INDIGENOUS TECHNOLOGIES USED BY THE RURAL WOMEN IN AGRICULTURE FARMING

BY

MD. RAZAUL KARIM
REGISTRATION NO. 01002

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Approved by

....
(Professor Md. Shadat Ulla)
Supervisor

....
(Prof. Md. Zahidul Haque)
Co-supervisor

....
(Prof. Md. Zahidul Haque)
Chairman

Agricultural Extension and Information System

SHER-E-BANGLA AGRICULTURAL UNIVERSITY
DHAKA-1207

Md.Shadat Ulla

Professor

Depertment of Agricultural Extension and Information System

Sher-e Bangla Agricultural University

Dhaka-1207, Bangladesh

CERTIFICATE

This is to certify that the thesis entitled, "*Indigenous Technologies Used By The Rural Women In Agriculture Farming*" submitted to the Department of Agricultural Extension and Information System, 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.Razaul Karim Registration** No. 01002 under my supervision and my guidance. No part of the thesis has been submitted for any other degree or diploma.

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

Dated:

Dhaka, Bangladesh

(Professor Md. Shadat Ulla)

Supervisor

DEDICATED TO
MY BELOVED parents

ACKNOWLEDGEMENTS

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ABBREVIATIONS AND ACRONYMS

BBS	=	Bangladesh Bureau of Statistics
DAE	=	Department of Agricultural Extension
FAO	=	Food and Agricultural Organization
GO	=	Government Organization
HYV	=	High Yielding Variety
IFT	=	Indigenous Farming Technology
IT	=	Indigenous Technology
ITs	=	Indigenous Technologies
ITK	=	Indigenous Technical Knowledge
ITUI	=	Indigenous Technology Use Index
NGO	=	Non-Government Organization
UNICEF	=	United Nations International Children's Emergency Fund

ABSTRACT

The main focus of the present study was to identify the Indigenous Technologies (ITs) being used by the rural women of 5 no. Sundarpur union of Kaharole upazila under Dinajpur district, Bangladesh and to determine the extent to which the identified ITs were being used by the rural women. The study also explored the relationships between eight selected characteristics (independent variables) of rural women with their extent of use of ITs in farming (dependent variable) activities. Data were collected from a sample of randomly selected 100 housewives (44 from Bhatgoan, 33 from Majhapara and 23 from Malgram). A structured interview schedule was used during January 1 2008 to February 2, 2008 for collection of data. Twenty ITs were found to be used by the women in addition to scientific farming technologies for performing farming activities. To measure the dependent variable a five- point rating scale was employed. Pearson Product Moment Correlation Co-efficients were computed to examine the relationship between the concerned variables. As regards the extent of use of ITs by individual rural women showed that 30 percent of the rural women were high users, 45 percent moderate and 25 percent low users. Out of eight selected characteristics of the rural women annual income, farm size, extension contact and decision making were positively correlated while the level of education was negatively correlated. The other characteristics like age, family size and organizational participation had no significant relationships with their extent of use of ITs in farming.

Chapter 1
Introduction

CHAPTER 1

INTRODUCTION

1.1 General Background

Bangladesh is predominantly an agricultural country. She is an over populated country, inhabiting about 141.8 millions of people in its 1, 47,570 sq. km of area (UNICEF, 2006). Again the addition of population per year is 1.8 million with an annual growth rate of 2.1 percent (UNICEF, 2006).

It is estimated that women are almost half of the total population of the world. In Bangladesh, 49.78% of the total populations are women of which 75.82% live in the rural areas (BBS, 2006) and 70% of them working populations are engaged in agriculture. The women family members are vitally important for agricultural activities in Bangladesh, as they are involved in different activities related to production, reproduction, decision making and household activities.

Women's involvement in rural development, more particularly in agricultural development in Bangladesh, is the most important strategy designed to improve the social and economic life of specific group of farming community.

"Modern" agriculture in Bangladesh with high levels of external inputs like agrochemical, hybrid seed, fuel-based mechanization together with enhanced research and extension activities have contributed to an overall increase in the country's food production but have created observable dissonance in the agro ecosystem. Overexploitations of the limited natural resources have brought changes in the natural ecosystem, which threaten to undermine future progress.

Although the relationship between women and ecology is relatively new as an area of study, but it has been a central reality since the dawn of civilization. For this generation to secure a healthy planet and better lives for the current and future generations, it becomes pertinent to recognize and support the crucial linkages and interaction between rural women and ecology. In this regard, their

indigenous knowledge constitutes major impetus of integrity in the inheritance of earth's flora and fauna life (Pietela and Vickens, 1994). However, it is important to know that ecological, environmental and agricultural problems are often a cause-effect of a life long menace that has plagued the global world and some causes have been attributed to activities of the rural populace in the tropical developing countries, with respect to biodiversity loss. Specifically, rural women's socio-economic activities have been seriously implicated as a major cause. It is a fact that they are primary resource users (Appleton, 1993b) these women do much of the hard work needed to maintain or conserve their biodiversity and improve Agricultural productivity, often in the face of great odds against success. But they have been labeled as agents of ecological, environmental and Agricultural problems mainly because they shoulder the heavy workload needed to keep their families fed, housed, and clothed. It must be emphasized that, their strong interactions with nature is significant to the survival of livelihood.

It has always been fundamental that rural women's struggle for survival to produce enough food for the family and to maintain the productive capacity of the natural resources, so that they can continue producing food for the family and for future generations. In order to combat the struggle, technology development through experimentation and integration of new knowledge including ITK has always been a necessary part of farming.

The rural women do some productive activities including agricultural and non-agricultural works with in the homestead (Halim and McCarthy, 1985). Farouq (1980) found that women's productive hour ranged from 19 to 14 a day compared to men's such hour from 9 to 12. But many of the activities performed by women are not considered as the productive ones and hence not reflected in the national census (Satter, 1979). Women play a key role in the conservation of basic life support systems such as land, water, flora and fauna (Swaminathan, 1985).

This emphasizes the urgency of growing interest in documenting these local technologies and drawing the attention of researchers, development workers and funding agencies to the merits of preserving and improving them in order to achieve development of agriculture.

1.2 Statement of the Problem

The economic survey which was done in our country, the role of rural women cannot be overlooked. Rural women are the unprivileged category of the society. Women can play vital role in our economy. Active participation of rural women is important for the implementation of any development program.

The innovativeness of rural women has been well documented by Johnsan (1972), Reij et al. (1986), Lightfoot (1987), Millington (1987), and McCorkle et al. (1988). In current literature, the innovative rural women are now accepted as the norm, not the exception and, in recent years, there has been a growing scientific interest in locally developed farming systems and technologies.

Being a new country in an ancient land, Bangladesh possesses a rich heritage of Indigenous technologies, though much of which is lost during modernization of agriculture. Still this country and people are proud to nurture many myths, believes and traditions (Chowdhury et al. 1996).The historical, anthropological and socio-religious traditions of Bangladesh particularly the Mauryan epigraphy, the puthi calendars of Bengal, the sayings of 'khana'the Quran and Hadith, the value system of Hindus- all exhibit a strong indigenous awareness of the environment and natural resource conservation. Agriculture still is the main occupation of the majority people in Bangladesh, as it has been so far thousand years. Agriculture alone served the dwellers of this area in the challenging days when the other means of social survival had been forced out of the economy by colonial interest.

Women are generally experienced with the local technologies for cultivation for dominating risk with in their own domain using the existing facilities. The traditional technologies are most beneficial for the small and marginal rural women need careful perspective by the researcher and extension workers.

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Considering the above reasons and time available, the present study, therefore, aims to provide information regarding the following matters:

1. What are the indigenous technologies used by the rural women in their agricultural farming?

2. To what extent are these technologies being used by the rural women?

3. What are the personal, socio-economic, socio-cultural and psychological characteristics of rural women?

4. Does any relationship exist between the characteristics of the rural women and their use of the indigenous technologies?

1.3 Objectives of the Study

Objectives help researchers to get into the right truck. Meaningful, clear-cut and achievable objective are the key to success in all kinds of research. The research work was conducted with the following objectives:

1. To determine some selected characteristics of the rural women. The selected characteristics are:

   A. Personal
   - i) Age
   - ii) Level of education
   - iii) Family size

   B. Socio-economic
   - i) Annual income
   - ii) Farm size

   C. Socio-cultural
   - i) Organizational participation
   - ii) Extension media contact

   D. Psychology
   - i) Decision making

2. To identify the commonly used ITs by rural women,

3. To examine the extent of use of indigenous technologies by the rural women in their farming,

4. To explore the relationship between selected characteristics of the rural women and their extent of use of ITs in agricultural farming, and

1.4 Justification and Scope of the Study

Agriculture and environment has an in-built relationship. We need increased agricultural production keeping the environment healthy and friendly. Indigenous technical knowledge ITs is an appropriate package of technology in crop cultivation which is most economical and less hazardous to the environment. As most of the farmers of Bangladesh are poor, they could hardly adopt-modern technology for crop cultivation. According to FAO, the environmental problems of developing countries are largely due to overexploitation of lands, extension of cropping and deforestation (Alexandratos, 1988). Some large irrigated areas are seriously affected by salinity. Increased use of pesticides and artificial fertilizers are also causing environmental problems, particularly the degradation of soil texture including soil fertility. Referring to the no desert areas, 43% of Africa, 32% of Asia, and 19% of Latin America is at the risk of desertification (FAO, 1984). According to more recent global data given by the World Watch Institute (Brown, 1988) in several populous countries, agricultural production stagnated whereas population continued to grow.

ITs is highly effective and applicable to many instances. ITs indicates the ways of improving soil structure, water holding capacity and nutrient and water availability without the use of artificial inputs. It keeps the farming systems sophisticated forms of ecological agriculture fine-tuned to the specific environmental conditions. The major strength of indigenous farming systems lie in their functional integration of different resources and farming techniques. By integrating various land-use functions (e.g. producing food, wood, etc. conserving soil and water; protecting crops; maintaining soil fertility) and the use of different biological components (trees, herbs, green manure etc), the stability and productivity of the farming system as a whole can be increased and the natural resource base can be conserved.

Although the findings of this study will be applicable to 3 villages under Kaharole upazila of Dinajpur district, it is expected that the findings may also

have applicable to other areas of Bangladesh were the physical, socio-economic, and other cultural conditions do not differ much from those of the study

The findings of the study are expected to be useful to the students, researchers, extension personnel, policy makers to improve strategic of action for conserving friendly farm environment with the rural people.

1.5 Assumptions of the Study

An assumption is the supposition that an apparent fact or principle is true in the light of available evidence (Goode and Hatt, 1952).

Following assumptions were in the mind of the researcher during conducting the study:

- The respondents selected for this study were competent to furnish proper responses to the queries included in the interview schedule.

- The responses delivered by the respondents were believable. They expressed the truth about their information or opinions.

- Views and opinions delivered by the rural women included in the sample were the representative views and opinions of all the rural women of the study area.

- The researcher who works as an interviewer was well aware of the social and cultural environment of the study area. Hence, the data collected by the researcher were free from bias and the respondents furnished their opinions without hesitations.

1.6 Limitations of the Study

In order to conduct the research in a meaningful and manageable way, it became necessary to impose some limitations in certain aspects of the study. Considering the time, money, labor and other necessary resources available to

the researcher, the following limitations have been observed throughout the study:

1. The study was done to purposively selected three villages of Kaharole Upazila under Dinajpur district.

2. There were many rural women in the study area, but only the women who were involved in crop cultivation were considered for this study.

3. Personal and socio-economic features of the respondents could be many but only eight were selected for investigation in this study.

4. There were many indigenous technologies practiced by the rural women in farming, but only twenty indigenous technologies were selected for measuring the extent of their use.

5. The researcher relied on the data furnished by the farmers from their memory during interview.

1.7 Definition of Terms

Different "terms" have been used in this research report that need to be defined properly so that the findings as well as other contents of the study report become well-clarified to its users

Technology

Technology is a design for instrumental action that reduces the uncertainty in the cause-effect relationship involved in achieving a desired outcome (Rogers, 1983). In the other words, technology refers to the combination of knowledge, inputs, and management practices are used together with productive resources to gain a desired output (ILEIA, 1991:3).

