ADOPTION OF JHUM CULTIVATION BY THE HILLY FARMERS

KYSUN RAFAT HOWLADER

REGISTRATION NO.01013

Semister: July-December, 2007

MASTER OF SCIENCE (M.S)
IN
AGARICULTURAL EXTENSION AND INFORMATION SYSTSEM

DEPARTMENT OF AGRICULTURAL EXTENSION AND INFORMATION SYSTEM
SHER-E-BANGLA AGRICULTURAL UNIVERSITY
DHAKA-1207

June-2008

ADOPTION OF JHUM CULTIVATION BY THE HILLY FARMERS

BY

KYSUN RAFAT HOWLADER

REGISTRATION NO.01013

Semister: July-December, 2007

A Thesis

Submitted to the Faculty of Agriculture,
Sher-e-Bangla Agricultural University, Dhaka,
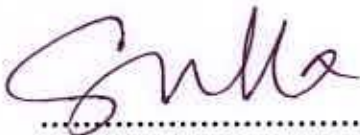in partial fulfillment of the requirements
for the degree of

MASTER OF SCIENCE (M.S)

IN

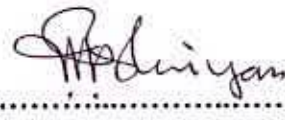## AGARICULTURAL EXTENSION AND INFORMATION SYSTSEM

June 2008

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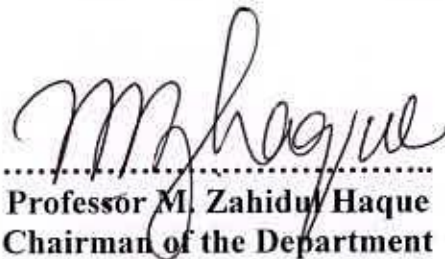
....
(Professor Md. Shadat Ulla)
Supervisor

....
(Professor Mohammad Hossain Bhuiyan)
Co-supervisor

....
Professor M. Zahidul Haque
Chairman of the Department

Dedicated to

My

Beloved Father and mother

Sher-e-Bangla Agricultural University

Sher-e-Bangla Nagar, Dhaka 1207

PABX : +88029144270-9
Fax   : +88029112649
e-mail : vcs@dhaka. net

Ref :

Date:......................

CERTIFICATE

This is to certify that thesis entitled, **"Adoption of Jhum Cultivation By the Hilly Farmers"** submitted to the Faculty of Agriculture, Sher-e-Bangla Agricultural University, Dhaka, in partial fulfillment of the requirements for the degree of MASTER OF SCIENCE in AGARICULTURAL EXTENSION AND INFORMATION SYSTSEM, embodies the result of a piece of research work carried out by KYSUN RAFAT HOWLADER, Registration No. 01013 under my supervision and 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 been duly acknowledged by him.

Dated:
Place: Dhaka, Bangladesh

(Professor Md. Shadat Ulla)
Supervisor

ACKNOWLEDGEMENTS

CONTENTS

CONTENTS (Contd.)

CONTENTS (Contd.)

CONTENTS (Contd.)

CONTENTS (Contd.)

CONTENTS (Contd.)

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

LIST OF ABBREVIATIONS OF SYMBOLS AND TERMS

Full Word	Abbreviations
Etcetera	etc.
And others (at elli)	*et al.*
Percent	%
Degrees of Freedom	df
Example	e.g.
Millimeter	mm
Namely	viz.
February	Feb.
Rangpur Dinajpur Rural Services	RDRS
Integrated pest management	IPM
Indigenous technical knowledge	ITK
Murate of Potash	MP
Triple super Phosphate	TSP
Focus Group Discussion	FGD
Kilometer	km
Square kilometer	Sq.km
Sub Assistant Agriculture Officer	SAAO
Bangladesh Agricultural University	BAU
Agricultural Extension Officer	AEO
Upzila Agriculture Officer	UAO
Statistical Package for Social Science	SPSS
Standard deviation	SD
Bangladesh Bureau of Statistics	BBS
United State	U.S
Coefficient of Variation	CV
Department of Agricultural Extension	DAE
Government Organization	GO

Full Word	Abbreviations
Non-Government Organization	NGO
Tribal Cultural Institute	TCI
Chittagong Hill Tracts	CHT

