level of education

The level of education scores of the farmers ranged from 0 to 14, the mean being 7.17 and standard deviation 3.83. Based on level of education scores the respondents were classified into five categories such as 'Illiterate' (0.0), 'can sign only' (0.5), 'primary level' (1-5), 'secondary level' (6-10) and 'above secondary level' (>10) as presented in Table 4.3.

Table 4.3 Distribution of the respondents according to their level of education

SL. No.	Categories	Number	Percentage
1	Illiterate (0.0)	3	1.9
2	Can sign only (0.5)	12	7.8
3	Primary level (1-5)	38	24.7
4	Secondary level (6-10)	76	49.4
5	Above secondary level (>10)	25	16.2
Total		154	100

Data in Table 4.3 indicated that highest proportion (49.4 percent) of the farmers had secondary education, where the lowest percentage (1.9%) of farmers were illiterate. Besides, 7.8 percent of farmers can sign only. Moreover, 24.7 percent had primary education and 16.2 percent of the farmers had above secondary education level. Education helps the farmers obtaining useful

information related to information collection. The study revealed that only 1.9 percent of farmers were illiterate in the study area. However, the literacy rate of our country is about 59.82 percent (BBS, 2015). It has been stated earlier that the farmers were got crop cultivation related training provided by Union Digital Center. For this reason, it can be assumed that the educational qualification of the sample farmers may be higher rather national average literacy rate.

4.1.3 Family size

The family size scores of the farmers ranged from 2 to 12. The average family size was 5.75 with a standard deviation of 1.93. The respondents were classified into three categories like 'small' (≤4), 'medium' (5-7) and 'large' (>7) are presented in Table 4.4.

Table 4.4 Distribution of the respondents according to their family size

SL. No.	Categories	Number	Percentage
1	Small (≤ 4)	43	27.9
2	Medium (5-7)	86	55.8
3	Large (>7)	25	16.2
Total		154	100

The data in the Table 4.4 revealed that more than half (55.8 percent) of the respondents had medium family size, 27.9 percent had small family size and 16.2 percent had large family size. The national average family size in Bangladesh is 4.85 (BBS, 2015) which is near the mean value of the present study (5.75). Almost similar result was found in the study of Noman (2012), Huda (2011), Akanda (2005), Miah (2002) and Haider (2001).

4.1.4 Farm size

The farm size scores of the farmers ranged from 0.6 to 6.43, the average being 1.08 and standard deviation 1.01. The farmers were classified into four categories as 'marginal' (0.02-0.2), 'small' (0.21-1.0), 'medium' (1.01-3.0) and 'large' (>3.0) as shown in Table 4.5.

Table 4.5 Distribution of the respondents according to their farm size

SL. No.	Categories	Number	Percentage
1	Marginal (0.02-0.2)	5	3.2
2	Small (0.21-1.0)	101	65.6
3	Medium (1.01-3.0)	38	24.7
4	Large (>3.0)	10	6.5
Total		154	100

Data in Table 4.5 showed that two-thirds (65.6 percent) of the respondents had small farm size, 24.7 percent had medium farm size, 6.5 percent had large farm size and 3.2 percent had marginal farm size. The findings is consistent with the national average such as 88.48 percent marginal to small, 10.34 percent medium and 1.18 percent large (BBS, 2012). This means that overall farm size of the farmers of the study area was higher compared to the farmers of other areas of Bangladesh. It might be an indication that the small farm holders were more interested to receive updated agricultural information from UDC. Moreover, it enriches their perception towards improved agricultural practices and enlightens power of understanding and abilities to analyze facts and situations to make appropriate decisions on agricultural activities.

4.1.5 Family income

The family income scores (taka in thousands) of the farmers ranged from 88 to 999 with a mean of 421.98 and standard deviation of 210.39. Based on the annual income the farmers were classified into three categories such as 'low income' (≤210), 'medium income' (211-630), 'high income' (>630) as shown in Table 4.6.

Table 4.6 Distribution of the respondents according to their Family income

SL. No.	Categories (Mean ± 1SD)	Number	Percentage
1	Low income (≤ 210)	24	15.6
2	Medium income (211-630)	106	68.8
3	High income (>630)	24	15.6
Total		154	100

Data in Table 4.6 indicated that more than half (68.8 percent) of the farmers had medium income compared to 15.6 percent under low and 15.6 percent under high income group. The national average

family income is Tk. 173.09 (BBS, 2012). However, average family income of the study area was found Tk. 421.98 thousand. This might be due to the reason that the CIG members were economically stronger than the others people of Bangladesh. An almost similar result was found by Talukder (2013).

4.1.6 Innovativeness

The innovativeness scores of the farmers ranged from 14 to 38 against the possible range of 0 to 40 with the mean and standard deviation of 27.71 and 5.13 respectively. On the basis of overall scores of innovativeness, the respondents were classified into three categories such as 'low' (≤22), 'medium' (23-32) and 'high' (>32) as shown in Table 4.7.

Table 4.7 Distribution of the respondents according to their Innovativeness

SL. No.	Categories (Mean ± 1SD)	Number	Percentage
1	Low (≤ 22)	17	11.0
2	Medium (23-32)	106	68.8
3	High (>32)	31	20.1
Total		154	100

Data in Table 4.7 indicated that majority (68.8 percent) of the farmers had medium innovativeness, 20.1 percent had high innovativeness and 11 percent had low innovativeness. The findings of the study revealed that overwhelming majority (88.96 percent) of the farmers had medium to high innovativeness towards the adoption of improved agricultural practices in terms of duration and extent of practicing improved agricultural practices. Therefore, innovativeness for adoption of new agricultural technologies was satisfactory in the study area. Findings of the study had almost similarity with the study of Mondol (2009) and Nuruzzaman (2003).

4.1.7 Extension media contact

The extension media contact scores of the farmers ranged from 3 to 47, against the possible score 0 to 60. The mean and standard deviation were 27.38 and 7.98 respectively. The respondents were classified into three categories based on their extension media contact as 'low' (≤20), 'medium' (21-35) and 'high' (>35) as shown in Table 4.8.

Table 4.8 Distribution of the respondents according to their Extension media contact

SL. No.	Categories (Mean ± 1SD)	Number	Percentage
1	Low (≤ 20)	28	18.2
2	Medium (21-35)	109	70.8
3	High (>35)	17	11.0
Total		154	100

Data in Table 4.8 showed that majority (70.8 percent) of the farmers had medium extension media contact, 18.2 percent had low extension media contact and 11 percent had high extension media contact. The findings indicate that above three-fourths (89 percent) of the farmers had medium to low extension media contact. This may be due to the reason that the respondents of the study area don't contact strongly with different extension media.

4.1.8 Agricultural knowledge

The farmers agricultural knowledge scores ranged from 13 to 36 with an average score being 26.09 and standard deviation of 4.56. On the basis of actual scores of the respondents, they were classified into three categories such as 'low' (≤22), 'medium' (23-30) and 'high' (>30) as shown in Table 4.9.