Knowledge

Literally Knowledge means knowing or what one knows about a subject, fact, person etc. Knowledge, however, refers to the amount of facts or information about an idea, object or person which a person knows. Regarding technological aspect Knowledge occurs when an individual is exposed to a technology's existence and gain some understanding of how it functions (Rogers, 1983).

Indigenous Technology (IT)

The terms "Indigenous Technology (IT)", "Indigenous Farming Technology (IFT)", "Indigenous Technical Knowledge (ITK)", "Traditional Knowledge", "Indigenous Techniques", "Women's ingenuity and Wisdom", "Farmers Knowledge System", "Local Knowledge" etc. have been synonymically used in different study.

However, IT in the present study referred to the sum total of knowledge and practices which are based on people's accumulated experiences in dealing with situations and problems in various aspects of life, and such knowledge and practices are special to a particular culture (wang, 1988).

Agricultural activities

Agricultural activities mean the works which was done by the women for helping agricultural production in their surroundings either directly or indirectly. Agricultural activities such as crop production, preserving grains, drying, vegetable and fruit production within the farm area, cattle, goat poultry and fish rearing and such other activities related to production.

Non-agricultural activities

Non-agricultural activities mean the works which was done by the rural women not related to the agricultural production. These include children's care, cooking, feeding all family members, taking care of the house, maintaining utensils, furniture and the like, and taking care of all the family members when any of them get sick.

Farm

Farm means a selected total unit of land where organized one or more enterprises like crop production, livestock production and fisheries, etc for the purpose of satisfying the producer's goal.

Farming

Farming in which production of vegetable, forestry, livestock, poultry, and fish take place in an integrated manner.

IT on Crop Production

This is the combination of various methods used by the rural women to manage different aspects of crop production like seed selection, seed treatment, intercultural operations, multiple cropping, relay cropping, fertility management, pest control, rising of seedlings, harvesting, processing and storing of farm products and the like.

Rural Women

Rural women were housewives living in village and engaged in farming activities directly or indirectly.

Age

The age of a rural woman was determined on the basis of actual years from her birth to the time of interview depending on her statement.

Level of Education

Empirically it was defined as the number of years spent by the respondent in receiving formal education.

Family Size

Family size referred to the total number of members including the respondent herself, his husband, children and other permanent dependents who live and eat together in a family unit.

Annual Income

Annual income of a respondent referred to the total number of money(taka) earned by her and other members of her family from various agricultural(crops,

livestock, vegetables, fruits and timbers, fish and other) and non-agricultural(service, business, other) sources in a year. Not only savings but also annual income of the respondent included the cost of maintaining her family.

Farm Size

Farm size referred to the hectare of land area devoted to the maintenance of farming enterprise(s) by a farmer. It included the homestead, own land under own cultivation, land taken from or given to others on borga, land taken from or given to others on lease and miscellaneous land holdings which the farmer has got ownership upon and have the prospect of engaging in farming as and when she wishes.

Organizational Participation
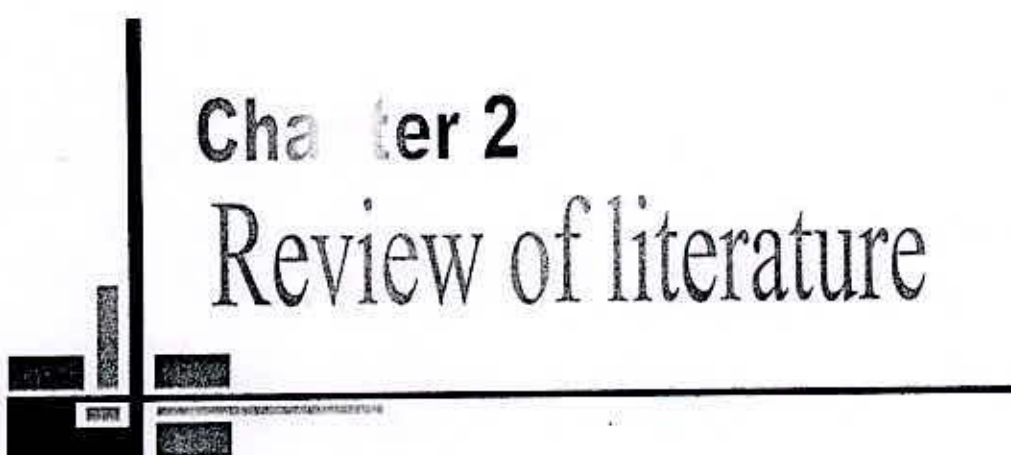
Organizational participation of the respondent refers to her taking part in different social organizations either as a general, executive member or an executive officer.

Extension Media Contact

Refers to an individual's exposure to contact with different communication media and source and personalities being used for dissemination of new technologies among the rural women.

Decision Making

Decision making means taking active participation of her families on different aspects like crop production, agricultural goods, family household goods etc.

Chapter 2
Review of literature

CHAPTER 2

REVIEW OF LITERATURE

This part of the study, reviews of the literatures concerned to the major focus of the study are presented. This study is mainly related with the rural womens' use of indigenous technologies in their agricultural farming with their eight selected characteristics. It may be relevant here to refer that a good number of research works concerning farmers' innovativeness and traditional knowledge system have been made in many countries of the world. The fact is clearly stated by carlier, 1987; Farrington and Martin, 1988; IDS, 1989 as: "there are far more examples of the innovations and local knowledge of third world farmers that can be described in a book. The numbers of reports and articles on this subject reflect growing awareness of the value and potentials of learning from such knowledge".

Relevant work has been done in concern of the use of indigenous technologies in agricultural farming. This chapter comprises three parts. First part of the study reviews relating to the indigenous technologies used by the rural women in agriculture farming.

Second part of the study reviews in addition with the relationship of some variables with adoption behavior of the client system has been presented.

Third part of the study, conceptual framework of the study has been showed based on the present study. However it should be referred that the words "adoption" and "use" are basically same.

2.1 Concept, Significance and Use of Indigenous Technology

2.1.1 Concept of Indigenous Technology

The concept of ITs has been manifested by different terms by different researchers. The words "Indigenous Technology (IT)", "Indigenous Farming

Technology (IFT)", "Indigenous Technical Knowledge (ITK)", "Traditional Knowledge", "Indigenous Techniques", "Women's ingenuity and Wisdom", "Farmers Knowledge System", "Local Knowledge" etc. had been comparatively used in different study. However some commonly reviews concerning to the concept of indigenous farming technologies are presented below:

Thrupp (1987) stated that indigenous knowledge is far more than merely what is reflected in technical method. It also entails many insights, perceptions and intuitions related to the environment, often including lunar or solar cycles, astrology, and meteorological and geological conditions. This 'folk wisdom' is usually integrated with belief systems and cultural norms, and expressed in traditions and myths. Also traditional methods of communication, e.g. through songs or proverbs, and traditional structures for social organization and cooperation form part of the local knowledge system. Such knowledge systems are not always easily understood by people trained in western science.

Chowdhury et al. (1996) asserted of indigenous technology as "indigenous people and farmers develop their location specific knowledge and practices of agriculture, natural resource management, human and animal health care and many other subjects for centuries. This complex of knowledge, traditional beliefs and practices are generally known as indigenous or traditional knowledge

The local or indigenous knowledge (IK) of a farming population living in a specific area is derived from the local people's past farming experience, both that handed down from previous generations and that of the present generations. When a technology developed elsewhere has been incorporated by local farmers as an integral part of their agriculture, it is as much a part of their indigenous knowledge as self developed technologies. Farmers' practical knowledge about the local ecosystem and how they interact- is reflected in their

farming techniques and in their skill in using the natural resources to gain their livelihood (Reijntjes *et al.* 1992).

2.1.2 Significance of Indigenous Technology

Researcher, extension workers as well as policy makers round the globe are now in a consensus that emphasizing and evaluating local technologies would pave the way for a sustainable agricultural improvement. The following reviews would make one understand the significance of ITK in order to achieve sustainability in agriculture:

Chowdhuiy *et al.* (1996) suggested that indigenous knowledge should be valued, as it comprises a storehouse of accumulated experience about natural resource management essential for sustainable agricultural development.

Sharland (1991) referring to the statements of Warren (1991) pointed out that agricultural scientists accept that indigenous technical knowledge must be reassessed for introducing new agricultural technology, as farmers have a wealth of information of their own environment which should be taken into account. The author also opined that indigenous technologies used by one society to solve problems can also be used to solve problems faced by another society in a similar agro-ecosystem in another part of the world. The knowledge is valuable national resource, its systems are dynamic and continually influenced by internal creativity and experimentation as well as by contact with external systems. It helps assure that the end users of agricultural development projects are involved in developing technologies appropriate to their needs. It is cost effective as well as it builds development efforts enhancing sustainability and capacity building.

Verma and Singh (1969) states that indigenous knowledge has undergone evolutionary process and is built from and based on thousands of years of experience. Traditional wisdom is time tested and understanding the dimension of

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technology of clienteles helps ascertaining the degree and direction of change through formal research.

Gupta (1990) holds that the knowledge produced by peasants, pastoralists, artisans and woman in the household laboratory, the kitchen-is an important source of generation of technologies for sustainable development. Existing the frontiers of science is possible by building upon some of functional, intuitive, composite recipes of peasant culture.

Many indigenous technologies and decision making systems are useful for sustainable development (Warren, 1991), which include:

❖ The utility of indigenous mixed cropping systems and forest gardens has been realized.

❖ Ethno veterinary medicine includes folk beliefs, knowledge, skills, methods and practices pertaining to the health care of animals.

❖ There are several indigenous crop pest management techniques, which are important tools for gaining sustainability in agriculture.

These studies illustrate the need for understanding and working with indigenous knowledge system.

Talawar and Singh (1992) argued that abstracting the science underlying indigenous knowledge system would help us understand the concepts and practices depicting the elements of sustainability to integrate with the modern information system for efficient resource management.

Reijntjes *et al.* (1992) reported that in recent years, there has been a growing scientific interest in locally developed farming systems and technologies. These are seen as a source of sound ideas, locally adapted cultivars *and* practices which could lead to sustainable use of resources. Indigenous technical knowledge is an important source of information about the local farming system, experiences, institutions, culture etc. Above all, farmers' knowledge and skills in adapting new ideas to their local conditions and needs form the basis for change withi.. the farming community.

Indigenous technologies used by one society to solve problems can also be used to solve problems faced by another society in a similar agro-ecosystem in another part of the world. This knowledge is a valuable natural resource by its internal creativity and experimentation as well as by contact with external systems. It helps assure that the end users of agriculture development projects are involved in developing technologies appropriate to their needs. It is cost effective as it builds on local development efforts enhancing sustainability and capacity building (Anonymous, 1994).

Shah (1994) stated that indigenous systems may not work in every situation, but the integration of local and external technologies can result in appropriate solutions.

2.1.3 Use of Indigenous Technologies

This section reviews concerning to the use of indigenous technologies in aspects of crops production. ITs is an vital source of information about the local farming knowledge, experiences, institutions, culture etc. Above all, producers' knowledge and needs from the basis for change within the farming community (Reijaties *et al.* 1992).

2.1.3.1 Crop Production

Sheheli (2003) observed that applying muddy soil collected from the bottom of the pond to improve the fertility of surface soil.

Islam (1996) found that applying ash in jute crop at the early stages of growth to prevent the attack of jute hairy caterpillar and other leaf-eaters.

Chowdhury *et al.* (1996) reported that in Sunamganj, women farmers mix ash with kerosene and spread over leaves to control aphid infestation in vegetables.

To destroy aphids and sucking flies of cucurbits and country beans the vines are fumigated by igniting dry cow dung under the platform. Farmers of Lalmonirhat (Chowdhury *et al.* 1996) do this practice.