ADOPTION OF JHUM CULTIVATION BY THE HILLY FARMERS

ABASTRACT

The main purpose of the research work was to determine the extent of adoption of jhum cultivation by the hilly farmers of Rangamati Sadar Upazila. Attempts were also made to describe some of the selected characteristics namely age, education, annual family income, Organization participation, Knowledge of jhum cultivation, Extension media contact, Training exposure, Aspiration of the jhumias and their relationship with adoption of jhum cultivation. An update list of the jhumias selected from the three mouza of two unions. In order to set cross sectional view, these three mouza selected purposively for target population from the two unions. These two unions also selected purposively from the whole upazila. A list of 750 farmers was considered the population of the study. The sample sizes were selected from the target population by using sample determination formula. The researcher received full cooperation forms the respondents during the time of interview. The entire process of data collection took 35 days in the month of 1st Feb. to 5th march 2007. Appropriate scales were developed in order to measure the variables. The highest proportion (68%) of the jhumias had medium adoption while 26.7% had high adoption and 5.3% had low adoption of jhum cultivation. Among the selected characteristics, age, education and organization participation showed negative and non significant relationship with their adoption of jhum cultivation. Annual family income showed positive and significant relationship with their adoption of jhum cultivation. Knowledge on jhum cultivation, aspiration and training exposure showed positive and non significant relationship with their adoption of jhum cultivation. Extension media contact showed positive and highly significant relationship with their adoption of jhum cultivation.

Chapter 1

Introduction
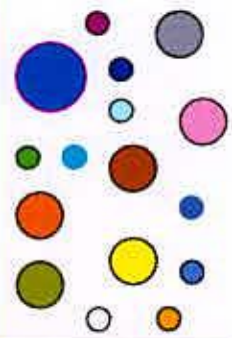
CHAPTER I

INTRODUCTION

1.1 General background

In different parts of Bangladesh about 1.4 million of aborigines are living in different areas on the hills and plain land commonly known as 'tribal people'. A total of 29 tribes have been found in Bangladesh (Razzaque, 1999) and majority of them live in Chittagong Hill Tracts (CHT). The tribes are mainly Chakma, Marma, Tipra, Garo, Bawm, Luci, Khashia, Hajong, Koach, Shautal, Monipuri, Chak, Kheyang, Kuki, Mong, Murang, Tangchunga and some other. There are three districts in CHTs. They are Rangamati, Khagrachari and Bandarban. Among the districts Rangamati has some speciality for its agricultural activities which is locally called jhum.

The term Jhun cultivation refers to farming system in which land under natural vegetation cropped with agricultural crops for years and then left vacant while the natural vegetation regenerate.

Jhuming is the unique name of agricultural operation practiced by Rangamati hill people. Sometimes it is called shifting cultivation, sometime it is called Sweden cultivation and sometimes slash and burn. Most tribal people are well acquainted with this type of farming. Jhuming is practiced on sloppy hills outside reserve forests. At present, about 20,000 hectares of land are under jhum cultivation every year. Temporary clearing and burning of forest vegetation for cropping is the principle characteristic for shifting cultivation and is seen as an alternative nutrient management strategy. Clearing and burning releases the nutrients in the vegetation.

1

Tribal people in the Chittagong Hill Tracts practice jhum in an area for one year and keep the land fallow for 4-5 years to allow it to rejuvenate.

The intensity of jhuming varies with changing conditions of rainfall, topography, accessibility, and density of population. On the basis of dependence, jhumia families are broadly classified into three categories: (i) primarily dependent, (ii) partially dependent, and (iii) marginally dependent. Methods adopted by tribal people in jhum cultivation vary from place to place. In fact, the life and culture of the ethnic people of the Chittagong Hill Tracts depend to a great extent on jhum cultivation. The DAE sources alleged that the 'jhum' cultivators burn all the shrubs in the area for cultivation, causing soil erosion. (United News of Bangladesh, Rangamati). In jhuming, seeds are sown after the first rain in April. A broad blade knife, commonly known as dao, is used to sow the seeds. Small holes are made throughout the field by dao and a mixture of different crop seeds are placed in them. However, the main crops generally grown in jhum include rice, maize, millet, sesame, cucumber, pumpkin, melon, stringbean, cotton, banana, ginger, turmeric, etc. In general, farmers cultivate more than 40 species in their fields, while approximately 50 wild plant species are collected by women. In this way, farmers meet all their day-to-day demands except salt. Very little weeding is carried out, except in some cases when it is considered necessary to provide protection against damages caused by wild animals and birds. Crops are harvested in succession as they get ripen between July and December. Jhuming enhances soil erosion and depletes fertility. As a result, crop yields are low enough to sustain a Jhumia family in a limited area. The widely followed 7-10 years minimum rotation cycle has now been reduced to just 3-4 years but still not sustainable.