Table 4.9 Distribution of the respondents according to their Agricultural knowledge

SL. No.	Categories (Mean ± 1SD)	Number	Percentage
1	Low (≤ 22)	26	16.9
2	Medium (23-30)	108	70.1
3	High (>30)	20	13.0
Total		154	100

Data in Table 4.9 revealed that most (70.1 percent) of the farmers had medium agricultural knowledge. Compared to 16.9 percent had low and 13 percent had high agricultural knowledge. This finding indicates that more than three-fourths (87.00 percent) of the farmers had medium to low agricultural knowledge. It may be due to moderate training provided by UDC, different extension activities and family education of the respondents.

4.1.9 Marketing awareness

The marketing awareness scores of the farmers ranged from 20 to 48, against the possible range of 10 to 50. The mean and standard deviation were 34.97 and 8.46 respectively. Based on marketing awareness scores the farmers were classified into three categories 'low'(≤26), 'medium'(27-43) and 'high'(>43) as shown in Table 4.10.

Table 4.10 Distribution of the respondents according to their Marketing awareness

SL. No.	Categories (Mean ± 1SD)	Number	Percentage
1	Low (≤26)	19	12.3
2	Medium (27-43)	92	59.7
3	High (>43)	43	27.9
Total		154	100

Data in Table 4.10 indicated that the highest proportion (59.7 percent) of the farmers had medium marketing awareness while 27.9 percent had high marketing awareness. Only 12.3 percent had low marketing awareness. The findings revealed that overwhelming majority (87.7 percent) of the farmers had medium to high marketing awareness. Findings have almost similarity with Mondol (2009).

4.1.10 Aspiration

The aspiration scores of the farmers ranged from 20 to 48 against the possible range 10 to 50 with a mean and standard deviation of 35.61 and 8.28 respectively. Based on their aspiration scores, the respondents were classified as 'low' (≤27), 'medium' (28-44) and 'high' (>44) which is presented in the Table 4.11.

Table 4.11 Distribution of the respondents according to their Aspiration

SL. No.	Categories (Mean ± 1SD)	Number	Percentage
1	Low (≤ 27)	17	11.0
2	Medium (28-44)	101	65.6
3	High (>44)	36	23.4
Total		154	100

It is revealed from the Table 4.11 that the highest proportion (65.6 percent) of the respondents had medium aspiration. While 23.4 percent of the respondents had high aspiration. Only 11 percent of the respondents had low aspiration. Findings showed that majority of the farmers possessed their aspiration and the result might be due to the effect of better educational qualification of the respondents.

4.1.11 Constraints faced

The scores of constraints faced in UDC of the respondents ranged from 4 to 23 against the possible range of 0 – 30 with an average of 11.22 and standard deviation of 4.96. Based on the observed scores of constraints faced in UDC, the respondents were classified into the three categories i.e. low (≤ 6), medium (7-16) and high (>16) constraints faced. The distribution has been shown in Table 4.12.

Table 4.12 Distribution of the respondents according to their Constraints faced

SL. No.	Categories (Mean ± 1SD)	Number	Percentage
1	Low (≤ 6)	33	21.4
2	Medium (7-16)	92	59.7
3	High (>16)	29	18.8
Total		154	100

About 59.7 percent of the respondents faced medium constraints, 21.4 percent faced low constraints and 18.8 percent faced high constraints. The findings revealed that overwhelming majority (78.57 percent) of the farmers had medium to low constraints. This may be due to the more cooperativeness of the entrepreneurs and need of the respondents.

4.2 Effectiveness of Union Digital Center

Agricultural information has now been considered as essential inputs in crop production to increase productivity. It enhances the working efficiency of the farmers and ultimately they get better yield from a crop. Effectiveness of any message may be increased if it is supported by an authority or an institution. Keeping this mind, an effort was made to determine the effectiveness of Union Digital Center (UDC) in receiving agricultural information by the farmer's on 10 selected areas of agricultural information. The agricultural information are based on recommended varieties, recommended seed rate, recommended irrigation, recommended doses of fertilizer, integrated pest management (IPM) practices, modern cultivation technology, compost preparation, post-harvest management of vegetables, fruits processing techniques and tree plantation. According to the strategy of Union Digital Center training programs are arranged for the Common Interest Group (CIG) members. During training program and with personally contact, CIG members received information, they may or may not understand the received information and they may or may not apply their received information in their farm.

4.2.1 Information receive

The farmers had received selected agricultural information in varying degrees from UDC. Farmers were classified into five categories on the basis of their information receive such as, 'none', 'low', 'moderate', 'high' and 'very high'. The number of farmers information receives of each of the categories was converted to percentage. The receive index (RI) of information on effectiveness of UDC ranged from 41.35 to73.73 against the possible range 0 to 100. The rank order of each of the information was made on the basis of RI value (Table 4.13).

Table 4.13 Distribution of the farmers according to their information receive on selected agricultural information with rank order

Sl. No.	Agricultural information	Percentage of farmers					RI	Rank order
		None	Low	Moderate	High	Very high		
1.	Recommended varieties	2.6	6.5	17.5	53.2	20.2	70.48	4
2.	Recommended seed rate	3.9	3.9	23.4	42.2	26.6	70.93	3
3.	Recommended irrigation	4.5	6.5	18.2	51.3	19.5	68.70	6
4.	Recommended doses of fertilizer	4.5	10.4	13.6	49.4	22.1	68.55	7
5.	Integrated pest management (IPM) practices	2.6	6.5	18.8	51.9	20.2	70.15	5
6.	Modern cultivation technology	5.2	15.6	40.9	31.2	7.1	54.85	8
7.	Compost preparation	3.9	4.5	16.9	42.2	32.5	73.73	1
8.	Post-harvest management of vegetables	18.2	12.3	28.6	18.2	22.7	53.73	9
9.	Fruits processing techniques	19.5	28.6	23.4	24.0	4.5	41.35	10
10.	Tree plantation	2.6	9.7	13.0	43.5	31.2	72.75	2

Data obtained in Table 4.13 revealed that the highest proportion of farmers receive information on 'compost preparation' (RI=73.73) from UDC followed by 'tree plantation' (RI=72.75), 'recommended seed rate' (RI=70.93), 'recommended varieties' (RI=70.48) and so on. Lowest receive of information was observed on 'fruits processing techniques' (RI=41.35) among selected agricultural information. Training provided by UDC which improve awareness of the farmers about the importance of compost fertilizers and procedure of preparation of compost. Thus the farmers receive more information on compost preparation which could be easily prepared. Some of the farmers are not aware about fruit processing technique due to lack of sufficient knowledge about it.

4.2.1.1 Overall information receive

The overall information receive of the farmers from selected agricultural information was also examined by computing their information receive scores. The information received scores of the farmers ranged from 11 to 38 against the possible range of 0 to 40. The mean and standard deviation were 25.81 and 6.13 respectively. The farmers were classified into three categories such as 'low receive' (up to 20), 'medium receive' (21 to 32) and 'high receive' (above 32) on the basis of their receive scores on the selected agricultural information (Table 4.14).

Table 4.14 Distribution of the farmers according to their information receive scores

Range		Categories (Mean ± 1SD)	Number	Percent	Mean	SD
Possible	Observed					
0-40	11-38	Low (≤20)	28	18.2	25.81	6.13
		Medium (21-32)	120	77.9		
		High (>32)	6	3.9		

Data contained in Table 4.14 indicate that the highest proportion (77.9 percent) of the farmer had medium received of agricultural information, while 18.2 percent had low and 3.9 percent had high received of agricultural information. Thus 83.1 percent of the farmers had medium to low receive of information from UDC. This finding implies that the farmers had medium amount of information received from UDC for their moderate awareness about information receive from UDC.