Chowdhury *et al* (1996) found that seedlings of different fruit trees were protected from grazing animals by applying liquid cow dung on the stem.

Chowdhury *et al.* (1996) observed that neem cake powder was applied by the farmers in the field to control termite infestation.

In Gazipur, Chowdhury *et al.* (1996) found that the fanners preserve bottle gourd seeds by keeping them inside the fruit. Selected bottle gourds are kept in the vine. After the season is over, they are exposed to strong sunlight for through drying. The inner pulp dries up completely and dry seeds make sound when the shell is shaken. These are stored in dry corner of the house. A small cut is made in the upper portion of the fruit. Germination capacity is fully retained in this way.

Wilken (1987) found that, use of ant refuse in Zaachilla and Mexico to fertilize high-value crops such as tomatoes, chili and onions. In India, ash applied in seedbed and in onion fields before sowing and planting helps in development and improvement of quality of bulbs. Farmers believe that this helps in soil reclamation (Anonymous, 1994).

Halim (1992) noticed that the farmers of Gazipur district cut deep ring in the oil around the cabbage, brinjal and cauliflower plants to prevent the attack of cutworm.

Altieri (1987) and Thurston (1990) opined that traditional crop selection, planting times and cultivation practices often reflect efforts to minimize insect damage.

The following indigenous pest control techniques are very effective (Anonymous, 1994):

* Mint leaves emit a pungent smell, which repels insects.
* Chilies and other hot peppers can be used on vegetables against the caterpillars, aphids, flies, ants and other pests.
* Pyrethrum acts as a botanical insecticide against caterpillars, aphids, flies, ant and other pests.
* Wood ash sprinkled on seedlings, helps repel cutworms.

The use of diluted cattle urine as pesticide has been reported by many. Lohar (1952) advocated that diluted urine was very effective in controlling powdery mildew on broad leaf mustard.

Koradia (1996) reported that uses of empty shells of cotton ball control a noxious weed *Cyperus rotundus*.

Hossain and Alam (1993) reported that the farmers in Kazirshimla of Mymensingh district, Bangladesh use the following indigenous techniques of pest control in crops:

❖ Haphazard planting of crops to reduce the infestation of certain weeds.
❖ Criss-cross hanging of banana leaf thread above brinjal plot to prevent bird attack.
❖ Digging deep ring around cabbage, cauliflower and tomato seedling to inhibit cutworm attack.
❖ Spreading sawdust over banana beetle.
❖ Using powdered seeds of peetraj *(Amoora rohutika)* as insecticide.
❖ Using ash as repellent.

Sing (2001) made a survey on the storage structures used by the farming community in North Bihar, India. He reported that they owned at least 13 different types of storage structures for storing of their agricultural products. Among all, gunny bags were in maximum (25.78%).

Prakash (1996) reported that dried leaves of neem and dried pepper stalk (after extracting pepper) are mixed with rice and other stored grains to repel pests in India.

Budathoki *et al.* (1989) reported that farmer uses cattle urine in vegetable crops as manure. It was reported that damp sand application in the crop field reduces soil pH (Anonymous, 1994). De Schlippe (1956) reported that the sites of termite mounds are particularly good for growing sorghum and cowpea.

In Lalmonirhat, farmers are collected mature leaves of 'Bishkatali', sun dried, powdered and applied in upper layers of storage grain to prevent insect attack in pulses (Chowdhury et al. 1996).

In Monohordi, Bangladesh tubers of local potato variety are kept in medium sized earthen container for better storage. The containers are placed one upon another (Chowdhury et al. 1996).

Large sized ripe tomato fruits from first flash are collected. By cutting longitudinally into equal halves the juice with the seeds are gathered in an earthen bowl. When one kg of juice is collected powdered clay soil (about 2 kg) is mixed thoroughly with it. Small size balls or blocks are made with the moist clay, each of them is pierced by inserting a sharp stick. These clay balls/blocks are sun dried for several days, and hanged in a corner of the kitchen by making a garland with a rope. In the next season when the seedbed is ready for sowing, the soil blocks are powdered and spread in the bed. Preservation in this way helps maintain good germination capacity and is practiced by the farmers of Ranipukilr, Rangpur, Bangladesh (Chowdhury et al. 1996).

The study of Chowdhury et al. (1996) revealed that farmers of different regions in Bangladesh practiced various techniques of multiple cropping which are unique to the local agro-ecological and socio-cultural settings. Some of the techniques documented by them were:

❖ Relaying potato and pointed gourd,
❖ Relaying potato and sweet gourd,
❖ Relaying potato and pepper,
❖ Intercropping potato and wheat,
❖ Intercropping potato and bitter gourd,
❖ Intercropping gourd, cucumber, potato and leafy vegetables like 'napa shak' and lal shak',
❖ Intercropping ash gourd, sweet and ginger with pineapple, and
❖ Intercropping vegetables like cauliflower, cabbage, tomato, red amaranth etc. with sugarcane.

Hossain and Alam (1993) observed that the farmers of kazirshimla, Mymensing plant bitter gourds need the rhizome of banana plants in the belief that the water supply by the banana plant enhances the growth of bitter gourd and intercropping gram and lentil.

Kashem *et al.* (1996) observed that the farmers in Bangladesh use muddy soil collected from the bottom of the pond to enrich the fertility of surface soil.

2.2 Relationship of the Client Systems and Adoption of Innovations

2.2.1 Relationship between Age of the Client Systems and Adoption of Innovations

Sheheli (2003) in her study observed that age of the rural women had negatively non significant relationship with their extent of use of indigenous technologies.

Islam (1996) found that age of the farmers had significantly negative relationship with their extent of use of ITK.

Mamun (2004) concluded that the age of the respondents was not significant with their knowledge on use of ITK for crop protection.

Iqbal (1963) on the basis of a study concluded that elderly farmers were more to adopt modern agricultural practices as compared to other age groups.

Kashem and Mikuni (1998) found a significant negative correlation between the age of the Bangladeshi farmers and their perception about benefits of using the Indigenous Technical Knowledge (ITK).

Naher (2000) in her study found that there was no relationship between ages of rural women and their participation in homestead vegetable cultivation, post harvest practices, poultry raising and goat rearing, while the activities in vegetable, cultivation are mostly participated by the younger housewives.

Ogunfiditimi (1981) concluded that age of the farmers in relation to adoption was a positive but not significantly correlated. He suggested that age of a farmer did not contribute to the use of recommended farm practices.

Nidagundi (1985) in his study found that there was no significant relationship between the age of the farmers and their adoption behaviour.

Gogoi and Gogoi (1989) in a study found that age had a significant negative effect on the adoption of recommended plant protection practices.

Khan (1993) in his study found that age of the farmers was significantly related with their adoption of insecticides. He also stated that with the increase of age of the farmers the adoption of insecticides reduces i.e. age was negatively related with adoption.

2.2.2 Relationship between Level of Education of the Client Systems and Adoption of Innovations

Sheheli (2003) found that level of education of the rural women had negatively non significant relationship with their extent of use of indigenous technologies.

Islam (1996) observed that there was no relationship between education and extent of use of ITK of the farmers.

Mamun (2004) reported that level of education of the respondents was highly significant with their knowledge on use of ITK for crop protection.

Chowdhury et al. (1968), Hossain (1971), Rahman (1973), Rao (1976), Halim (1982), Ali and Chowdhury (1983) and Bashar (1993) in their respective studies.

Singh (1982) found that family education of the farmers was positively related to agricultural technology and their relationship was satisfactorily significant.

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Kaur (1988) observed that education influenced the opinion of the women about the project activity and adoption of vegetables gardening, animal husbandry etc.

Kashem and Mikuni (1998) did not find any relationship between education of the farmers and their perception about benefits of using ITK.

Baadgaonker (1984) found that education of farmers had a significant relationship with their adoption behaviour. Bavalalti and Sundaraswamy (1990) observed no significant relationship between education of the farmers and their adoption of dry land farming practices.

Okoro and Obibuaka (1992) studied adoption of recommended management practices among small holders in IMO state, Nigeria. The findings of the study indicated a positive relationship between education of the respondents and their adoption of recommended management practices.

Khan (1993) studied on the adoption of insecticides and related issues in the village of Pachar union, Madaripur district. He observed that education had a significant positive relationship with the adoption of insecticides. The similar findings also been reported by Rahim (1961), Bose and Saxena (1965).

2.2.3 Relationship between Family Size of the Client Systems and Adoption of Innovations

Sheheli (2003) in her study concluded that family size of the rural women had a significant positive relationship with their extent of use of indigenous technologies.

Islam (1996) observed that family size of farmers had a significantly negative relationship with their extent of use of ITK.

Halim and McCarthy (1985) reported that women performed different types of economic activities like post harvest, vegetable gardening, livestock care etc. and their rate of involvement depended on family structure.

Roa (1976) reported that rural women's participation in agriculture was negatively correlated with the size of their family.

Rao (1976) also observed similar findings between the family size of the farmers and their adoption of some selected agricultural technologies.

Hossain (1991) in his study in Sadar Upazila of Jamalpur district observed that family size of the farmers had no significant effort on their adoption of improved farm practices.

2.2.4 Relationship between Annual Income of the Client Systems and Adoption of Innovations

Sheheli (2003) in her study reported that annual income of the rural women had a significant positive relationship with their extent of use of indigenous technologies.

Islam (1996) found that a negative and significant relationship between annual income of the farmers and their extent of use of ITK.

Mamun (2004) revealed that annual income of the respondents was highly significant with their knowledge on use of ITK for crop protection.

Kaur (1988) observed that income level of rural women was highly associated with the use of improved agricultural technologies (HYV seeds, fertilizers and chemicals).

Rahman (1973) in his study found a positive relationship between income or the farmers and their adoption of improved farm practices.

2.2.5 Relationship between Farm Size of the Client Systems and Adoption of Innovations

Sheheli (2003) indicated in her study that farm size of the rural women had a significant positive relationship with their extent of use of indigenous technologies.

Islam (1996) found that the farm size of the farmers had a significant negative relationship with their extent of use of indigenous technical knowledge (ITK).

Mamun (2004) reported that farm size of the respondents was highly significant with their knowledge on use of ITK for crop protection.

Kashem and Mikuni (1998) did not find any significant relationship between farm size and perception about benefits of using ITK among Bangladeshi and Japanese farmers.

Karim (1973) indicated in his study that farm size of the transplanted aman growers had a substantial positive relationship with their use of fertilizers.

Hossain (1981) in his study on the adoption of four improved farm practices revealed a consistent and positive relationship between size of farm and use of all the four practices by the farmers.

Ogunfiditimi (1981) found that farm size had a negative correlation to use of the new farm practices.

2.2.6 Relationship between Organizational Participation of the Client Systems and Adoption of Innovations

Sheheli (2003) observed that there was no relationship between organizational participation of the rural women and their extent of use of indigenous technologies.

Islam (1996) reported that organizational participation of the farmers had no relationship with their extent of use of indigenous technical knowledge.

Mamun (2004) revealed that Organizational Participation of the respondents was highly significant with their knowledge on use of ITK for crop protection.

Hoque (1984) reported that organizational participation of farmer had a significant relationship with their adoption of improved practices.

2.2.7 Relationship between Extension Media Contact of the Client Systems and Adoption of Innovations

Sheheli (2003) in her study concluded that there was no relationship between extension media contact of the rural women and their extent of use of ITs.

Islam (1996) observed in his study that a significant and positive relationship between the media exposure of the farmers and their extent of use of indigenous technical knowledge.

Mamun (2004) reported that extension media contact of the respondents was highly significant with their knowledge on use of ITK for crop protection.

Halim (1982), Ali *et al.* (1983) and Bashar (1993) found no relationship between contact with extension workers and farmers' adoption behaviour regarding improved crop production practices.