Infact, there is no alternative cultivation in the CHTs. But many bad remarks have been made about jhum cultivation. In this context the researcher is interested to study whether the adoption of jhum cultivation has been increased or decreased. So the researcher undertook the study "adoption of jhum cultivation by Rangamati hilly farmers."

1.2 Statement of the problem

Jhum cultivation is the traditional practices for the hilly farmers. The life and culture of the hilly farmers depend on jhum cultivation to a great extent. Males and females work together through at the jhum period. Hilly farmers have no experience of good harvest rather subsistence in nature with low productivity and marginal economy. Still then hilly farmers are continuing the jhum practices as there are no other alternatives. So, they must continue to adopt the practices for their survival till new practices are introduced. It is assumed that if jhum practices are done properly, it is expected to be more beneficial to the tribal people.

In view of foregoing discussion, the researcher undertook a study entitled "Adoption of jhum cultivation by the Rangamati hilly farmers." The main purpose of the study was to have an understanding on the adoption of jhum cultivation by the hilly farmers and about some selected factors contributing in the adoption of jhum cultivation. For conducting the research in a planned and appropriate way, the researcher put forward the following questions:

◊ What were the personal, psychological and socioeconomic characteristics of hilly farmers?

◊ To what extent the jhum cultivation had been adopted by them?

3

◊ What were the relationships between adoption of jhum cultivation and farmers' selected personal, psychological and socioeconomic characteristics?

◊ What were the problems faced by the hilly farmers in jhum cultivation?

1.3 Specific objectives of the study

To direct the study properly the following objectives were set

1. To ascertain the extent of adoption of jhum cultivation by the hilly farmers of Rangamati

2. To describe the selected characteristics of the hilly farmers. The selected characteristics are:

      i. Age
      ii. Education
      iii. Annual family income
      iv. Organization participation
      v. Knowledge on jhum cultivation
      vi. Extension media contact
      vii. Training exposure
      viii. Aspiration

3. To explore the relationship of selected characteristics of the hilly farmers with their extent of adoption of jhum cultivation; and

4. To determine the problems faced by the farmers in jhum cultivation in the following aspects:

      i. Lack of land in jhum cultivation
      ii. Lack of inputs and credit
      iii. Labour crisis
      iv. Harvesting problem
      v. Crop damaged by animal (Pig, Cow, Monkey, goat and bird etc.).

1.4 Justification/ Importance of the study

The major focus of the studies was to assess hilly farmers' adoption of jhum cultivation. The finding of the study was supposed to be applicable to Rangamati and other hilly districts of Bangladesh. Jhum cultivation has may bad effects. The Government is also trying to stop the jhum cultivation as an influencial government extension service DAE always discoverages the jhum cultivation. Regrettably, DAE or research institutes could not introduce any alternative agricultural practices. In this circumstance it would be wise to understand the view of jhumia about jhum cultivation, extent of its adoption and problems in it. So, study on 'Adoption of jhum cultivation is absolutely justified. Moreover, DAE and other concerned authorities would have opportunity to improve jhum cultivation and help jhumia to sink their problems.

1.5 Scope and limitation of the study

1.5.1 Scope of the study

The findings of the study will particularly be applicable to Rangamati Sadar Upazilla under Rangamati Districts. However, the findings may have implications to other areas of the Bangladesh where the social ecosystem is similar with those of the study area. Thus, the findings of the study are expected to be useful to reveal the socio-economic cultural profile of hilly farmers which might be helpful to the extension workers in formulating different strategies for socio-economic development of the hilly area. Finally, there is a great scope for investigation on jhum farmers' adoption of jhum cultivation.

1.5.2 Limitation of the study

In considering the time, money and other resources available to the research and to make the research meaningful and manageable from the practical point of view, it has certain limitations that are listed below:

1. Among ten (10) upazila in the hilly area only one upazila has been selected as the study area and required data were collected from a small group of respondents considered for this study.

2. Most of the hilly farmers were illiterate or had a lower level of literacy. It was very difficult to set accurate information because they did not keep any written records with respect to their cultivation. Therefore, the researcher relied on the data furnished by the hilly farmers from their memory during interview.

3. The characteristics of the farmers were many and varied. But only eight characteristics of hilly farmers were selected for investigation.

4. Population for this study was kept confined to the head of jhum cultivation farm families who grew the jhum crop in the 2007 year. But some farm families had more than one jhum cultivation.

1.6 Assumption of the study

An assumption is the supposition that an apparent fact or principal is true in light of the available evidence (Goode and Hatt, 1952). An assumption is taken as a fact of belief to be true with out proof. In this study the researcher had the following assumptions in mind while carried out this study:

1. The hilly farmers included in the sample were competent to furnish proper responses to the items included in the interview schedule.