4.2.2 Understanding of the received information

Information received by the farmers may or may not always be understood by them. Farmers were classified into five categories on the basis of their information understanding such as 'none', 'low', 'moderate', 'high' and 'very high'. The number of farmers in respect to understanding of received information was converted to percentage. Thus understanding index (UI) of information on effectiveness of UDC ranged from 24.83 to 52.33 against the possible range of 0 to 100. The rank order of each of the information was made on the basis of UI value (Table 4.15).

Table 4.15 Distribution of the farmers according to their understanding of received information with rank order

Sl. No.	Agricultural information	Percentage of farmers					UI	Rank order
		None	Low	Moderate	High	Very high		
1.	Recommended varieties	3.2	14.9	63.0	17.6	1.3	49.73	3
2.	Recommended seed rate	7.8	23.4	42.2	24.7	1.9	47.38	4
3.	Recommended irrigation	6.5	22.8	51.9	16.9	1.9	46.23	6
4.	Recommended doses of fertilizer	12.3	16.3	49.4	20.1	1.9	45.75	7
5.	Integrated pest management (IPM) practices	5.2	22.8	53.2	16.9	1.9	46.88	5
6.	Modern cultivation technology	16.9	44.9	31.8	4.5	1.9	32.40	9
7.	Compost preparation	9.7	21.4	34.4	18.9	15.6	52.33	1
8.	Post-harvest management of vegetables	27.9	31.2	18.2	20.8	1.9	34.40	8
9.	Fruits processing techniques	35.7	35.1	24.7	3.2	1.3	24.83	10
10.	Tree plantation	7.1	16.9	43.5	31.2	1.3	50.68	2

Data contained in Table 4.15 revealed that the highest proportion of farmers understand information on ‘compost preparation’ (UI=52.33) followed by ‘tree plantation’ (UI=50.68), ‘recommended varieties’ (UI=49.73), ‘recommended seed rate’ (UI=47.38) and so forth. Lowest understanding among the received information was observed on ‘fruits processing techniques’ (UI=24.83). Farmers understand information more on which they received according to their desires.

4.2.2.1 Overall understanding of the received information

The overall understanding of information received from UDC was also examined by computing the understanding scores. The information understanding scores of the farmers ranged from 3 to 36 against the possible range of 0 to 40. The mean and standard deviation were 17.22 and 5.69 respectively. The farmers were classified into three categories namely ‘low understanding’ (up to 12), ‘medium understanding’ (13 to 23) and ‘high understanding’ (above 23) on the basis of their information understanding scores (Table 4.16).

Table 4.16 Distribution of the farmers according to their information understanding scores

Range		Categories (Mean ± 1SD)	Number	Percent	Mean	SD
Possible	Observed					
0-40	3-36	Low (≤12)	33	21.4	17.22	5.69
		Medium (13-23)	88	57.1		
		High (>23)	33	21.4		

The findings indicated that the highest proportion (57.1 percent) of the farmers had medium understanding of information, while about 21.4 percent had low understanding and 21.4 percent had high understanding. The finding implies that about three-fourths (78.6percent) of the farmers had medium to high understanding of information. This means that the farmers' understanding of information was satisfactory. Majority numbers of farmers understand the received information because of their need of increasing output.

4.2.3 Application of received information

After understanding of received information farmers applied this information in their own farm. On the basis of application farmers were also categorized on five categories such as 'none', 'low', 'moderate', 'high' and 'very high'. The number of farmers in respect to application of information was converted to percentage. The application index (AI) of information ranged from 18.8 to 40.88 against the possible range 0 to 100. The rank order of each of the information was made on the basis of AI value (Table 4.17).

Table 4.17 Distribution of the farmers according to their application of received information with rank order

Sl. No.	Agricultural information	Percentage of farmers					AI	Rank order
		None	Low	Moderate	High	Very high		
1.	Recommended varieties	13.7	37.0	44.8	4.5	0	35.03	6
2.	Recommended seed rate	10.4	31.9	50.6	7.1	0	38.60	2
3.	Recommended irrigation	11.7	47.4	37.7	3.2	0	33.10	7
4.	Recommended doses of fertilizer	16.9	32.5	35.7	14.9	0	37.15	4
5.	Integrated pest management (IPM) practices	15.6	25.4	55.8	3.2	0	36.65	5
6.	Modern cultivation technology	29.2	48.7	20.8	1.3	0	23.55	8
7.	Compost preparation	10.4	31.8	46.2	7.1	4.5	40.88	1
8.	Post-harvest management of vegetables	51.9	16.9	27.9	3.3	0	20.65	9
9.	Fruits processing techniques	45.5	35.1	18.1	1.3	0	18.80	10
10.	Tree plantation	13.6	29.9	48.1	8.4	0	37.83	3

It is found from Table 4.17 that the application of received information was varied to a great extent. The highest proportion of the farmers applied information on 'compost preparation' (AI=40.88) followed by 'recommended seed rate' (AI=38.60), 'tree plantation' (AI=37.83) and so on. Lowest application of information was observed on 'fruits processing techniques' (AI=18.80) among selected agricultural information. Farmers are more sincere about the expenditure. They can easily prepare compost fertilizer beside their home yard at a less cost and using compost fertilizers they get more yields. Farmers don't use excessive amount of seed than recommended seed rate because the price of seed is very high in market and excessive use of seed may reduce yield.

4.2.3.1 Overall application of received information

The information application scores of the farmers ranged from 2 to 25 against a possible range of 0 to 40, the average being 12.89 and standard deviation 4.94. The farmers were also classified into three categories namely 'low application' (up to 8), 'medium application' (9 to 17) and 'high application' (above 17) on the basis of their information application scores (Table 4.18).

Table 4.18 Distribution of the farmers according to their information application scores

Range		Categories (Mean ± 1SD)	Number	Percent	Mean	SD
Possible	Observed					
0-40	2-25	Low (≤8)	31	20.1	12.89	4.94
		Medium (9-17)	91	59.1		
		High (>17)	32	20.8		

The finding indicates that more than half (59.1 percent) of the farmers had medium application of information, while 20.8 percent had high application and 20.1percent had low application. The finding implies that about three-fourths (79.9 percent) of the farmers had medium to high application of information. This means that the farmers' application of information was moderately satisfactory. Moderate number of farmers applied received information. Due to increase yield of crops and become profitable farmers utilize received information.

4.2.4 Effectiveness of union digital center

Effectiveness of UDC was determined by computing Effectiveness of Union Digital Center Index (EUDCI). EUDCI was computed by the summation of receive index (RI), understanding index (UI) and application index (AI). The EUDCI value of each of the selected agricultural information ranged from 84.98 to 166.94 against the possible range 0 to 300 (Table 4.19).