Significant positive relationship between extension contact and adoption of improved farm practices were observed by Fligel (1956), Hardee (1965), Moulik *et al.* (1966), Rao (1976), Grewal (1980), Bezbora (1980), Mohammad and Mahboob (1981), Hossain (1981), Osunlogun *et al.* (1986), Mustafi *et al.* (1987), Igodan *et al.* (1988), Ali (1993) and many other researchers.

2.2.8 Relationship between Decision Making of the Client Systems and Adoption of innovations

Islam (1996) found that the decision of the farmer had no relationship with their extent of use of indigenous technical knowledge.

Dean et *al* (1958) found a positive relationship between the decision of the respondents and their adoption of recommended crop practices.

Chowdhury *et al.* (1968) also reported a positive relationship between the decision of the farmers and their adoption of improved agricultural practices.

2.3 The Conceptual Framework

The conceptual framework of Rosenbarg and Hovland (1960) was kept in mind while framing the structural arrangement for the dependent and independent variables. Indigenous technologies used by the rural women in agriculture farming considered as dependent variables which are supposed to be influenced and through interacting forces of many characteristics in her surroundings. It is not possible to work with all characteristics in a single study. It was therefore, necessary to limit the characteristics which contain age, education, family size annual income, farm size, organizational participation, extension media contact and decision making role. Depending on this discussion and the review of literature the conceptual framework of this study has been prepared which is diagrammatically presented in the Fig. 2.1
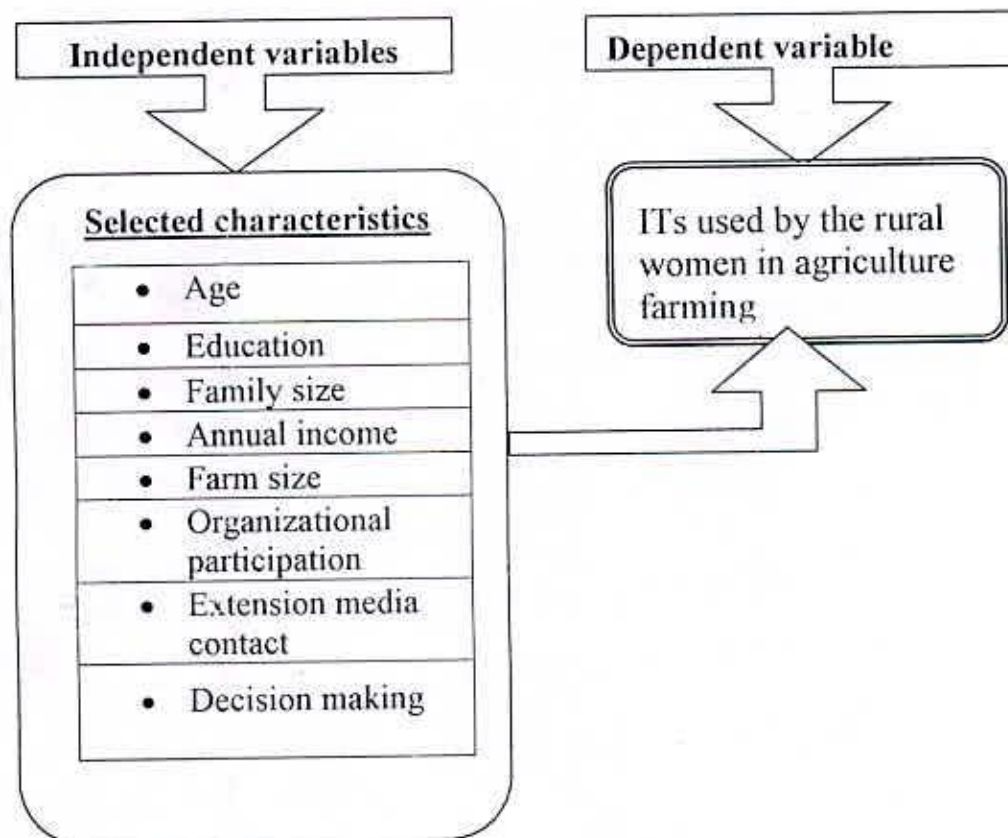
Fig: 2.1 Conceptual framework of the study

Chapter 3

Materials and Methods

CHAPTER 3

METHODOLOGY

In any scientific research, methodology plays an important role. To perform a research work systematically, careful consideration 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.

3.1 Locale and Population

The locale of the study was three selected villages of Kaharole upazila under Dinajpur district. The selected villages were Bhatgoan, Majhapara and Malgram. All of the rural women of these three selected villages were the population of the study. A total of 500 rural women constituted the population. An up-to-date list of rural women was collected with the help of concerned Union Parishad. A map of Kaharol upazila under Dinajpur district showing and another one showing the study area are presented in figures 3.1and 3.2 respectively.

3.2 Sampling Design

To prepare a representative sample, 20% of the population was selected randomly from each of the selected three villages. Thus, the sample size so drawn stood at 100. In addition to this, 10% of the sample was selected randomly and proportionately from the population of each of the selected three villages. Thus, the additional sample was drawn, which stood at ten farmwomen, were included in the reserve list. In case of any rural women included in the real sample was not present or found absent during the time of data collection, she was replaced from this list. The distribution of the population and sample including the reserve list is shown in table 3.1.

Fig. 3.1 A Map of Dinajpur District Showing the Kaharole Upazila
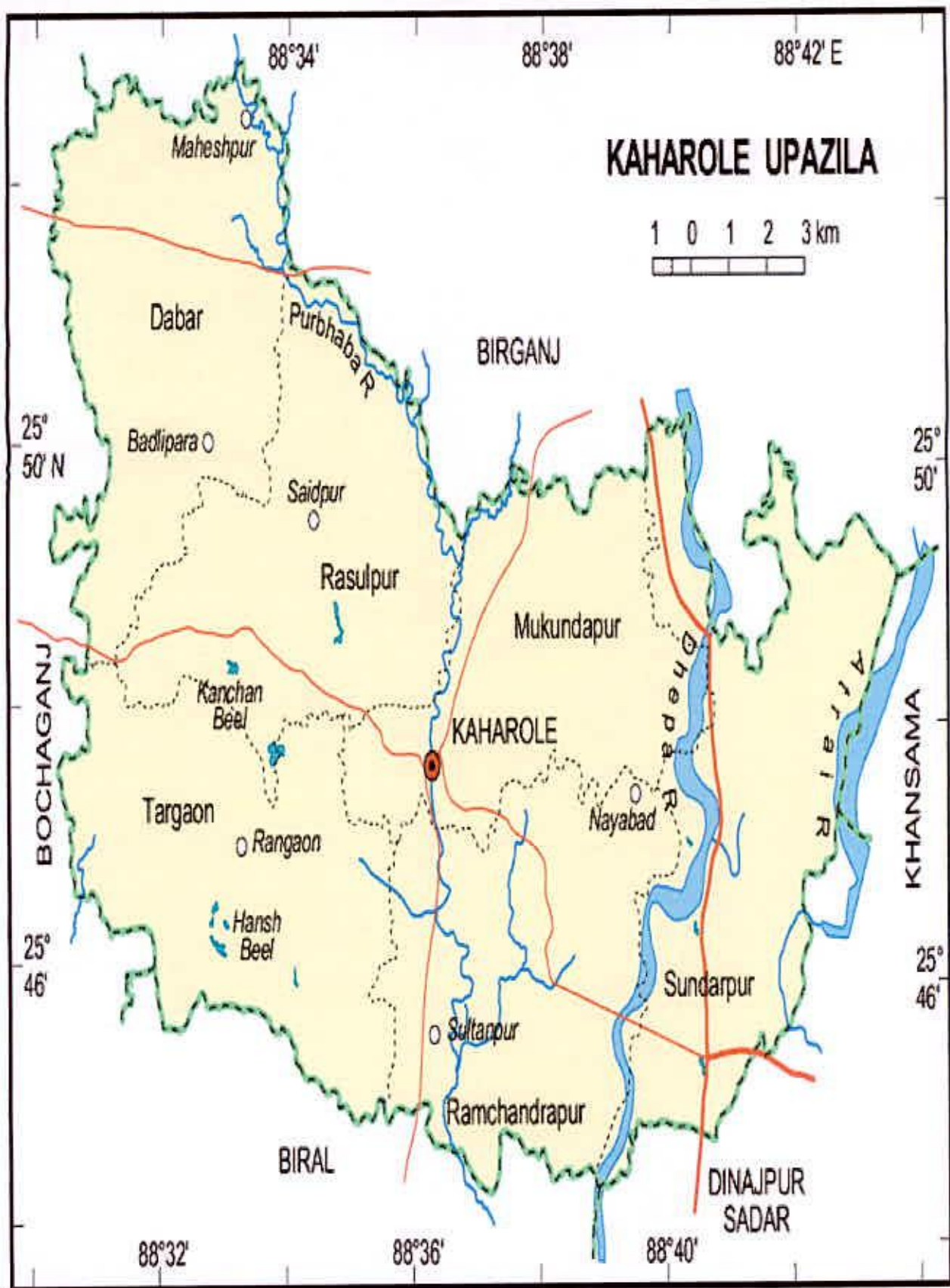
Fig. 3.2 A Map of Kaharole Upazila Showing the Study Area

Table 3.1 Distribution of Population and Sample of Rural Women in Three Selected Villages

Name of the villages	Total number of rural women	Sample size	Rural women included in reserve list
Bhatgoan	220	44	4
Majhapara	161	33	3
Malgram	116	23	3
Total	497	100	10

3.3 Variables of the Study and Their Selection

An independent variable is that factor which is manipulated by the researcher in his attempt to ascertain its relationship to an observed phenomenon. A dependent variable is that factor which appears, disappears or varies as the research introduces, removes or varies the independent variables (Townsend, 1953). The dependent variable is often called criterion or predicted variables, whereas independent variables is called the treatment, experimental or antecedent variable (Dalen, 1977).

For selection of dependent or independent variable, the researcher went through the past related literature and discussed with experienced researchers, teachers, local leaders and experts, in relevant fields of agricultural extension. Before setting the variables of the study, the researcher herself visited the study area and talked to the rural women. After discussions with the supervisor and co-supervisor and considering time, money and other sources available for the study, one dependent and eight characteristics of the rural women as independent variables. The dependent variable is: Indigenous Technologies Used by the Rural Women in Agriculture Farming. The eight independent variables were: i)age ii)level of education iii)family size iv)annual income of family v)farm size vi)organizational participation vii)extension media contact and viii)decision making.

3.3.1 Measurement of Independent Variables

Eight selected characteristics of the respondent women constituted the independent variables of this study. The procedure of measurement of the selected variables is presented below:

3.3.1.1 Age

Age of a rural woman was determined on the basis of actual years from her birth to the time of interview on the depend of her information. A score of one (1) was gained for each year of her age. Question on this variable appears in term 1 in the interview schedule (Appendix-A).

3.3.1.2 Level of Education

Level of education of a rural woman was determined by the years of schooling completed as indicated by her in response to item 2 of the interview schedule (Appendix A). A score of one (1) was gained for her every year of schooling completed. If a rural woman did not know how to read and write, her education score was taken as zero(o) but could sign her name only then she got a score of (0.5), 1 for class one, 2 for class two and so on.

3.3.1.3 Family Size

Family size of a rural woman was determined on the basis of actual number of members in her family including herself, her husband, children, brothers, sisters. parents and other person who jointly live and ate together during the time of interviewing.

3.3.1.4 Annual Income

Annual income of a rural woman was determined by computing an "Annual income score" depending on the total yearly earnings in taka from agriculture and other funds by herself and other members of her family as set in response to item 4 of the interview schedule (Appendix-A). She was asked to indicate the total income of her family from crop production, livestock rearing, poultry rising, fish culture, services, business, labor and other sources. The incomes

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from these sources were added together for computation of annual income score. A score of (1) was assigned for each one thousand taka.