2. The researcher who also acted as the interviewer was well adjusted to the

socio-cultural environment of the study area. The collected data were more reliable.

3. The data furnished by the respondents were valid and reliable.

4. The sample size was representative of the whole hilly farm families of the study area.

5. The findings of the study will have general application to other parts of the country with similar socio-economic and cultural characteristics of the farmers of the study area.

6. The adoption of cultivation by the hilly farmers was linearly related with their selected characteristics.

1.7 Definition of terms

Adoption

Adoption is an implementation of a decision to continue to use of an innovation. According to Rogers (1995), "Adoption is a decision to make full use of an innovation as the best course of action available". However, (Ray, 1991) says, when an individual takes up a new idea as the best course of action and practices it, the phenomenon is known as adoption.

Jhuming

Juming is a cultivation practices by which lands are cultivated by slash and burn jungles. It is also known as Sweden cultivation. Farmers always shift the places and go to another place. That's why it is also known as shifting cultivation.

Jhumia or jhumias

It refers to the farmers who carried out the jhum cultivation practices. Jhumias live in high hilly area in the Chittagong Hill Tracts (CHT) district of Bangladesh.

Age

Age of a respondent is defined as the span of his/her life from his birth to the time of interview.

Education

Education refers to the development of desirable knowledge, skill and attitude in an individual through reading, writing, working observing and other related activities. It means the formal education of a farmer.

Annual family income

Annual family income was defined as the total earning of the respondent and member of her family from agriculture and other sources (Services, business etc.) during a year.

Organizational participation

Organizational participation refers to the extent of involvement of jhumia farmers in the existing social organization in the area such as: tribal organization, bazer committee etc.

Knowledge on jhum cultivation

Knowledge on jhum cultivation refers to knowledge on farming or agricultural system in which land under vegetation is cleared, cropped and for years and then left unattended while the natural vegetation regenerate. The cultivation phase is usually short (2-3 years), but the regeneration phase is much longer (10-20 years).

Aspiration

Aspiration refers to the standard set by an individual regarding profession or type of job he/she liked for him/herself and their family members at the time of interview.

Training exposure

Training exposure refers to the programmes under taken by different government, semi-government and non government organizations to improve the skill, knowledge and changing attitude of a person for doing a specific job properly.

Extension media contact

The term extension media contact referred to one's exposure to the different extension teaching methods through which jhum farmers were taught different agro technologies and practices.

Agricultural knowledge

Agricultural knowledge refers to the extent of understanding of agricultural subject matters and their use in different aspect of agricultural production.

Problem faced by hilly farmers

It referred to the different problems as perceived by the hilly farmers in jhum cultivation. The Problems of the jhum cultivation in this study include difficulties faced by them in five selective problems such as (i) Land in jhum cultivation (ii) Input in jhum cultivation (iii) Labour availability (iv) Harvesting of products (v) Crop damaged by animal (Pig, Cow, Monkey, goat and bird etc.).

Variable

It referred to the indication of research characteristics that occurs in a number of individuals, objects, groups etc. and that can take on various values, for example the age of an individual.

Extent of adoption

Ray (1991) defined extent of adoption as "The degree to which the farmer has actually adopted a practice."

Respondent

People, who answered questions through an interview procedure in a face to face situation for a social survey, were conducted to be respondent. They are the people from whom social. In this study jhumia were the respondent.

Chapter 2
Review of literature
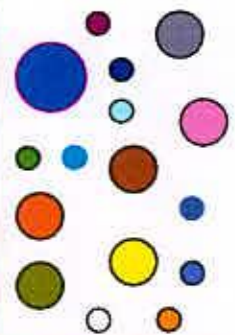
25.04.2008 03:35

CHAPTER II

REVIEW OF LITERATURE

The purpose of this chapter is to review the past studies conducted by different researchers related to the present study. The researcher has tried her best to collect needful information related to perceived adoption of jhum cultivation as well as other similar programs and activities. Adoption of jhum cultivation by hilly farmers was the main focus of this study and it was considered as the dependent variables. The researcher selected 8 characteristics of the respondents as the independent variables. These were age, level of education, annual family income, organization participation, knowledge on jhum cultivation, extension media contact, aspiration, training exposure etc.

This chapter comprises of three sections. First section deals with general content of adoption. The second section deals with the relationship between hilly farmers' with their adoption of jhum cultivation. The last section deals with the conceptual framework of the study.