Table 4.19 Distribution of index value for calculation of effectiveness of union digital center with rank order

Sl. No.	Agricultural information	Dimensions index value			EUDCI	Rank order
		RI	UI	AI		
1.	Recommended varieties	70.48	49.73	35.03	155.24	4
2.	Recommended seed rate	70.93	47.38	38.60	156.91	3
3.	Recommended irrigation	68.70	46.23	33.10	148.03	7
4.	Recommended doses of fertilizer	68.55	45.75	37.15	151.45	6
5.	Integrated pest management (IPM) practices	70.15	46.88	36.65	153.68	5
6.	Modern cultivation technology	54.85	32.40	23.55	110.8	8
7.	Compost preparation	73.73	52.33	40.88	166.94	1
8.	Post-harvest management of vegetables	53.73	34.40	20.65	108.78	9
9.	Fruits processing techniques	41.35	24.83	18.80	84.98	10
10.	Tree plantation	72.75	50.68	37.83	161.26	2

The findings contained in Table 4.6 indicate that the highest effective information was ‘compost preparation’ (EUDCI=166.94) followed by ‘tree plantation’ (EUDCI=161.26), ‘recommended seed rate’ (EUDCI=156.91), ‘recommended varieties’ (EUDCI=155.24) and so on. The lowest effective information was ‘fruits processing techniques’ (EUDCI=84.98) among the selected agricultural information.

Compost preparation was found as the most effectively utilized information from UDC. The result might be due to that Bangladesh is predominantly an agricultural country and compost fertilizers have no bad effect on environment, increase soil fertility and can be prepared easily in residence. Hence peoples were very much interested on the information related to compost as it their most important need in agriculture.

The second most effectively utilized information was tree plantation. The result may due to that the land topography of the research area is about high. So it is easy to practice tree plantation ultimately farmers become aware about the information of tree plantation.

The lowest effectively utilized information was fruits processing techniques. The result might be due to that farmers are less aware about this information and less applied in their farm.

The findings and above mentioned discussions promoted the researcher to conclude that the information which are easily available, close to farmers and widely practiced in agriculture have received from UDC by the farmers.

4.2.5 Overall effectiveness of union digital center based on actual scores

The overall effectiveness of UDC was determined on the basis of their actual scores. Thus, the observed effectiveness scores of the farmers ranged from 16 to 99 against the possible score of 0 to 120. The mean and standard deviation were 55.92 and 16.13 respectively. The respondents were classified into three categories namely 'low effectiveness' (up to 40), 'medium effectiveness' (41 to 72) and 'high effectiveness' (above 72) on the basis of their effectiveness scores (Table 4.20).

Table 4.20 Distribution of the farmers according to their effectiveness

Range		Categories (Mean ± 1SD)	Number	Percent	Mean	SD
Possible	Observed					
0-120	16-99	Low (≤40)	76	49.4	55.92	16.13
		Medium (41-72)	47	30.5		
		High (>72)	31	20.1		

The highest proportion (49.4 percent) of the farmers had low effectiveness of UDC in receiving agricultural information compared to 30.5 percent had medium effectiveness and 20.1 percent had high effectiveness. The findings revealed that above three fourth (79.8 percent) of the farmers had medium to low effectiveness of UDC in utilization of agricultural information. Therefore, it can be said that the UDC play a moderate significant role in utilization of agricultural information by the farmers.

4.3 Contribution of the selected characteristics of the farmers to the effectiveness of UDC in utilization of agricultural information

For this study eleven characteristics of the respondent were selected and each of the characteristics was treated as independent variables. The selected characteristics were age (X_1), level of education (X_2), family size (X_3), farm size (X_4), family income (X_5), innovativeness (X_6), extension media contact (X_7), agricultural knowledge (X_8), marketing awareness (X_9), aspiration (X_{10}) and constraints faced by the farmers (X_{11}). Effectiveness of Union Digital Center (UDC) in utilization of agricultural information (Y) was the only dependent variable of this study. Before exploring contribution of the selected characteristics of the farmers to the effectiveness of Union Digital Center (UDC), Pearson Product Moment correlation was run to find out the relation between the selected characteristics of the farmers and effectiveness of Union Digital Center (UDC). From the correlation test, it was found that level of education, farm size, family income, innovativeness, extension media contact, agricultural knowledge, marketing awareness and aspiration of the farmers had significant positive relationship with the effectiveness of Union Digital Center (UDC) in utilization of agricultural information. Besides

these age, family size and constraints faced had no significant relationship with the effectiveness of Union Digital Center (UDC) in utilization of agricultural information. The result has been shown in appendix-B.

Then full model regression analysis was run with selected 11 independent variables. But it was observed that the full model regression results were misleading due to the existence of interrelationships among the independent variables. Therefore, in order to avoid the misleading results and to determine the best explanatory variables, the method of step-wise multiple regressions was administrated and 11 independent variables were fitted together in step-wise multiple regression analysis. Table 4.21 shows the summarized results of step-wise multiple regression analysis with 11 independent variables on the effectiveness of Union Digital Center (UDC) in utilization of agricultural information. It was observed that out of 11 variables 5 independent variables namely level of education (X_2), family income (X_5), innovativeness (X_6), agricultural knowledge (X_8) and aspiration (X_{10}) were entered into the regression equation. Other six variables were not entered into regression equation. The regression equation so obtained is presented below:

$$Y= -24.61 + 0.435\times X_8 + 0.205\times X_6 + 0.141\times X_2 + 0.193\times X_{10} + 0.149\times X_5$$

Table 4.21 Summary of stepwise multiple regression analysis showing the contribution of selected characteristics of the respondents to the effectiveness of Union Digital Center (UDC) in utilization of agricultural information

Variables Entered	Standardized Partial 'b' Coefficients	Value of 't' (with probability level)	Adjusted R^2	Increase in R^2	Variation Explained in percent
Agricultural Knowledge	0.435	5.898(00)	0.417	0.417	41.7
Innovativeness	0.205	3.497(0.001)	0.478	0.061	6.1
Level of education	0.141	2.403(0.017)	0.498	0.02	2
Aspiration	0.193	2.672(0.008)	0.513	0.015	1.5
Family Income	0.149	2.549(0.012)	0.531	0.018	1.8
Total				0.531	53.1

Multiple R = 0.739
R-square = 0.546
Adjusted R^2 =0.531
F-ratio = 35.593
Standard error of estimation = 11.05
Constant = -24.61

The multiple R and R^2 values were found 0.739 and 0.546 respectively and the corresponding F-ratio was 35.593 which were significant at 0.000 levels. For determining unique contribution of knowledge on effectiveness of Union Digital Center (UDC) in utilization of agricultural information of each of the five variables the increase in R^2 value were determined. These five variables had 53.1 percent contribution on the effectiveness of Union Digital Center (UDC) in utilization of agricultural information. Agricultural knowledge had the highest contribution (41.7 percent of the variation) followed by innovativeness 6.1 percent, level of education 2 percent, family income 1.8 and aspiration 1.5 percent variation in effectiveness of Union Digital Center (UDC) in utilization of agricultural information. Table 4.21 showed that level of education, family income, innovativeness, agricultural knowledge and aspiration had significant contribution to the effectiveness of Union Digital Center (UDC) in utilization of agricultural information i.e. the farmers who had more level of education, family income, innovativeness, agricultural knowledge and aspiration were found to gather more information from UDC, some predictive importance has been briefly discussed below:

Level of education

Stepwise multiple regressions revealed that level of education of the respondents had 2 percent contribution to the effectiveness of Union Digital Center (UDC) in utilization of agricultural information. Correlation matrix also showed that level of education of the respondents had significant positive relationship with the effectiveness of Union Digital Center (UDC) in utilization of agricultural information (Table 4.21).