3.3.1.5 Farm Size

The farm size of the rural woman was computed in hectares applying the following formula:

$$FS = A_1 + A_2 + A_5 + A_6 + A_7 + A_8 + 0.5(A_3 + A_4)$$

Where

$$
\begin{aligned}
Fs &= \text{Farm size} \\
A_1 &= \text{Homestead area} \\
A_2 &= \text{Own land under own cultivation} \\
A_3 &= \text{Land given to others on borga} \\
A_4 &= \text{Land taken from others on borga} \\
A_5 &= \text{Land taken from others on lease} \\
A_6 &= \text{Own pond} \\
A_7 &= \text{Fallow land} \\
A_8 &= \text{Others land}
\end{aligned}
$$

Question on this variable may be seen in item 5 of the interview schedule (Appendix-A).

3.3.1.6 Organizational Participation

Organizational participation of a rural woman was determined depending on the nature of her involvement and duration of participation in different organizations is working in the study area. The researcher identified nine such

organizations as shown in item 6 in the interview schedule (Appendix A).For computing organizational participation score of the respondents. The following formula was used:

For computing organizational participation score, a formula used by Parveen (1995) was followed. The formula was:

Where,

A = Activities score

D = Duration score

Organizational participation scores were gained in the following manner for participation of a rural woman in each organization:

Nature of participation	Scores assigned
Not participation	0
General member	1
Executive committee member	2
Executive committee officer	3

Duration scores were gained in the following manner:

Duration of participation	Scores assigned
Nil period	0
Up to 3 years	1
4-6 years	2
7 years and above	3

Organizational participation score of a rural woman was determined by adding the scores depending on the above mentioned formula for her participation in the following organization.

3.3.1.7 Extension Media Contact

The extension media contact score was computed for each rural woman depending on the extent of his contact with 12 selected media as ascertained from his responses to item no. 7 in the interview schedule.

A four-point rating scale ranging from "not at all" to frequently" was developed for this purpose. The scoring technique used for computing the media contact score of respondent is given below:

Nature of extension contact	Scores assigned
Not at all	0
Rarely	1
Occasionally	2
Frequently	3

Extension media contact score was calculated by summing the scores of all the twelve communication media. Extension media contact score could range from o to 36, where zero (o) indicated no media contact and 21 indicated maximum media contact.

3.3.1.8 Decision Making

Decision making means taking active participation of her families on different aspects like as crop cultivation, crops on different fields, to use high yielding variety in their field, given decision to use cow dung in their field, taking decision on land lease, selling own land, selling agricultural goods, buying family household goods, to receive credit from organization and taking decision on her son/daughter marriage.

Ten statements as indicated in item 8 in the interview schedule (Appendix-A) were thus selected. The statements were arranged randomly in the schedule to avoid psychological bias of the respondents.

The respondents were asked to indicate for each opinion whether they gave "regularly", "frequently", "occasionally", "rarely", "not at all" with the opinion. Scores were assigned to these responses in the order of 4, 3,2,1,0 respectively. Decision making score could range from 0-40 where 0 indicates no decision and 40 indicate highest decision.

3.3.2 Measurement of Dependent Variable

The present study includes only one dependent variable – Indigenous technologies used by the rural women in agriculture farming. This variable was measured by computing indigenous technologies use score by adopting the scale developed by Islam (1996).Twenty indigenous technologies were selected on the basis of field survey and discussed with the rural women of the study area. These twenty indigenous technologies were selected to determine the extent of use of indigenous technologies by the rural women. The respondents were question to indicate their extent of use to each of the 20 indigenous technologies along a five-point rating scale: "regularly", "frequently", "occasionally", "rarely", "not at all". Scores were assigned to these responses in the order of 4, 3, 2, 1 and 0 respectively.

Applying the above rating scale, score on the "extent of use of indigenous technologies" for an individual respondent was determined by summing up the scores for all the 20 enlisted indigenous technologies as sets in schedule item-9. The "extent of use of indigenous technologies" score for individual rural women could range from 0 to 80 where 0 indicates no use of indigenous technologies and 80 indicate the use of highest level.

An indigenous technologies use index (ITUI) was calculated to examine the extent of use of individual indigenous technologies by the rural women. This (ITUI) was calculated by using the following formula:

$$(ITUI)= N_1 X_4 + N_2 X_3 + N_3 X_2 + N_4 X_1 + N_5 X_0$$

Where, (ITUI) = Indigenous technologies use index

N_1 = Number of rural women used a particular IT regularly

N_2 = Number of rural women used a particular IT frequently

N_3 = Number of rural women used a particular IT occasionally

N_4 = Number of rural women used a particular IT rarely

N_5 = Number of rural women not used a particular IT

The ITUI for each of the Indigenous technologies could range from 0 to 400, o being the lowest and 400 being the highest level of ITUI score.

3.4 Statement of Hypothesis

As defined by Goode and Hatt (1952) 'A hypothesis is a proposition, which can be put to a test to determine its validity.' It may prove correct or incorrect of a proposition. A null hypothesis states that there is no relationship between the variables. If a null hypothesis is rejected on the basis of a statistical test, it is assumed that there is a relationship between the concerned variables.

The following hypothesis was formulated to explore the relationships between the dependent and independent variables. The research hypothesis for this study was:

"There is a relationship between each of age, education, family size, annual income, farm size, organizational participation, extension media contact, decision making of the rural women and their use of indigenous technologies in agricultural farming".

For testing this hypothesis statistically, they were transformed into null form as follows:

"There is no relationship between each of age, education, family size, annual income, farm size, organizational participation, extension media contact, decision making of the rural women and their use of indigenous technologies in agricultural farming".

3.5 Research Instrument for Data Collection

An interview schedule was used as the data gathering instrument for this study. The researcher prepared an interview schedule keeping the objectives of the study in view. The questions and statements content in the schedule were simple, direct and easily understandable by the rural women without giving rise to any doubt and misunderstanding in their mind. The schedule was prepared in simple for clear understanding of the respondents.

The interview schedule is prepared in Bangla for easy understanding on the part of respondents. The draft interview schedule was pre-tested with fifteen women in actual field situation before finalizing the same for collection of data. Necessary corrections, additions, alterations, rearrangements and adjustments were made in the schedule based on the basis of the experiences gained during data collection. The interview schedule was then cyclostyle in its final form for the collection of data. An English version of the interview schedules are enclosed at Appendix-A.

3.6 Collection of Data

Data were collected personally by the researcher himself through face to face interview. Interview was usually conducted in respondents' house during their leisure period. Desired rapport was established by the researcher with the respondent. However, if any respondent failed to understand any question, the researcher took necessary to explain the matter.

No serious difficulty was faced in data collection. Rather, the researcher received an excellent cooperation from the respondents. Besides the people in the community rendered possible assistance especially by informing the respondents for interview in advance and locating the house of respondents. Data for this study were collected through personal interview by the researcher himself during January1, 2008 to February2, 2008.

3.7 Compilation of Data

After completion of field survey, data from all the interview schedules were coded, compiled, tabulated and analyzed in accordance with the objectives of the study. In this process, all the responses in the interview schedules were given numerical coded values. Local units were converted into standard units and qualitative data were converted into quantitative data by means of suitable scoring wherever necessary. The responses to the questions in the interview schedules were transferred to a master sheet to facilitate tabulation.

3.8 Categorization of Respondents

For describing the different characteristics, the respondents were classified into various categories. The categorizations of respondents were made in three ways. Firstly, the characteristics of rural women such as age, level of education, and annual income, were classified in accordance with the procedure followed by BBS. Secondly, the data having normal distribution were categorized in accordance with the mean value plus minus half standard deviation. Thirdly, the character of the rural women farm size classified in accordance with the procedure followed by the DAE (1995). In addition, common sense, logic, social context and reality of the situation were also taken consideration during categorization of respondents. The personal experience of the researcher as well as other experts decisions were also taken into consideration in this regard.

3.9 Statistical Analysis

Statistical measures such as number and percentage distribution, rank, range, mean, and standard deviation were used in describing the dependent and independent variables of the study. For easily understanding, tables and graph were also used in presenting the data. For exploring the relationships between selected characteristics of the rural women with their extent of use of ITs, Pearson's product-moment correlation method was used. Five-percent (0.05) level of probability was used as a basis for curtail any null hypothesis.

Chapter 4
Results & Discussions

CHAPTER 4

RESULTS AND DISCUSSIONS

In this Chapter findings of the study and their logical interpretations have been presented according to the objectives of the study. Results have been discussed in relation to other similar studies wherever these were applied. The chapter has been divided into five sections. The first section deals with the list of (ITs) being used by the rural women in study area. The second section deals with selected characteristics of the rural women. The third section deals with the extent of use of Indigenous Technologies (ITs) by the rural women. The fourth section deals with the reasons for the use of (ITs) in farming while the fifth section reveals the relationships between the selected characteristics of the rural women and their use of Indigenous Technologies (ITs).

4.1 Selected Characteristics of the Rural Women

The eight selected characteristics of rural women included their age, education, family size, annual income, farm size, organizational participation, extension media contact, and decision making. The salient features of these characteristics are shown in Table 4.1.

Table 4.1 Descriptive Statistics and Salient Features of Rural Women Characteristics

Characteristics	Measuring unit	Possible range	Observed range
Age	Years	-	16-70
Education	Score	-	0-15
Family size	Number	-	03-09
Annual income	Rated score	-	09-200
Farm size	Hectare	-	.02-4.38
Organizational participation	Scale score	-	.00-12
Extension media contact	Scale score	0-36	.00-15
Decision making	Scale score	0-40	07-40

4.1.1 Age

The age of the respondents ranged from 16-70 years, the average being 35 years with a standard deviation of 10.62. Based on their observed distribution of age, the respondents were classified into three categories as it appears in Table 4.1.1

Table 4.1.1 Distribution of the Rural Women According to Their Age

Category	Respondents		Mean	Standard deviation
	Number	Percent		
Young-aged (up to 34)	49	49		
Middle-aged (35-52)	46	46	35	10.62
Old-aged (above 52)	05	05		
Total	100	100		

Data presented in Table 4.1.1 shows that the 46 percent of the respondents belonged to middle aged category as compared to 49 percent of them being young and only 5 percent old. This leads to the understanding that 95 percent of the respondents were being young and middle aged groups. Comparatively young and middle aged women are energetic and they are very interested likely to gain experience in farming and consequently might have played a role in decision making regarding the use of ITs in their farming.

4.1.2 Education

Education scores of the respondents ranged from 0 to 15, the average being 5.32 with a standard deviation of 4.02. The respondents were placed under five categories according to their level of education. Table 4.1.2 reveals the distribution of the respondents in accordance with their education.

Table 4.1.2 Distribution of the Rural Women According to Their Education

Category	Respondents		Mean	Standard deviation
	Number	Percent		
Illiterate (0)	06	06		
Can sign only (0.5)	19	19		
Primary (1-5)	27	27	5.32	4.02
Secondary (6-10)	42	42		
Above secondary	06	06		
Total	100	100		

More than (75 percent) of the rural women had education on different levels. Only 6 percent of them had no education and 19 percent who can sign their name only. This truly pasteurizes the gradual increase in the country's literacy rate since independence. However, the literacy rate of the respondents higher than that of the national average of 52.8 percent (BBS, 2001).It follows from the findings that literacy rate has been quite well in the study area. It is revealed that educated women are more progressive, innovative and have ability to manage their farm activities more efficiently.

4.1.3 Family Size

High population density is a usual phenomenon in Bangladesh. However, the family size of the respondents in the study area ranged from 3-9 having an average of 5.07 and standard deviation of 1.69. Distribution of the respondents according to their family size has been shown in Table 4.1.3.

Table 4.1.3 Distribution of the Rural Women According to Their Family Size

Category	Respondents		Mean	Standard deviation
	Number	Percent		
Small family (up to 5)	66	66		
Medium family (6-7)	24	24	5.07	1.69
Large family (above 8)	10	10		
Total	100	100		

Table shows that 66 percent of the respondents were small family while 24 percent of the respondents were medium family and only 10 percent of the respondents were large family. Thus, the majority (90 percent) of the women had small to medium family. The average family size (5.07) in the study area was higher than that of the national average which is 4.8 (BBS, 2002). This may be due to the low awareness among the respondents and family planning activities was not enough in the study area.