2.1 Review of Literature on adoption of technology

The review which was written in this chapter was not directly related to the topic adoption of jhum cultivation by the hilly farmers of Rangamati. So far my knowledge goes no such research literature was found. However, some papers were reviewed to the adoption of agriculture innovation. This may give some direction to the adoption of jhum cultivation. Because, in this study jhum cultivation considered as a technology.

Rahman (2005) found in his study that the majority (60.50) of the respondents had medium adoption while 15.14 percent had low and 24.36 percent had high adoption in respect of modern rice variety cultivation.

Haque (2003) found that the overheating majority (75 %) of the maize growers had medium to high adoption of modern maize cultivation technologies while one forth (25 %) had low adoption.

Rahman (2003) found that ninety seven percent of the pineapple growers adopted 2-4 intercrops viz, zinger, turmeric, sweet ground and aroid in pineapple cultivation.

Salam (2003) found that overwhelming majorities (94 %) of the respondents were faced high constraints and (6%) had medium constrints in adopting environmentally friendly farming practices. No farmer was found having low constraint.

Hasan (2003) found that majority (67 percent) of the farmers had medium to high adoption while one third had low adoption of recommended potato cultivation practices.

Rahman (2003) revealed that about half (47 percent) of the frist growers had medium adoption, 44 percent had low and 9 percent had high adoption of year-round homestead fruit cultivation practices.

Zegeye *et al.* (2002) studied the determinants of adoption of improved maize technologies in major maize growing region of Ethiopia. He found that the rate of adoption of improved maize varieties and chemical fertilizer, factors affecting the adoption of improved maize varieties and the determinant factors affecting adoption of chemical fertilizers are also highlighted.

Gebre (2002) conducted a study on Maize technology adoption in Ethiopia. This study presents the results of the Sasakawa-Global 2000 Agriculture program in Ethiopia and its influence on agricultural research and maize production in the region. The Sasakawa-Global 2000 is an international non-government organization initiated in 1986 because of the 1984-85 famine in Ethiopia, with the aim of empowering Africa to produce its own food through the adoption improved agricultural technologies.

Alexznder and Goodhue (2002) conducted the study on pricing of innovation. They evaluate the producer's returns to planting patented seed innovation, using a calibrated optimization model of a south-central maize producer's adoption decision in Iowa, USA. Their results suggest that patented seed innovations did not increase the market power of biotechnology firm in the relevant market of production system.

Swinkels *et al.* (2002) studied assessing the adoption potential of hedgerow intercropping for improving soil fertility, in western Kenya. They conducted the average cost or hedgerow intercropping was 10.5% (Sd = 5.5) when based on returns to land and 17.5% (Sd = 6.5) based on returns to labour. Fifth plaited additional hedges and only 14% did so to improve soil fertility. It thus appears that the potential for its adoption as a soil fertility practices. Hedgerow intercropping appears to have greater adopter potential if its aim is to provide feed for an intensive dairy operation or for curbing soil erosion.

Sardar (2002) studied on "adoption of IPM practices by the farmers under PETRRA Project of RDRS. He observed that majority (45.9 percent) of the farmers had medium, 38.3 percent had low and 15.8 percent had high adoption of IPM practices.

Haider *et al* (2001) observed that more than one-third (37 percent) of the farmers fell in low adopter category compared to 32.5 percent falling in optimum adopter category 23.5 percent above optimum adopter category and only 7 percent had non-adopter of Nitrogenous fertilizer. In respect of extent of phosphoric fertilizer about two thirds (68 percent) of the farmers had non adopter category compared to 23 percent having above optimum adopter, 5 percent optimum adopter and only 4 percent had below optimum adopter of phosphoric (P) fertilizer. In respect of extent of potassic fertilizer three quarters categories compared to 10 percent falling bellow optimum adopter, 8 percent optimum adopter and only 3 percent above optimum adopter of potassic (K) fertilizer.

Mostafa (1999) studied the adoption of recommended mango cultivate practices by the mango growers of Nawabganj Sadar thana. He found that at half (49 percent) of the mango growers had "low adoption" 31 percent "very low" adoption and 20 percent had "medium" adoption of fertilizers.

Muttaleb *et al.* (1998) found that over all adoption of plant protection practices was medium. Among the plant protection practices high adoption were observed in fungicides, insecticide and soil treatment and low adoption were found that treatment and low adoption were found in suberization of cut tuber hand picking of cutworm and rouging of diseased plant.