Education helps the farmers to face the adverse condition and adjust with unfavorable condition through reading leaflets, booklets, books and other printed materials in this case. Education helps the farmers to broaden their outlook and expand mental horizon by helping them to develop proper attitude and correct perception to decrease knowledge gap about production technology of crops. An educated man is relatively more responsive to the technology, new innovation. S/he can easily contact with various extension agent and make frequent contact with other information sources, which make them able to acquire adequate accurate information. S/he has enough courage to take risk. The farmers who have no schooling, s/he is supposed to face a great difficulty in adjusting with the unfavorable condition regarding information receive on crop production. Such consideration indicates the need for improving literacy level among the farmers for receiving, understanding and applying agricultural information in their field.

Family Income

From stepwise multiple regressions, it was found that family income of the respondent had the 1.8 percent contribution to the effectiveness of Union Digital Center (UDC) in utilization of agricultural information. Correlation matrix also showed that family income of the respondents had significant positive relationship with the effectiveness of Union Digital Center (UDC) in utilization of agricultural information. The findings is quite logical, because effectiveness of UDC influence the respondents to adopt improved farming practices, which in turn, increases farm output and eventually improves financial condition of their family. Respondents having high family income may be interested to increase their living standard and also influence to receive more information on crop production.

Innovativeness

Stepwise multiple regressions revealed that innovativeness of the respondents had 6.1 percent contribution to the effectiveness of Union Digital Center (UDC) in utilization of agricultural information. Correlation matrix also showed that level of education of the respondents had significant positive relationship with the effectiveness of Union Digital Center (UDC) in utilization of agricultural information (Table 4.21). The findings indicated that higher the innovativeness of the farmers, the higher was the effectiveness of UDC.

Agricultural knowledge

From stepwise multiple regressions, it was found that agricultural knowledge of the respondent had highest (41.7 percent) contribution to the effectiveness of Union Digital Center (UDC) in utilization of agricultural information. Correlation matrix also showed that agricultural knowledge of the respondents had significant positive relationship with the effectiveness of Union Digital Center (UDC) in utilization of agricultural information.

There is a saying that 'knowledge is power'. Actually knowledge is a very sharp effective weapon to change fortune. The farmers having more agricultural knowledge can practice or adopt improved farming operation. The other farmers having poor or inadequate agricultural knowledge may likely to contact with the knowledgeable farmers for getting agricultural information. By this way the extent of contact with UDC may be increase in the community.

Aspiration

From stepwise multiple regressions, it was found that aspiration of the respondents had 1.5 percent contribution to the effectiveness of Union Digital Center (UDC) in utilization of agricultural information. Correlation matrix also showed that aspiration of the respondents had significant positive relationship with the effectiveness of Union Digital Center (UDC) in utilization of agricultural information.

The above findings indicated that the respondents having more aspiration make capable of being more confident. More confidence makes more working spirit among people and thus they earn more. The man, who has some cash or asset, wants to have more. It is a natural desire of human being. It may be conclude that the more the aspiration of the farmers the more the effectiveness of UDC.

4.4 Constraints Faced Index in the effectiveness of Union Digital Center (UDC) in utilization of agricultural information

The observed constraints faced index in receiving agricultural information from UDC ranged from 128 to 325 against the possible range of 0 to 462. The formula for determining CFI has been shown in chapter 3. The selected ten problems faced by the respondents which were arranged in rank order according to their descending order of constraints faced index (CFI) as shown in Table 4.22.

Table 4.22 Rank order of 10 selected constraints faced by the respondents in receiving agricultural information from UDC with rank order

Constraints	Extent of Constraints faced				CFI	Rank Order
	No constraints (0)	Low constraints (1)	Medium constraints (2)	High constraints (3)		
Negative attitude and obstacles from local leaders	72	40	38	4	128	10
Lack of co-operation of entrepreneurs	0	67	54	33	274	2
Lack of information receiving capacity of the members	64	46	41	3	137	8
Lack of proper internet facility in UDC	50	71	31	2	141	7
Lack of efficiency of the personnel working in UDC	53	53	45	3	152	5
Lack of interaction among CIG_s	53	53	48	0	149	6
Lack of proper knowledge on modern agricultural information by the officers	55	65	33	1	134	9
Shortage of employee in Union Digital Center	36	11	7	100	325	1
Lack of courage to take entrepreneurship initiatives	51	55	46	2	153	4
Lack of regular publication on agricultural information from UDC	49	54	49	2	158	3

CFI= Constraints Faced Index

On the basis of CFI, it was observed that 'Shortage of employee in Union Digital Center' ranked first followed by 'lack of co-operation of entrepreneurs', 'lack of regular publication on agricultural information from UDC', 'lack of courage to take entrepreneurship initiatives', 'lack of efficiency of the personnel working in UDC', 'lack of interaction among CIG_s', 'lack of proper internet facility in UDC', 'lack of information receiving capacity of the members', 'lack of proper knowledge on modern agricultural information by the officers' and 'Negative attitude and obstacles from local leaders'.

CHAPTER V

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

This chapter presents summary of findings, conclusions and recommendations of the study.

5.1 Summary of findings

The major findings of the study are summarized below:

5.1.1 Individual characteristics of the farmers

Age of the farmers ranged from 24 to 66 years and more than half (51.9 percent) of the respondents were middle aged compared to 32.5 percent of the respondents belonged to the young aged categories and 15.6 percent were in the old aged category.

Level of education scores of the respondents ranged from 0 to 14 and the highest proportion (49.4 percent) of the farmers had secondary education, 1.9 percent were illiterate, 7.8 percent can sign only, 24.7 percent had primary education and 16.2 percent of the farmers had above secondary education level.

Family size scores of the respondents were ranged from 2 to 12 and half (55.8 percent) of the respondents had medium family size, 27.9 percent had small family size and 16.2 percent had large family.

Farm size scores of the farmers ranged from 0.6 to 6.43. More than half (65.6 percent) of the respondents were small farm sized, 24.7 percent had medium farm size, 6.5 percent had large farm size and 3.2 percent had marginal farm size.

Family income of the farmers ranged from 88 to 999 and more than half (68.8 percent) of the farmers had medium income compared to 15.6 percent under low and 15.6 percent under high income group.

Innovativeness scores of the respondents ranged from 14 to 38 and majority (68.8 percent) of the farmers had medium innovativeness, 20.1 percent had high innovativeness and 11 percent had low innovativeness.

Extension media contact scores of the respondents ranged from 3 to 47. Majority (70.8 percent) of the farmers had medium extension media contact, 18.2 percent had low extension media contact and 11 percent had high extension media contact.

Agricultural knowledge scores of the respondents ranged from 13 to 36.More than half (70.1 percent) of the farmers had medium, 16.9 percent had low and 13 percent had high agricultural knowledge.

Marketing awareness scores of the farmers ranged from 20 to 48. The highest proportion (59.7 percent) of the farmers had medium marketing awareness while 27.9 percent had high marketing orientation and 12.3 percent had low marketing awareness.

Aspiration scores of the farmers ranged from 20 to 48 and the highest proportion (65.6 percent) of the respondents had medium aspiration, 23.4 percent of the respondents had high and 11 percent of the respondents had low aspiration respectively.