4.1.4 Annual income

Annual income scores of the rural women ranged from 09-200 with an average of 65.05 and standard deviation, 32.88. The distribution of the rural women in different categories on the basis of their annual income has been shown in Table 4.1.4.

Table 4.1.4 Distribution of the Rural Women According To Their Annual Income

Category	Respondents		Mean	Standard deviation
	Number	Percent		
Very low income (up to 57)	55	55		
Low income (58-105)	33	33		
Medium income (106-153)	09	09	65.05	32.88
High income (153)	03	03		
Total	100	100		

The 55 percent and 33 percent of the respondents were very low to low income groups as compared only 9 and 3 percent of the respondents were medium to high income groups respectively. The national average per capita income of the country is TK.14961 (BBS, 2001) according to the current exchange rate. Since the greater proportion (88 percent) of the rural women were very low to low income groups, it is logical to assume that they had limited access to modern high-cost technologies.

4.1.5 Farm size

The total farm size of the respondents varied from 0.02-4.38 hectares with an average of 1.03 hectares and standard deviation 0.74. Depending on the farm size, the respondent was classified into four categories as shown in Table 4.1.5

Table 4.1.5 Distribution of the Rural Women According To Their Farm Size

Category	Respondents		Mean	Standard deviation
	Number	Percent		
Marginal farm (up 1.11)	68	68		
Small farm (1.12-2.2)	24	24		
Medium farm (2.3-3.29)	06	06	1.03	0.74
Large farm (3.29)	02	02		
Total	100	100		

The highest proportion (68 percent) of the respondents had marginal farm size as compared to 24 percent of them had small farm while 6 and 2 percent respondents had medium to large farm. More than (92 percent) of the respondents had fallen under marginal to small categories. The average farm size of the women was 1.03 hectares which was higher than the national average of 0.68 hectare (BBS. 2002).

Land is one of the important factors of production (land, labor, capital, organization) having important roles in many innovation-decision issues including the question of compatibility of a particular innovation. It indicates that majority of the family's possessed small amount of land. Housewives of the small and marginal farms are more active and involved in different productive activities to support family expenses and nutrition.

4.1.6 Organizational participation

Organizational participation score of the respondents ranged from 0-12 with an average and standard deviation of 5.43 and 3.86. According to the participation scores, the respondents were classified into three categories such as "no participation ", "low participation " and "moderate participation ".

Table 4.1.6 Distribution of the Rural Women According To Their Organizational Participation

Category	Respondents		Mean	Standard deviation
	Number	Percent		
No participation (0)	22	22		
Low participation (1 – 7)	41	41	5.43	3.86
Medium participation (8)	37	37		
Total	100	100		

Analysis of data presented in Table 4.1.6 reveal that 78 percent of the respondents had some organizational participation from low to moderate. Interestingly, there is no highly participated category. Only 22 percent respondents had no participation. The participation tendency seems to be satisfactory in the study area.

Organizational participation helps individual to find out solution to their own problems as well as other social problem. More participation in organizational activities could create coordinated capability and share ideas, information and experiences, which might help them to solve their own problems. The organizational participation also helps them to find out new ITs being practiced by others and make decision in this regard. But a great majority of the rural women in the study area were found low to moderate participation in organization. The GOs and NGOs dealing with development programs for the rural women should take necessary steps of these aspects.

4.1.7 Extension media contact

The scores of extension media contact of the respondents ranged from 0to15 with an average of 5.43, and standard deviation of 2.87. Based on the observed individual scores, the respondents were classified into the four categories i.e. no contact, low contact, medium contact and high contact. The distribution has been shown in the Table 4.1.7

4.1.7 Distribution of the Rural Women According To Their Extension Media Contact

Category	Respondents		Mean	Standard deviation
	Number	Percent		
No media contact (0)	01	01		
Low media contact (1-6)	71	71		
Medium media contact (7-11)	23	23	5.43	2.87
High media contact (above 12)	05	05		
Total	100	100		

About (71 percent) of the respondents had low media contact while only 23 percent of them had medium contact. So, it could be concluded that the respondents of the study area do not get sufficient information about the new technology of modern cultivation.

4.1.8 Decision making

Decision making scores of the respondents varied from 07-40 with an average of 23.33 and standard deviation, 7.77. On the basis of their decision making scores the respondents were classified into three categories. The distribution has been shown in the Table 4.1.8

Table 4.1.8 Distribution of the Rural Women According To Their Decision Making

Category	Respondents		Mean	Standard deviation
	Number	Percent		
Low decision (up to 18)	31	31		
Moderate decision (19-29)	43	43	23.33	7.77
High decision (above 29)	26	26		
Total	100	100		

The highest proportion (43 percent) of the respondents had moderate decision compared to (26percent) of them having high decision and (31 percent) had low decision. It seems from the above observations that a satisfactory level of decision existed among the rural women of the study area.

4.2 Identification of Commonly Used ITs

ITs differ widely from one country to another, from one region to another, and even from one place to another in the same region due to their uniqueness to a particular culture and agro ecosystem. Before selecting this ITs researcher went to the field level study. At first he organized at a FINA (Farmers Information Needs Assessment) meeting and there he discussed with the rural women about which ITs they are practiced regularly. Secondly the researcher went to the various researcher, extension workers, development workers, policy makers and discussed with them about this matter and also he searched internet, journal and different relevant thesis. The researcher finally selected this twenty ITs. Important ITs being used by the rural women of the study area are presented in the following Table.

Table 4.2 Identified Some Common ITs in Study Area

Sl. No.	Name of ITs
01	Storing Cereals, pulses and oil seeds by mixing with the dust of dried neem leaves to repeal stored grain pest
02	Cereals, pulses and oil seed are put in pitcher, earthen pot, duhli, motka in order to control insect infestation
03	Potatoes preserve in sand layers for long time storing
04	Using double polythene bags to store grains
05	Cutting upper portion leaf & twig of bottle gourd for better growth of trees, much fruiting, prevent fruit dropping and also to eat for vegetables
06	Relaying potato, mustard, wheat, bitter gourd/sweet gourd +chili in a sequence
07	Spreading ash in leafy vegetables to control insect (mainly aphid) and better growth of vegetables
08	Applying the excreta of poultry bird at country bean and cucurbit plant pit because of better plant growth
09	Mulching garlic fields with straw/water-hyacinth
10	Applying fish-cleaning water at bean and cucurbit plant bases for enhanced and better growth of country bean and cucurbit plants
11	Visiting the potato field early in the morning to detect and to kill potato cutworm
12	Making narrow incisions on the stem of papaya plants for better fruiting and prevent fruit-dropping
13	Practicing hand pollination in kakrol flowers for large, round and uniform fruits
14	Applying diluted cattle urine to control insect
15	Applying muddy soil collected from the bottom of the pond to improve the fertility of surface soil
16	Using bishkatali(Polygonum hydropiper) to store Cereals, pulses and oil seed
17	Intercropping garlic and potato to minimize pest attack
18	Spreading tobacco dusts over the field to control insects
19	Setting up bamboo sticks, branches of trees etc. in vegetable field to let the birds sit and eat away insects
20	Using the skeleton of dried bottle gourd to store different types of seeds.

4.3 Extent of Use of (ITs) By the Rural Women

The present study related only one dependent variable: the extent of use of Indigenous Technologies (ITs) by the rural women. The ITs used by the rural women in different sectors like crop, fish and livestock production but here I discussed only about the crop production in their farming.

The scores on the extent of use of ITs by rural women ranged from 14 to 49 against a possible range of 0 to 80. The distribution shows in table 4.3.1.

Table 4.3.1 Distribution of the Rural Women According to their Use of ITs

Category	Respondents		Mean	Standard deviation
	Number	Percent		
Low user (up to 25)	25	25		
Moderate user (26 to 37)	45	45	31.70	8.12
High user (above 37).	30	30		
Total	100	100		

The highest proportion (45 percent) of the respondents was moderate users compared to (30 percent) of them being high users and (25 percent) low users.

Table 4.3.2 presented below contains a brief description of the identified ITs along with their number of citations on the extent of use of the individual ITs. Based on the findings, Indigenous Technology Use Index (ITUI) for each of the ITs along with their associated ranks appears in Table 4.3.2

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Table 4.3.2 List of Identified ITs Used by the Rural Women in the Study Area

Sl. No	Indigenous Technologies(ITs)	Citation (N=100)						
		Regularly	Frequently	Occasionally	Rarely	Not at all	(ITs)Use Index	Rank
1	Cutting upper portion leaf & twig of bottle gourd for better growth of trees, much fruiting, prevent fruit dropping and also to eat for vegetables	66	19	5	4	6	335	1
2	Spreading ash in leafy vegetables to control insect (mainly aphid) and better growth of vegetables	37	42	16	5	0	311	2
3	Applying the excreta of poultry bird at country bean and cucurbit plant bases because of better plant growth	39	27	17	8	9	264	3.5
4	Setting up bamboo sticks, branches of trees etc. in vegetable field to let the birds sit and eat away insects	27	40	13	10	10	264	3.5
5	Visiting the potato field early in the morning to detect and to kill potato cutworm	17	35	29	7	12	238	5
6	Using the skeleton of dried bottle gourd to store different types of seeds.	41	13	2	2	42	209	6
7	Using double polythene bags to store grains	26	19	19	7	29	209	7
8	Spreading tobacco dusts over the field to control insects	7	36	8	25	24	177	8
9	Cereals, pulses and oil seed are put in pitcher, earthen pot, duhli, motka in order to control insect infestation	22	4	33	7	34	153	9
10	Potatoes preserve in sand layers for long time storing	25	7	13	19	36	146	10

11	Relaying potato, mustard, wheat, bitter gourd/sweet gourd +chili in a sequence	13	38	17	13	19	140	11
12	Applying fish-cleaning water at country bean and cucurbit plant pit for enhanced and better growth of bean and cucurbit plants	13	9	13	24	41	129	12
13	Storing Cereals, pulses and oil seed by mixing with the dust of dried neem leaves to repeal stored grain pest	18	3	15	4	60	115	13
14	Intercropping garlic and potato to minimize pest attack	8	10	14	4	64	94	14
15	Applying muddy soil collected from the bottom of the pond to improve the fertility of surface soil	4	13	14	9	60	92	15
16	Mulching garlic fields with straw/water-hyacinth	2	5	6	14	73	49	16
17	Practicing hand pollination in kakrol flowers for large, round and uniform fruits	1	0	5	34	60	48	17
18	Making narrow incisions on the stem of papaya plants for better fruiting and prevent fruit-dropping	0	0	13	20	67	46	18
19	Applying diluted cattle urine to control insect	0	0	5	3	90	13	19
20	Using bishkatali(Polygonum hydropiper) to store Cereals, pulses and oil seed	2	0	0	4	94	12	20

Among the twenty (20) selected ITs, "Cutting upper portion leaf & twig of bottle gourd for better growth of trees, much fruiting, prevent fruit dropping and also to eat for vegetables" had highest extent of use by the rural women and "Spreading ash in leafy vegetables to control insect (mainly aphid) and better growth of vegetables" had second highest extent of use by the rural women". The value of ITUI shows that rural women use more ITs related to their homestead gardening trees and crops health.

4.4 Relationship between the Selected Characteristics of the Rural Women And their Use of ITS

To explore the relationships between the selected characteristics of the rural women and their use of ITS "Pearson's Product-Moment Correlation Co-efficient 'r' has been used.

A hypothesis was rejected when the observed 'r' value was greater than the tabulated value of 'r' at 0.05 levels of probability.

As mentioned earlier, the eight selected characteristics of the rural women were the independent variables of the study. The variables were age, education, family size, annual income, farm size, organizational participation, extension media contact and decision making. The dependent variable is indigenous technologies used by the rural women in agriculture farming. The results of the correlation analysis between the independent and dependent variables shown in Table 4.5. In a bid to achieve the said intercorrelations the correlation coefficients among the variables were arranged in matrix from which in Appendix-B.