14

Islam (1996) carried out a study on farmer's use of indigenous technical knowledge (ITK) in the context of sustainable agricultural development. He found the extent of use of ITK by individual farmers that, the highest proportion (42.73 percent) of the respondents belonged to the lower user category as compared to 41.82 percent in the moderate user category and 15.45 percent in the higher user category respectively.

Hasan (1996) found in his study that the highest proportion (44 percent) of the respondents perceived the existence of medium adoption, compared to 26 percent low adoption and 3 percent high adoption in respect of selected agricultural technologies.

Nikhade *et al.* (1995) found that the adoption gap about the use of recommended technology of cotton among cotton growers was about 30 percent which seemed to be quite high.

Juliana *et al.* (1991) undertook a study on adoption of integrated management practices in five villages of vasusdevanallar block in Tirunelvi district, Tamilnaru, India. They found that about 50 percent of marginal farmers, 47.50 percent of small farmers and 52.50 percent of big farmers had medium adoption and 42.50 percent of big farmers, 22.50 percent of small farmers and percent of the marginal farmers had high level of adoption. In both adopts level of big farmers' participation was higher in comparison to other categories of farmers.

Gogoi and Gogoi (1989) conducted a study on adoption of recommended plant protection practices in rice in Zorhat district of Assam state in India. The study revealed that among the respondents, 50 percent had low level of adoption, while other 50 % ranged from medium to high adoption.

Rahman (1987) conducted a research study on the extent of adoption of four improved practices, such as used of fertilizers, line sowing, irrigation and use of insecticides in transplanted aman rice cultivation in two village of Mymensingh district. It revealed that 22 percent of the farmers adopted all the four practices compared to 49 percent adopted three practices, 22 percent adopted two practices, 5 percent adopted one practices and only 2 percent adopted of the four practices.

Sobhan (1975) studied on the extent of adoption of winter vegetables namely tomato, radish, lettuce and potato in Boilar union of Mymensingh district. Over all winter vegetable adoption scores of the farmers could range from 0 to 140. Over all adoption scores indicated that 27 percent of the farmers did not adopt winter vegetables cultivation while 28 percent had low adoption and 55 percent high adoption.

Mohammad (1974) studied the extent of adoption of insect control measures by the farmers in Khamar union of Rajshahi district. He found that among the respondent farmers, 25 percent did not adopt insect control measure; 28 percent had high level of adoption; 32 percent had medium level of adoption and 25 percent had low level of adoption.

Karim (1973) conducted a study on the adoption of fertilizers by transplanting aman growers in former Keyotkhali union of Mymensingh district. He studied the adoption of three fertilizers Urea, Triple super phosphate (TSP) and muriate of potash (MP). He found that 4 percent of the respondent growers had high adoption of fertilizers while 9 percent had medium adoption and 41 percent low adoption. Remaining forty six percent (46 percent) of the respondent growers did not use any of the three fertilizers.

Hossain (1971) carried out a research study on the adoption of four improved practices in Gouripur of Mymensingh district. The practices were (i) plant protection measure, (ii) recommended variety of paddy, (iii) line transplanting and (IV) recommended dose of fertilizers. It revealed that among the respondent farmers 57.40 percent adopted plant protection measure, 35.51 percent adopted recommended variety of paddy, 25.36 percent adopted line transplanting and 11.52 percent adoption recommended dose of fertilizers.

2.2 Relationship between jhum cultivators with their adoption of technologies

2.2.1 Age and adoption of different technologies

Salam (2003) conducted a study on constraints faced by the farmers in adopting environmentally friendly farming practices. He found that age of the farmers had no significant relationship with there constant in adopting environmentally friendly farming practices.

Sardar (2002) found that the age of the farmers had positive significant negative correlation with their adoption of IPM practices.

Aurangozeb (2002) observed that there was significant negative relationship between age and adoption of integrated homestead farming technologies.

Sarker (1997) observed that there was no significant relationship between ages of the farmers with their adoption of improved potato cultivation practices.

17

Islam (1996) conducted a study on farmers' use of indigenous technical knowledge (ITK) in the context of sustainable agricultural development. He found that age of the farmers had significant negative relationship with their extent of use of ITK.

Rahman (1995) conducted a study to identify the relationship between the personal characteristics and constraints facing in cotton cultivation of Muktagacha thana under Mymensingh district. He found that there was no significant relationship between the age of the farmers and there facd in cotton cultivation.