Constraints faced scores of the farmers ranged from 4 to 23. About 59.7 percent of the respondents faced medium constraints, 21.4 percent faced low constraints and 18.8 percent faced high constraints.

5.1.2 Effectiveness of Union Digital Center (EUDC)

Effectiveness of Union Digital Center (EUDC) in receiving agricultural information was determined by three dimensions (receive, understanding and application) against the 10 selected agricultural information. The receive, understanding and application scores ranged from 11 to 38, 3 to 36 and 2 to 25 respectively against the possible range of 0 to 40. On the other hand, EUDC ranged from 16 to 99 against the possible range 0 to 120. The highest proportion (77.9 percent) of the farmer had medium received of agricultural information, while 18.2 percent had low and 3.9 percent had high received of agricultural information. The highest proportion (57.1 percent) of the farmers had medium understanding of information, while about 21.4 percent had low understanding and 21.4 percent had high understanding. More than half (59.1 percent) of the farmers had medium application of information, while 20.8 percent had high application and 20.1percent had low application. However, the highest proportion (49.4 percent) of the farmers had low effectiveness of UDC in utilization of agricultural information compared to 30.5 percent had medium effectiveness and 20.1 percent had high effectiveness.

The receive index (RI), understanding index (UI) and application index (AI) of the 10 agricultural activities ranged from 41.35 to73.73, 24.83 to 52.33 and 18.8 to 40.88 respectively against the possible range of 0 to 100. On the other hand, EUDCI ranged from 84.98 to 166.94 against the possible range of 0 to 300. The highest effective information was ‘compost preparation’ (EUDCI=166.94) followed by ‘tree plantation’ (EUDCI=161.26), ‘recommended seed rate’ (EUDCI=156.91), ‘recommended varieties’ (EUDCI=155.24) and so on. The lowest effective information was ‘fruits processing

techniques' (EUDCI=84.98) among the selected agricultural information.

5.1.3 Contribution of the selected characteristics of the farmers to the effectiveness of UDC in utilization of agricultural information as perceived by them

Out of the eleven independent variables, only five variables namely level of education, family income, innovativeness, agricultural knowledge and aspiration had significant contribution to the effectiveness of Union Digital Center (UDC) in utilization of agricultural information. as indicated by step-wise multiple regression analysis. These five contributory factors combinedly explained 53.1 percent of the total contribution.

5.1.4 Constraints faced by the respondents to the effectiveness of Union Digital Center (UDC) in utilization of agricultural information

On the basis of CFI, it was observed that 'shortage of employee in Union Digital Center' 'ranked first followed by 'lack of co-operation of entrepreneurs', 'lack of regular publication on agricultural information from UDC', 'lack of courage to take entrepreneurship initiatives', 'lack of efficiency of the personnel working in UDC', 'lack of interaction among CIG$_s$', 'lack of proper internet facility in UDC', 'lack of information receiving capacity of the members', 'lack of proper knowledge on modern agricultural information by the officers', and 'Negative attitude and obstacles from local leaders'.

5.2 Conclusions

"A conclusion presents the statements based on major findings of the study and these statements mostly confirm to the objectives of the research in the shortest form. It presents the direct answers of the research objectives, or it relates to the hypothesis" (Labon and Schefter, 1990).

Findings of the present study and the logical interpretation of other relevant facts prompted the researcher to draw the following conclusions:

1. The findings indicate that most of the respondents had perceived medium effectiveness after involvement with UDC. It may be concluded that UDC plays a moderate role in utilization of agricultural information by the farmers.
2. The findings indicate that agricultural knowledge of the respondents had highest contribution to the effectiveness of Union Digital Center (UDC) in utilization of agricultural information. It may be concluded that the respondents having more agricultural knowledge were highest effectiveness of Union Digital Center (UDC) in utilization of agricultural

information.

3. The findings indicate that innovativeness of the farmers had a significant contribution to the effectiveness of Union Digital Center (UDC) in utilization of agricultural information. It may be concluded that effectiveness of Union Digital Center (UDC) in utilization of agricultural information will increase with the increasing of innovativeness of the farmers.
4. The findings indicate that level of education had a significant contribution to the effectiveness of Union Digital Center (UDC) in utilization of agricultural information. It may be concluded that level of education of the respondents had influence on the acceleration of effectiveness of Union Digital Center (UDC) in utilization of agricultural information.
5. From stepwise multiple regressions, it was found that family income of the respondent had a significant contribution to the effectiveness of Union Digital Center (UDC) in utilization of agricultural information. It may be concluded that the respondents having high family income were more likely to have higher effectiveness of Union Digital Center (UDC) in utilization of agricultural information.
6. The findings indicate that that aspiration of the respondents had 1.5 percent contribution to the effectiveness of Union Digital Center (UDC) in utilization of agricultural information. It may be conclude that the more the aspiration of the farmers the more the effectiveness of UDC.
7. The highest effective information was 'compost preparation' (EUDCI=166.94) followed by 'tree plantation' (EUDCI=161.26), 'recommended seed rate' (EUDCI=156.91), 'recommended varieties' (EUDCI=155.24) and so on. The lowest effective information was 'fruits processing techniques' (EUDCI=84.98) utilized by the farmers from UDC. Therefore, it could be concluded that the farmers try to utilize those information which are important in their agricultural activities.
8. Farmers faced highest constraints in 'Shortage of employee in Union Digital Center' followed by 'lack of co-operation of entrepreneurs', 'lack of regular publication on agricultural information from UDC', 'lack of courage to take entrepreneurship initiatives', 'lack of efficiency of the personnel working in UDC', 'lack of interaction among CIG_s', 'lack of proper internet facility in UDC', 'lack of information receiving capacity of the members', 'lack of proper knowledge on modern agricultural information by the officers' and 'Negative attitude and obstacles from local leaders'.

5.3 Recommendations

5.3.1 Recommendations for policy implications

On the basis of experience, observation and conclusions drawn from the findings of the study following recommendations are made:

1. The study has consistently shown that the respondents under this study have been moderately successful in utilization of agricultural information. For sustainability of their utilization at a more increased level, authority may arrange motivational campaigning about UDC.
2. The findings of this study have indicated that agricultural knowledge of the respondents had highest contribution to the effectiveness of Union Digital Center (UDC) in utilization of agricultural information. Therefore, it may be recommended that Union Digital Center (UDC) may provide training to the beneficiaries for increasing their knowledge.
3. The findings indicate that innovativeness of the farmers had a significant contribution to the effectiveness of Union Digital Center (UDC) in utilization of agricultural information. Therefore, it may be recommended that the entrepreneurs should inform the farmers about new technology for increasing their innovativeness.
4. The findings indicate that level of education had a significant contribution to the effectiveness of Union Digital Center (UDC) in utilization of agricultural information. Therefore, it may be recommended that attempts should be taken to establish adult learning center to increase level of education as well as effectiveness of Union Digital Center (UDC) in utilization of agricultural information.
5. The findings indicate that family income of the respondent had a significant contribution to the effectiveness of Union Digital Center (UDC) in utilization of agricultural information. Therefore, it may be recommended that attempts should be taken to involve farmers in various income generating activities for increasing income as well as effectiveness of Union Digital Center (UDC) in utilization of agricultural information.
6. The findings indicate that that aspiration of the respondents had a significant contribution to the effectiveness of Union Digital Center (UDC) in utilization of agricultural information. It may be recommended that the authority may exhibit result demonstration to the respondents for increasing their aspiration as well as effectiveness of Union Digital Center (UDC) in utilization of agricultural information.