Table 4.4 Co-efficient of Correlation between Selected Characteristics of the Rural Women and their Extent of Use of ITs

Selected characteristics of the rural women (Experimental Variables)	Predictive Variable	Computed value of 'r'
Age	Indigenous Technologies used by the rural women in agricultural farming	-0.079 ^{NS}
Level of education		-0.216 *
Family size		0.125 ^{NS}
Annual income		0.374**
Farm size		0.262**
Organizational participation		0.122 ^{NS}
Extension contact		0.229*
Decision making role		0.354**

NS = Net significant

* = Significant at 5% level of probability

** = Significant at 1% level of probability

5% level with 98 freedom =	0.196
1% level with 98 freedom =	0.257

Out of eight variables, the correlation co-efficient of three variables like age, family size and Organizational participation being not significant at 0.05 level, the concerned null hypothesis could not be rejected and hence, and it was concluded that none of these three variables had any relationships with the use of ITs by the rural women. The correlation co-efficient of one variable like level of education had negatively relationship at 0.05 levels of significance. The correlation co-efficient of three variables like annual income, farm size, decision making role are positively significant at 0.01 level of significance while the correlation co-efficient of one variable like extension contact is positively significant at 0.05 level of significance.

4.4.1 Level of Education of the Rural Women and Their Use of ITs

The relationship between level of education of the respondents and their extent of use of ITs was explored by testing the following null hypothesis

"There is no relationship between the education of the rural women and their extent of use of ITs"

The co-efficient of correlation calculated was found to be -0.216. This led to the following observations in connection with the relationship between the variables under consideration:

"Firstly, the relationship showed a negative trend. Secondly, the computed value of 'r' (-0.216) was significant at 0.05 level of probability and with 98 degrees of freedom".

On the basis of the above findings, the concerned null hypothesis was rejected meaning that the education of the respondents was related to their extent of use of ITs. The negative trend, however, implied that extent of use of ITs was decreased with the increase of education.

Education helps individuals gain knowledge and skill in different cognitive contents and develop positive attitudes. The education level of rural women ultimately increases their power of observation and decision making. Also educated women are more likely to come in contact with mass media,

especially printing materials. Thus they gain knowledge and develop favorable attitude towards the new cultivation method.

4.4.2 Annual Income of the Rural Women and Their Use of ITs

The relationship between annual income of the respondents and their extent of use of ITs was explored by testing the following null hypothesis

"There is no relationship between the annual income of the rural women and their extent of use of ITs".

The co-efficient of correlation calculated was found to be +0.374. This led to the following observations in connection with the relationship between the variables under consideration:

"Firstly, the relationship showed a positive trend. Secondly, the computed value of 'r' (+0.374) was found to be greater than the tabulated value 'r' (0.257) with 98 degrees of freedom even at 0.01 level of probability". Hence, the relationship was highly significant.

Thus, the null hypothesis was rejected and the researcher concluded that annual income had significant positive relationship with their extent of use of ITs. Thus, indicated that high annual income makes strong economic base of family and contributes to the performance of ITs in crop cultivation more efficiently which ultimately help in gaining knowledge in different aspects by the rural women.

4.4.3 Farm Size of the Rural Women and Their Use of ITs

The relationship between farm size of the respondents and their extent of use of ITs was explored by testing the following null hypothesis

"There is no relationship between the farm size of the rural women and their extent of use of ITs"

The co-efficient of correlation calculated was found to be +0.262. This led to the following observations in connection with the relationship between the variables under consideration:

"Firstly, the relationship showed a positive trend. Secondly, the computed value of 'r' (+0.262) was found to be greater than the tabulated value 'r' (0.257) with 98 degrees of freedom even at 0.01 level of probability". Hence, the relationship was highly significant.

Thus, the null hypothesis was rejected and the researcher concluded that farm size had significant positive relationship with their extent of use of ITs. The rural women with large farm size have higher extension media contact that might have enabled them to gain knowledge about ITs and change their attitude towards the use of ITs. They might have developed proper attitudes towards the protection of environment from the harmful affects of the use of modern technologies (use of pesticide, chemical fertilizer etc). Thus, the uses of ITs were higher in rural women who have large farms.

4.4.4 Extension Contact of the Rural Women and Their Use of ITs

The relationship between extension contact of the respondents and their extent of use of ITs was explored by testing the following null hypothesis

"There is no relationship between the extension contact of the rural women and their extent of use of ITs"

The co-efficient of correlation calculated was found to be +0.229. This led to the following observations in connection with the relationship between the variables under consider

"Firstly, the relationship showed a positive trend. Secondly, the computed value of 'r' (+0.229) was found to be greater than the tabulated value 'r' (0.196) with 98 degrees of freedom even at 0.05 level of probability". Hence, the relationship was significant.

Thus, the null hypothesis was rejected and the researcher concluded that extension contact had significant positive relationship with their extent of use of ITs.

The rural women with higher media exposure had possessed higher knowledge on use of ITs. Media exposure enables individual to come more in contact with different kinds of information of cognitive, affective and psychomotor domains. These stimuli, after being processed by the various senses of the rural women, are quite able to impart knowledge on the various innovations. Thus, it was possible to gain more knowledge with the increase of contact with various media.

4.4.5 Decision Making Role of the Rural Women and Their Use of ITs

The relationship between decision making role of the respondents and their extent of use of ITs was explored by testing the following null hypothesis *"There is no relationship between the decision making role of the rural women and their extent of use of ITs"*

The co-efficient of correlation calculated was found to be +0.354. This led to the following observations in connection with the relationship between the variables under consideration:

"Firstly, the relationship showed a positive trend. Secondly, the computed value of 'r' (+0.354) was found to be greater than the tabulated value 'r' (0.257) with 98 degrees of freedom even at 0.01 level of probability". Hence, *the relationship was highly significant.*

Thus, the null hypothesis was rejected and the researcher concluded that decision making role had significant positive relationship with their extent of use of ITs. Rural women are active and energetic. They want to economic solvency in their family and as a result they had done some traditional cultivation practices in their homestead gardening and also their field level cultivation.

Chapter 5
Summary, Conclusion & Recommendations

CHAPTER 5

SUMMARY, CONCLUSION AND RECOMMENDATION

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

5.1 Summary of Findings

The present study was undertaken with the following objectives

- To determine some selected characteristics of the rural women
- To identify the commonly used ITs by rural women
- To examine the extent of use of indigenous technologies by the rural women in their farming,
- To explore the relationship between selected characteristics of the rural women and their extent of use of ITs in agricultural farming, and

Sundarpur union of Kaharole upazila under Dinajpur district was the locale of the study. A sample of 100 respondents was drawn from a population of 500. Data were collected from January 1, 2008 to February 2, 2008 using an interview schedule. However, the major findings of the study are summarized below:

5.1.1 Individual Characteristics of the Rural Women

Age: It was found that 49, 46 and 5 percent of the rural women were young, middle-aged, and old respectively. The mean age of the respondents was 35.00 years and 95 percent of them belonged to young and middle-aged categories.

Education: It was found that 6 percent of the rural women were illiterate and 19 percent of the rural women were can sign only while 27, 42 and 6 percent had primary, secondary, and above secondary level of education respectively.

The mean education score was 5.32 which are higher than that of the national average of 52.8 percent (BBS, 2001).

Family Size: It was found that 66 percent of the rural women were small family and 24 percent of the rural women were medium family while only 10 percent of rural women were large family. The mean score of the respondents was 5.07 and 90 percent of the family are small to medium size.

Annual Income: The percentages of rural women who belonged to the very low, low, medium and high income groups were 55, 33, 9 and 3 respectively. The average annual income score was 65.05.

Farm Size: The percentages of rural women who owned Marginal, small medium, and large farms were 68, 24, 6 and 2 respectively. The average farm size was 1.03 hectares.

Organizational Participation: It was found that 22 percent, 41 percent, and 37 percent of the rural women had no, low, and moderate organizational participation respectively. As such, 78 percent of the rural women had low to moderate organizational participation. And the average organizational participation score was 5.43.

Extension Contact: It was revealed that 1 percent of the rural women had no media contact, 71 percent had low media contact, 23 percent had medium contact and 05 percent had high media contact. It was also found that the average media contact score was 5.43.

Decision Making: It was observed that 31 percent of the rural women had low decision as compared to 43 percent moderated and 26 percent high decision. And the average decision making score was 23.33.

5.1.2 Relationships between Independent Variables and Dependent Variables of the Respondents

5.1.2.1 Relationships between the Selected Characteristics of the Rural Women and their Extent of Use of ITs

Out of eight variables, the correlation co-efficient of three variables like age, family size and Organizational participation being not significant at 0.05 level, the concerned null hypothesis could not be rejected and hence, and it was concluded that none of these three variables had any relationships with the use of ITs by the rural women. The correlation co-efficient of one variable like level of education had negatively relationship at 5% level of significance. The correlation co-efficient of three variables like annual income, farm size, decision making role are positively significant at 1% level of significance while the correlation co-efficient of one variable like extension contact is positively significant at 5% level of significance.

5.2 Conclusions

Conclusions drawn on the basis of the findings of this study and their logical interpretation in the light of the other relevant factors are furnished below:

1. In the study area as many as twenty ITs have been identified which were mostly related to their homestead gardening trees and crops health. But the rural women, in many aspects, were not properly aware of the proper use of these ITs. Moreover, these seem to exist a lack of proper understanding among them about why and how to use these ITs. The results shows that the rural women could be benefited more if the ITs could be improved further through the process of their integration with modern scientific knowledge.

2. On the basis of their extent of use of ITs it was found that thirty percent of the rural women had high users of the selected indigenous technologies and their overwhelming majority that means seventy percent were moderate to low

users. These results lead to the conclusion that there is need to raise the awareness and knowledge levels of the rural women about the proper use of the ITs with a view to maintain environment friendly sustainable agricultural development in the study area.

3. Level of education of the rural women had a negative relationship with their use of ITs. The negative relationship implied that extent of use of ITs was decreased with the increase of education. Education helps individuals to gain knowledge and skill in different cognitive contents and develop positive attitudes. The education level of rural women ultimately increases their power of observation and decision making. Also educated women are more likely to come in contact with mass media, especially printing materials. Thus they gain knowledge and develop favorable attitude towards the new cultivation method.

4. Annual income of the rural women and their extent of use of ITs had a significant and positive relationship. Thus, indicated that high annual income makes strong economic base of family and contributes to the performance of ITs in crop cultivation more efficiently which ultimately help in gaining knowledge in different aspects by the rural women.

5. Farm size of the rural women and their extent of use of ITs had a significant and positive relationship. The rural women with large farm size have more extension media contact that might have enabled them to gain knowledge about ITs and change their attitude towards the use of ITs. The above facts lead to the conclusion that use of ITs are largely limited to the women having larger farm sizes. The policymakers and extension service provides need to have proper consideration on this fact.

6. Extension contact of the rural women and their extent of use of ITs had a significant and positive relationship. The rural women with higher media exposure had possessed higher knowledge on use of ITs. Media exposure enables individual to come more in contact with different kinds of information of cognitive, affective and psychomotor domains.

7. The researcher concluded that decision making role had significant positive relationship with their extent of use of ITs. Rural women are active and energetic. They want to economic solvency in their family and as a result they had done some traditional cultivation practices in their homestead gardening and also their field level cultivation.

8. Age, family size and organizational participation had no significant relationship with their extent of use of ITs. It may be concluded that age, family size and organizational participation of the rural women are not important factors for their extent of use of ITs.

5.3 Recommendations

5.3.1 Recommendations for Policy Implications

Based on the findings and conclusions of the study, the following recommendations are presented:

1. It is recommended that the research and extension organizations both GOs and NGOs should take necessary steps to increase positive attitude towards the use of ITs. Otherwise, the use of modern technologies will increase day by day and traditional cultivation system will be hampered.