Islam (1993) observed that there was no relationship between the ages of potato growers with their adoption of improved practices in potato cultivation. Similar results were observed by Karim and Mahaboob (1986), Rahman (1986), Singh (1992), Kher (1992), Pathak et al. (1992)

Kashem (1991) observed that there was positive and significant relationship between the ages of the marginal farmers with their adoption of jute technologies. Similar results were found by Ali et al. (1986), Singh and Rajendra (1990), Okoro et al. (1992), Narwal et al. (1991) and Hossain et al. (1991)

Hossain (1989) in his study on problem faced by the researchers and extension personnel in technology generation and transfer found that age of the researchers shows a significant positive correlation with there communication media and change agent preference about the communication media and changes agents than the young research workers.

Mansur (1989) that age of the farmers had no significant relationship with the feeds and feeding problems confrontation but showed a positive trend.

Islam (1987) in a study on artificial insemination problems faced by the farmers in two selected unions of Madhupur upazila under Tangile district found that age of the farmers had no significant relationship.

2.2.2 Education and adoption of different technologies

Hossain (2003) concluded that education of the farmers had a significant and positive relationship with their adoption of modern Boro rice cultivation practices.

Salam (2003) conducts a study on constraints faced by the farmers in adopting environmentally friendly farming practices. He observed that education of the farmers had negative significant relationship with there constraints in adopting environmentally friendly farming practices.

Sardar (2002) found that the education of the farmers had significant positive relationship with their adoption of IPM practices.

Aurangozeb (2002) studied on the extent of adoption of integrated homestead farming technologies by the rural women in RDRS. He observed that there was positive relationship between education and adoption of integrated homestead farming technologies.

Sarker (1997) conducted a study to determine the relationship between selected characteristics of potato cultivation practices in five villages of Comilla District. He found that education of potato growers had significant relationship with their adoption of improved potato cultivation practices. Similar results were found by Kashem(1991).

Hasan (1996) concluded a study on adoption of some selected agricultural technologies among the farmers as perceived by the frontline GO and NGO workers. He observed that education have no significant relationship with the perceived adoption of selected agricultural technologies. Similar results were found by Kher (1992) and Islam (1996).

Rahman (1995) in his study found that the education of the farmers had significant negatives effect on their faced constraint in cotton cultivation. The findings indicated that the higher education of the farmers, the lower was their faced constraint in cotton cultivation.

Bavalatti and Soundaarswamy (1990) observed no significant relationship between education of the farmers and their adoption of dry land farming practices.

Kaur (1988) found that education influenced the opinion of the women about adoption of vegetable gardening animal husbandry etc.

Mansur (1989) found that education of the farmers had significant negatives effect on their problem confrontation in feeds and feeding cattle.

Raha (1989) in his study found that the education of the farmers had no significant relationship on their irrigation problem confrontation. However, a positive trend was noticed in the relationship.

Islam (1987) in his study on artificial insemination problem confrontation of the farmers found a negative significant relationship between education and poultry problem confrontation.

Ali (1978) in his study found that there was no significant relationship between level of education of the farmers and their cattle problem confrontation.

2.2.3 Annual family income and adoption of different technologies

Sarker (1997) found that family income of potato growers had a positive relation with their adoption of improved potato cultivation practice, Similar results were observed by Hossain (1999), Rahman (1986), Kashem (1991), Pal (1995), Islam (1993), and Khan (1993).

Islam (1996) found a significant negative relationship between the annual income of the farmers and their extent of use of ITK. Hossain (1983) and Hoque (1993) found similar results.

Rahman (1995) found that a negative and substantially significant relationship between annual income of the farmers and their faced constraints in cotton cultivation.

Singh (1991) in a study found that income of the farmers was significantly associated with the level of adoption of plant protection measures.

Mansur (1989) in his study found that the relationship between income of the farmers and their constraints faced in feeds and feeding cattle was significant but showed a negative trend.

Islam (1987) reported that the relationship between income of the farmers and artificial insemination constraints faced was significantly negatives.

Hossain (1985) found a significant positive relationship between annual income of the farmers and constraints faced of the landless labourers.

Saha (1983) found a significant positive relationship between income of the farmers and their poultry problem confrontation in his study.

2.2.4 Organizational participation and adoption of different technologies

Sardar (2002) conducted a study on adoption of IPM practices by the farmers under PETRRA project of RDRS. He observed that organizational participation of the farmers had no significant relationship with their adoption of IPM practices.

Rahman (2001) conduct a study on knowledge attitude and adoption of the farmers regarding Aalok 6201 hybrid rice in Sadar upazila of Mymensingh district. He found that organizational participation of the farmers had a significant and positive relationship with their adoption regarding Aalok 6201 hybrid rice.