7. The Union Digital Centers (UDCs) more specifically Farmers Information and Advice Center (FIAC) need to arrange training of a reasonable duration in crop cultivation involving as many farmers as possible who will be in turn arrange training for their neighbor farmers. The philosophy is ‘let farmers be the teacher of other farmers’. More than three-fourths (78.8 percent) of the farmers were young and middle aged and they should be encouraged in receiving training organized by FIAC.
8. An interdisciplinary (crops, livestock, fisheries etc.) technical expertization for strengthening the “Farmers Information and Advice Center (FIAC),” within the framework of UDC need to be emphasized for achieving full potential out of it.
9. There should be appointed more manpower and technical expertise at union level. Therefore, more number of common interest groups will be trained and information transfer will be easier than present situation.
10. Farmers faced many constraints in utilization of agricultural of agricultural information. Therefore, it may be concluded that emphasis should be given to minimize these problems.

5.3.2 Recommendations for further study

Considering the scope and limitations of the study, the following recommendations are made for further study:

1. The present study was conducted a union named Alokjhari of Khansama upazila of Dinajpur district. So, similar attempts may be taken in other parts of the country to verify the results.

2. The study was undertaken to explore the contribution of 11 characteristics of the farmers on effectiveness of UDC in receiving agricultural information. But there are many other characteristics of the farmers which may influence them regarding effectiveness of union digital center. So, it is recommended that further study should be conducted involving other unexplored characteristics of the farmers.

3. In this study farmers had received information from UDC only 10 selected agricultural information with varying degrees as a part of their information need. It is, therefore, recommended that further study may be conducted involving other agricultural information.

4. In this study effectiveness of UDC have been studied on three dimensions (receive, understanding and application) of information. In further study, other dimensions may be included.

5. Level of education, family income, innovativeness, agricultural knowledge and aspiration had significant contribution to the effectiveness of UDC. Hence, further investigation is necessary to find out such relationships between the concern variables to authentic the present study.

6. In the present study age, family size, farm size, extension media contact, marketing awareness and constraints faced by the farmers showed no contribution to the effectiveness of UDC. In this connection further research is necessary to justify the results.

7. All constraints affect the performance of the farmers. There is need for undertaking research on the various problems faced by the farmers which affect their performance.

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APPENDIX-A

An English Version of Interview Schedule

Department of Agricultural Extension and Information System

Sher-e-Bangla Agricultural University

Dhaka-1207

An interview schedule for data collection of the research study entitled

"Effectiveness of Union Digital Center in Utilization of Agricultural Information"

Serial No. ☐

Name of Respondent: ……CIG group name: ……..

Father's/Husband's name:……..Village: …….

[Please answer the following questions and put tick (√) whenever necessary]

1. Age: Please mention your present age? ☐ Years

2. Level of education: Please mention your level of education

a) Can't read and write ☐
b) Can sign name only ☐
c) I have passed class……..

3. Family size: Please mention your total number of family members (including yourself)

Male		Female		Total=	

4. Farm size: Please mention the area of your land according to use

Sl. No.	Type of land use	Area of land		
		Local Unit		Hectare
		Decimal	Bigha	
A_1	Homestead land including pond			
A_2	Own land under own cultivation			
A_3	Land taken on lease from others			
A_4	Land given to other on share cropping basis			
A_5	Land taken from other on share cropping basis			
	Total farm size=$A_1+A_2+A_3+1/2(A_4+A_5)$			

5. Family income: Please mention your annual family income according to the following sources

Sl. No.	Sources of income	Production (local unit)	Market price (Tk./local unit)	Total (Tk.)
A. Agricultural				
1.	Rice			
2.	Maize			
3.	Wheat			
4.	Potato			
5.	Vegetable			
6.	Fruits			
7.	Fish			
8.	Poultry			
9.	Dairy			
10.	Land lease			
B. Non-Agricultural				
1.	Service			
2.	Business			
3.	Others (if any)			
			Total=	

6. Innovativeness: Please furnish your information about the duration and extent of uses of the following technologies

Sl. No.	Name of technologies	Do not use	Duration of adoption			
			Above 5 years	4-5 years	2-3 years	Within 1 year
1.	Cultivation of BRRI dhan62 variety of rice					
2.	Use of BADC wheat seed of shatabdi variety in crop cultivation					
3.	Land preparation by power tiller					

(Continued)

Sl. No.	Name of technologies	Do not use	Duration of adoption			
			Above 5 years	4-5 years	2-3 years	Within 1 year
4.	Use of vermicompost as bio-fertilizer					
5.	Use of "bumper" as balance fertilizer in crop production					
6.	Use of IPM in rice field					
7.	Use of sex pheromone trap					
8.	IBD vaccination of poultry					
9.	Artificial pollination in vegetable cultivation					
10.	Tree plantation for environmental protection					

7. Extension media contact: Please indicate the extent of your contact with following extension media

Sl. No.	Extension media	Not at all	Extent of contact			
			Rarely	Occasio-ally	Frequently	Regularly
A. Individual Contact						
1.	Neighbour		1-2 times/week	3-4 times/week	5-6 times/week	≥7 times/week
2.	Local leader		1 time/week	2 times/week	3 times/week	≥4 times/week
3.	Agricultural input dealer		1-3 times/season	4-5 times/season	6-7 times/season	≥8 times/season
4.	Sub-Assistant Agricultural Officer		1-2 times/year	3-4 times/year	5-6 times/year	≥7 times/year
5.	NGO workers		1 time/year	2-3 times/year	4-5 times/year	≥6 times/year
6.	Agricultural Extension Officer		1 time/year	2-3 times/year	4-5 times/year	≥6 times/year

(Continued)

Sl. No.	Extension media	Not at all	Extent of contact			
			Rarely	Occasio-ally	Frequently	Regularly
7.	Upazila Agricultural Officer		Do	Do	Do	Do
8.	Upazila Livestock Officer		Do	Do	Do	Do
9.	Upazila Fisheries Officer		Do	Do	Do	Do
A. Group contact						
1.	Participation in field day		1 time/2 year	1 time/year	2 times/year	≥3 times/year
2.	Participation in result demonstration meeting		Do	Do	Do	Do
B. Mass Contact						
1.	Visit to agricultural fair		1 time/ 3 year	1 time/2year	1 time/year	≥2 time/year
2.	Watching agricultural TV program		1 time/month	2-4 times/month	5-6 times/month	≥7 times/month
3.	Reading agricultural booklets or magazines		1time/year	2-3 times /year	4-5 times /year	≥6 times/year
4.	Listening agricultural radio program		1 time/month	2-4 times/month	5-6 times/month	≥7 times/month