2. The concerned organizations dealing with extension services in the fields of crop and livestock should undertake programs to increase the knowledge and understanding levels of the rural women through such methods as training, frequent farm and home visit and group discussion, etc.

3. The level of education of the rural women had negative significant relationships with their extent of the use of ITs. It is therefore, recommended that rural women can take advantage of different printed materials i.e. book, booklets, leaflets, posters, newspapers, etc. so that they can get more knowledge easily and can increase positive attitude towards the modern cultivation system. It is, therefore, recommended that GOs and NGOs should take necessary steps to increase positive attitude towards the use of ITs.

4. Annual income of the rural women had positive significant relationship with their extent of the use of ITs. It is, therefore, recommended that arrangement should be made by DAE and other concerned organization for increasing income of the rural women which would be helpful in improving the standard of living through their proper utilization of ITs.

5. Farm size of the respondents had positive significant relationship with their extent of the use of ITs for crop cultivation. It is therefore, recommended that fellow land should be cultivated. Co-operative farming system is recommended.

6. Extension media contact of the respondents had positive significant relationship with their extent of use of ITs. Thus, it is recommended that planned communication contact with more effective media be launched with the client system

5.3.2 Recommendations for Further Study

A small kind of study cannot provide all information for proper understanding of ITs used by the rural women in agriculture farming. Therefore, the following suggestions were put forward for further research:

1. The present study was conducted in sundarpur union of Kaharole upazila under Dinajpur district. It is recommended that similar research should be conducted in other areas of Bangladesh, which will be helpful for effective policy formulation.

2. This study investigated the relationship of eight selected characteristics of the rural women with their extent of use of ITs as dependent variables. But there are many other characteristics of these women, which may influence them to use ITs in farming. Therefore, it is recommended that further study would be conducted with other independent and dependent variables.

3. In the present study age, family size and organizational participation of the respondents had no significant relationships with their extent of use of ITs. In this situation further verification is necessary.

4. The present study was conducted on the use of ITs by the rural women in their agriculture farming. But in other aspects like human health, sanitation, natural resource management etc rural women may also have enriched possession of indigenous techniques, which may contribute to the natural balance of agriculture either directly or indirectly.
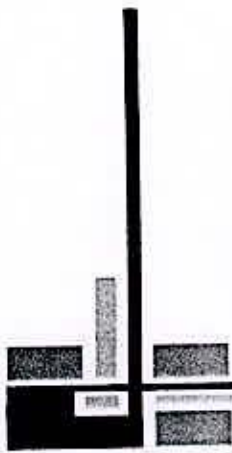
Chapter 7
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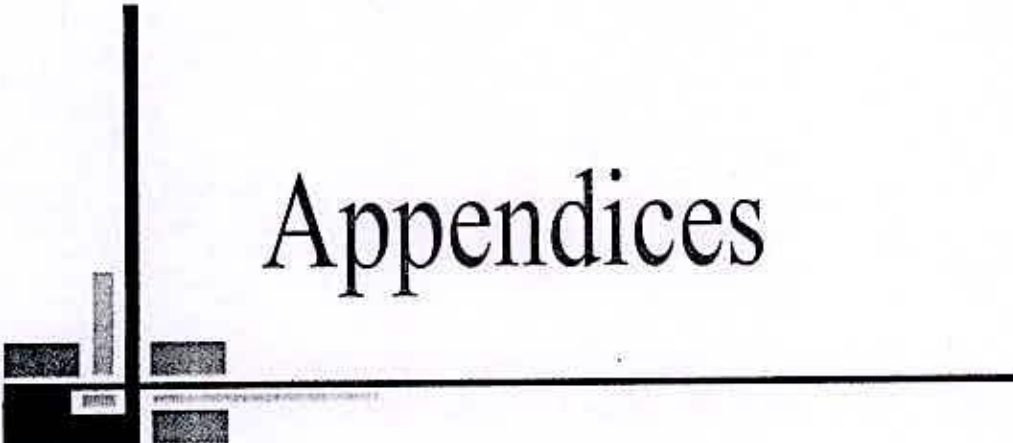Rahim, S.A. 1961. Diffusion and Adoption of Agricultural Practices. Technical Publication No.7. 2nd edition, Pakistan Academy for Rural Development, Comilla, East Pakistan: 8-9 and 37-38.

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Appendices

APPENDIX-A

(English Version of the Interview Schedule)

Department of Agricultural Extension and Information System

Sher-e-Bangla Agricultural University

Dhaka-1207

Indigenous Technologies Used by the Rural Women in Agriculture Farming.

(Please answer the following questions and put-check mark whenever applicable)

Name: -----   Sample no: -----

Father's Name\ Husband's Name: ------

Village: -----

Union: -----

Dist: -----

Please answer the following questions:

1. Age:

How old are you? ---------- Years.

2. Level of Education

Please mention your educational status

a. Can't read and write ( )

b. Can sign only ( )

c. Attended class up to ( )

3. Family Size:

Please mention the number of your family members (including yourself)

Type of Members	Number	
	Male	Female
a)Adult (more than 18 years)		
b)Pre-adult (5 to 18 years)		
c)Infant (less than 5 years)		
Total		

4. Annual income of Family:

Please furnish your and your family members' annual income from different sources

Sl. No	Source of income	Amount of taka
1.	Agriculture(crops)	
2.	Livestock	
3.	Poultry	
4.	Fish culture	
5.	Business	
6.	Service	
7.	Labor	
8.	Others(if any)	
Total		

5. Farm Size:

Please mention the area of your land according to tenure status

Sl. No	Type of land use	Area of land	
		Local unit	Hectare
1.	Homestead		
2.	Own land under own cultivation		
3.	Land given to others on borga		
4.	Land taken from others on borga		
5.	Land taken from others on lease		
6.	Own pond		
7.	Fellow land		
8.	Others		
	Total		

6. Organizational Participation:

Do you involve with any organization\ Institution?

Yes: -----   No: -----

If yes, please mention the nature and duration of your participation following organizations

Sl. No.	Name of the organizations	Nature of participation (with duration)			
		No participation	General member	Executive member	Executive officer
1.	Agricultural co-operative somity				
2.	NGOs Committee				
3.	Mohila club				
4.	Mohila samabay somity				
5.	Union chairman				
6.	Word member				
7.	School committee				
8.	Madrasa committee				
9.	Others				

7. Extension Media Contact:

Please mention the extent your level of communication with the following media

Sl. no	Communication media	Frequently	Occasionally	Rarely	Not at all
1.	Personal Contact				
	a. Ideal farmer/Neighbor	>5-6 times/month ( )	3-4 times/month ( )	1-2 times/month ( )	0 time/month ( )
	b. Friends and relatives	>5-6 times/month ( )	3-4 times/month ( )	1-2 times/month ( )	0 time/month ( )
	C. Farm input dealer	>5-6 times/month ( )	3-4 times/month ( )	1-2 times/month ( )	0 time/month ( )
	d. NGO worker	>12-13 times/year ( )	6-11 times/year ( )	1-5 times/month ( )	0 time/month ( )
	e. Sub Assistant Agricultural Officer(SAAO)	>12-13 times/year ( )	6-11 times/year ( )	1-5 times/month ( )	0 time/month ( )
	f. Agricultural Extension Officer(AEO)	>7-8 times/year ( )	4-6 times/year ( )	1-3 times/month ( )	0 time/month ( )

2.	Group Communication				
	a. Method demonstration	>5-6 times/month ( )	3-4 times/month ( )	1-2 times/month ( )	0 time/month ( )
	b. Result demonstration	>5-6 times/month ( )	3-4 times/month ( )	1-2 times/month ( )	0 time/month ( )
	c. Agricultural meeting	>5-6 times/month ( )	3-4 times/month ( )	1-2 times/month ( )	0 time/month ( )
3.	Mass Communication				
	a. Newspaper	>20-21 times/month ( )	10-19 times/month ( )	1-9 times/month ( )	0 time/month ( )
	b. Radio	>20-21 times/month ( )	10-19 times/month ( )	1-9 times/month ( )	0 time/month ( )
	c.Television	>10-11 times/month ( )	5-9 times/month ( )	1-4 times/month ( )	0 time/month ( )

8. Decision Making:

Please mention your opinion regarding the following decision making items-

Sl. no	Decision making items	Decision				
		Regularly	Frequently	Occasionally	Rarely	Not at all
1.	Taking decision on crop cultivation in a particular season					
2.	Make your opinion on different crops on different fields					
3.	Take decision to use HYV in your field					
4.	Taking decision to use cow dung in your field					
5.	Taking decision on land lease					
6.	Decision in selling own land					
7.	Taking decision in selling Agricultural goods in the market					
8.	Taking decision in buying family household goods					
9.	Take your decision to receive credit from a organization					
10.	Taking decision on your son/daughter marriage					

9. Extent of the Use of Indigenous Technologies (ITs) in Agricultural Farm:

Please indicate the extent to which you use and why you use the following (ITs) in your farm-

Sl. no	Indigenous Technologies	Extent of use				
		Regularly	Frequently	Occasionally	Rarely	Not at all
1.	Storing Cereals, pulses and oil seeds by mixing with the dust of dried neem leaves to repeal stored grain pest					
2.	Cereals, pulses and oil seed are put in pitcher, earthen pot, duhli, motka in order to control insect infestation					
3.	Potatoes preserve in sand layers for long time storing					
4.	Using double polythene bags to store grains					
5.	Cutting upper portion leaf & twig of bottle gourd for better growth of trees, much fruiting, prevent fruit dropping and also to eat for vegetables					
6.	Relaying potato, mustard, wheat, bitter gourd/sweet gourd +chili in a sequence					
7.	Spreading ash in leafy vegetables to control insect (mainly aphid) and better growth of vegetables					
8.	Applying the excreta of poultry bird at country bean and cucurbit plant pit because of better plant growth					
9.	Mulching garlic fields with straw/water-hyacinth					
10.	Applying fish-cleaning water at country bean and cucurbit plant bases for enhanced and better growth of bean and cucurbit plants					
11.	Visiting the potato field early in the morning to detect and to kill potato cutworm					
12.	Making narrow incisions on the stem of papaya plants for better fruiting and prevent fruit-dropping					
13.	Practicing hand pollination in kakrol flowers for large, round and uniform fruits					
14.	Applying diluted cattle urine to control insect					
15.	Applying muddy soil collected from the bottom of the pond to improve the fertility of surface soil					
16.	Using bishkatali (Polygonum hydropiper) to store Cereals, pulses and oil seed					
17.	Intercropping garlic and potato to minimize pest attack					
18.	Spreading tobacco dusts over the field to control insects					
19.	Setting up bamboo sticks, branches of trees etc. in vegetable field to let the birds sit and eat away insects					
20.	Using the skeleton of dried bottle gourd to store different types of seeds.					

Thank you for your co-operation

Signature of the
Interviewer with date

APPENDIX-B

CORRELATION MATRIX AMONG THE VARIABLES OF THE STUDY

VARIABLE	X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8	Y
X_1	1								
X_2	-.271**	1							
X_3	.404**	-.178 NS	1						
X_4	.141 NS	-.102 NS	.224*	1					
X_5	.078 NS	-.024 NS	.150 NS	.634**	1				
X_6	.123 NS	.040 NS	-.020 NS	.079 NS	.052 NS	1			
X_7	.123 NS	-.013 NS	.123 NS	.222*	.014 NS	.253*	1		
X_8	.001 NS	-.132 NS	.136 NS	.198*	.126 NS	.175 NS	.095 NS	1	
Y	-.079 NS	-.216*	.125 NS	.374**	.262**	.122 NS	.229*	.354**	1

NS =Correlation is not significant

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

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

X_1 = AGE
X_2 = LEVEL OF EDUCATION
X_3= FAMILY SIZE
X_4 = ANNUAL INCOME
X_5 = FARM SIZE
X_6 = ORGANIZATIONAL PARTICIPATION
X_7= EXTENTION CONTACT
X_8 = DECISION MAKING ROLE
Y = INDIGENOUS TECHNOLOGY USED BY THE RURAL WOMEN