8. Agricultural knowledge: Please answer the following questions

Sl. No.	Questions	Assigned score	Obtained score
1.	Name two beneficial insects.	2	
2.	Name two diseases of poultry.	2	
3.	How insect can be controlled when top of the plant infested?	2	
4.	How many days after one have to top-dress on germination of maize?	2	
5.	Mention the ways and means of increasing soil fertility.	2	
6.	Mention the means for using recommended doses of MP in Modern Variety (MV) of potato.	2	
7.	Mention the means of controlling pest without insecticides.	2	
8.	What crops can be grown with maize as mixed crop?	2	
9.	What is the necessity of fertilizer application in the pond?	2	
10.	Why chemical fertilizers are more harmful to environment?	2	
11.	What will happen if urea fertilizer applies during booting stage of rice?	2	
12.	Mention the water color of cultivable pond.	2	
13.	Which types of sapling are considered for tree plantation?	2	
14.	Mention the methods of controlling rice hispa and stem borer without applying pesticides.	2	
15.	How can you prevent foot and mouth disease (FMD) of cattle?	2	
16.	How cropping diversity does secure balance use of family labour throughout the year?	2	
17.	Why production reduce next year after cultivation of Telapia fish?	2	
18.	What is important concern (time) if wheat is grown after harvesting of T. Aman?	2	
19.	Please mention the name of two crops which cultivated under shade.	2	
20.	Mention the name of two fruits containing vitamin-C.	2	

9. Marketing awareness: Please state the degree of your agreement or disagreement to each of the following statements

Sl. No.	Statements	Nature of opinion				
		SA	A	U	D	SD
1.(+)	Well-developed marketing system helps to get actual price of the product					
2. (-)	Agricultural inputs availability in market have no effect on crop cultivation					
3.(-)	One should purchase his products from the nearest shop irrespective of price					
4.(+)	Minimum taxation scheme enhances marketing facilities					
5. (-)	It is better to purchase product from retailer rather than wholesaler					
6. (+)	Mobile phone helps to justify price in the course of procurement and retailing					
7. (+)	Market news is useful to a farmer					
8.(-)	A farmer can get good price by grading his products					
9.(-)	One should sell his products to the nearest market irrespective of price					
10.(+)	Warehouses can help the farmers to get better price of his goods					

SA= Strongly Agree, A= Agree, U= Undecided, D= Disagree, SD= Strongly Disagree

10. Aspiration: Please mention the extent of your agreement or disagreement towards the following statements

Sl. No.	Statements	Nature of opinion				
		SA	A	U	D	SD
1.(-)	I don't want self-dependent on agriculture because it is a underprivileged occupation					
2.(+)	Although there is a risk in farming, but I want to be financially solvent through farming					
3.(-)	For development of a country there is no role of agriculture					
4.(+)	I try my best to educate my sons in agriculture					
5.(-)	I don't fascinated in agriculture because crops are scratched regularly due to natural calamities					
6.(+)	I will try to gather more information from UDC					
7.(-)	I will not try to reach my daughter to higher education in agriculture					
8.(+)	UDC plays important role in agricultural development					
9.(-)	Use of modern agricultural implements decreases productions					
10.(+)	I will try to increase communication with entrepreneurs in future					

SA= Strongly Agree, A= Agree, U= Undecided, D= Disagree, SD= Strongly Disagree

11. Constraints faced by the farmers in UDC: Please mention the extent of constraints you faced in UDC

Sl. No.	Constraints	Not at all	Extent of constraints		
			Low	Medium	High
1.	Negative attitude and obstacles from local leaders				
2.	Lack of co-operation of entrepreneurs				
3.	Lack of information receiving capacity of the members				

(Continued)

Sl. No.	Constraints	Not at all	Extent of constraints		
			Low	Medium	High
4.	Lack of proper internet facility in UDC				
5.	Lack of efficiency of the personnel working in UDC				
6.	Lack of interaction among CIG_s				
7.	Lack of proper knowledge on modern agricultural information by the officers				
8.	Shortage of employee in Union Digital Center				
9.	Lack of courage to take entrepreneurship initiatives				
10.	Lack of regular publication on agricultural information from UDC				

12. Effectiveness of Union Digital Center

12.1 Information receive: Please state the amount of following information received from union digital center

Sl. No.	Agricultural information	None (0)	Receive (No./season)			
			Low (1)	Moderate (2)	High (3)	Very high (4)
1.	Recommended varieties		1-3	4-6	7-9	≥10
2.	Recommended seed rate		1-3	4-6	7-9	≥10
3.	Recommended irrigation		1-3	4-6	7-9	≥10
4.	Recommended doses of fertilizer		1-3	4-6	7-9	≥10
5.	Integrated pest management (IPM) practices		1-3	4-6	7-9	≥10
6.	Modern cultivation technology		1-3	4-6	7-9	≥10
7.	Compost preparation		1-3	4-6	7-9	≥10
8.	Post-harvest management of vegetables		1-3	4-6	7-9	≥10
9.	Fruits processing techniques		1-3	4-6	7-9	≥10
10.	Tree plantation		1-3	4-6	7-9	≥10

12.2 Understanding: Please state the extent of understanding of the following information

Sl. No.	Agricultural information	None (0)	Understanding			
			Low (1)	Moderate (2)	High (3)	Very high (4)
1.	Recommended varieties					
2.	Recommended seed rate					
3.	Recommended irrigation					
4.	Recommended doses of fertilizer					
5.	Integrated pest management (IPM) practices					
6.	Modern cultivation technology					
7.	Compost preparation					
8.	Post-harvest management of vegetables					
9.	Fruits processing techniques					
10.	Tree plantation					

12.3 Application: Please state the amount of application of the following information

Sl. No.	Agricultural information	None (0)	Application			
			Low (1)	Moderate (2)	High (3)	Very high (4)
1.	Recommended varieties					
2.	Recommended seed rate					
3.	Recommended irrigation					
4.	Recommended doses of fertilizer					
5.	Integrated pest management (IPM) practices					
6.	Modern cultivation technology					
7.	Compost preparation					
8.	Post-harvest management of vegetables					
9.	Fruits processing techniques					
10.	Tree plantation					

Thanks for your kind cooperation

.....
Signature of interviewer

APPENDIX-B

Correlation Matrix of the Dependent and Independent Variables (N=154)

	X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8	X_9	X_{10}	X_{11}	Y
X_1	1											
X_2	-0.098	1										
X_3	0.314**	-0.432**	1									
X_4	0.107	0.232**	0.042	1								
X_5	0.030	0.149	0.061	0.497**	1							
X_6	0.045	-0.058	-0.074	0.247**	0.140	1						
X_7	0.170*	0.427**	-0.151	0.355**	0.118	0.028	1					
X_8	0.045	0.311**	-0.070	0.346**	0.260**	0.072	0.141	1				
X_9	0.030	0.199*	-0.176	0.220**	0.066	0.324**	0.120	0.562**	1			
X_{10}	0.036	0.188*	-0.138	0.228**	0.121	0.261**	0.047	0.601**	0.646**	1		
X_{11}	-0.067	-0.012	0.042	-0.031	0.015	-0.059	-0.050	0.095	0.082	-0.001	1	
Y	0.123	0.323**	-0.113	0.352**	0.335**	0.300**	0.225**	0.649**	0.464**	0.553**	-0.051	1

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

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

Legends

Independent variable		Dependent variable
X_1 = Age X_2 = Level of education X_3 = Family size X_4 = Farm size X_5 = Family income X_6 = Innovativeness	X_7=Extension media contact X_8=Agricultural knowledge X_9 = Marketing awareness X_{10} = Aspiration X_{11}= Constraints faced by the farmers	Y= Effectiveness of Union Information and Service Center