Mostafa (1999) conducted a study on adoption of recommended mango cultivation practices by the mango growers of Nawabganj Sadar thana. He found that organizational participation of mango growers had a significant positive relationship with their adoption of recommended mango cultivation practices.

Sarker (1997) conducted a study on correlates of selected characteristics of potato growers with their adoption of improved potato cultivation practices in five village of Comilla district. He observed that organizational participation of the potato growers had no relationship with their adoption of improved potato cultivation practices.

Kher (1992) carried out a research study on the adoption of improved wheat cultivation practices by the farmers in selected village Rajouri block, India. He observed that there was no significant relationship between the farmers' social participation and their adoption of improved wheat cultivation practices.

2.2.5 Knowledge of jhum cultivation and adoption of different technologies

Sardar (2002) in his study revealed that agricultural knowledge of the farmers had positively significant with their adoption of IPM practices.

Rahman (1995) in his study found that the knowledge of cotton cultivation of the farmers had a significant negative effect on their faced constraints in cotton cultivation.

Raha (1989) reported from his study that knowledge in modern Boro paddy of the farmers had no significant relationship with their irrigation problem confrontation, but a positives trend was noticed.

Reddy *et al.* (1987) found significant association between knowledge and use of improved package of practices in paddy production by participant and non participant farmers.

Koch (1985) conducted a study in the north-west organic free, state South Africa concerning perception of agriculture innovativeness, aspiration, knowledge and innovation adoption. He observed that there was a strong positive relationship between perception, knowledge and practice adoption. This finding is very much in agreement with that of Rogers and Shoemaker (1971).

2.2.6 Extension media contact and adoption of different technologies

Haque (2003) concluded that extension contact of the farmers had significant positive relationship with their adoption of modern maize cultivation technologies.

Sardar (2002) concluded that the extension contact had positively significant, relationship with their adoption of IPM practices.

Aurangozeb (2002) observed that there was significant relationship between contact with extension media and adoption of integrated homestead farming technologies.

Osunloogun *et al.* (1996) studied adoption of improved Agricultural practices by co-operative farmers in Nigeria. The findings of the study indicated a positive relationship between extension contact and adoption improved practices.

Slade *et al.* (1988) studied that adoption rates among farmers receiving one or more VEW visits per month were generally higher than those farmers who were not visited by VEW'S contact farmers were better adopter of some technologies that non contact farmers.

Bezbora (1980) studied adoption of improved agricultural technology by the farmers of Assam. The study indicated a positive relationship between extension contact and adoption of improved cultivation practices.

2.2.7 Aspiration and adoption of different technologies

Sarder (2002) found that the farmers had no significant with their adoption of IPM practices.

Bari (2000) observed that the aspiration of the farmers had no significant relationship with their attitude towerds the hybrid Rice Aalok 6201.

Koch (1985) conducted a study in the north-west organic free, state South Africa concerning perception of agriculture innovativeness, aspiration, knowledge and innovation adoption. He observed that there was a strong positive relationship between perception, knowledge and practice adoption. This finding is very much in agreement with that of Rogers and Shoemaker (1971).

An extension search was made to collect research findings of the relationship between aspiration of and individual with his problem confrontation. But no findings come to the notice of the researcher.

2.2.8 Training exposure and adoption of different technologies

Islam (2002) conducted a study on farmers' knowledge and adoption of ecological agricultural practices under the supervision of Proshika. He found that agricultural training experience of the farmers had no significant relationship with their adoption of ecological agricultural practices.

Rahman (2001) observed in study that training received of the farmers had a significant and positive relationship with their adoption regarding Aalok 6201 hybrid rice.

2.3 The Conceptual Framework of the Study

The conceptual framework of Rosenburg and Hovland (1960) was kept in mind while framing the structural arrangements of the variables. The study was concerned with adoption of jhum cultivation by the Rangamati hilly farmers.

In scientific research, selection and measurement of variables constitute an important task. Properly constructed hypothesis of any research contain at least two variables namely, "dependent variable" and "independent variable". Selection and measurement of those variables is an important task. A dependent variable is that which appears, disappears or varies as the researcher introduces, remove or varies the independent variables (Townsend, 1953). An independent variable is that factor which is manipulated by the researcher in his attempt to ascertain its relationship to an observed phenomenon.

This study concerned with dependent variable adoption of jhum cultivation by the Rangamati hilly farmers and the selected characteristics as independent variables, *i.e.* age, education, annual family income, Organization participation, Knowledge of jhum cultivation, Extension media contact, Aspiration, Training exposure.

Based on these above discussion and the review of literature, the conceptual framework of this study has been formulated and shown in figure 2.1.
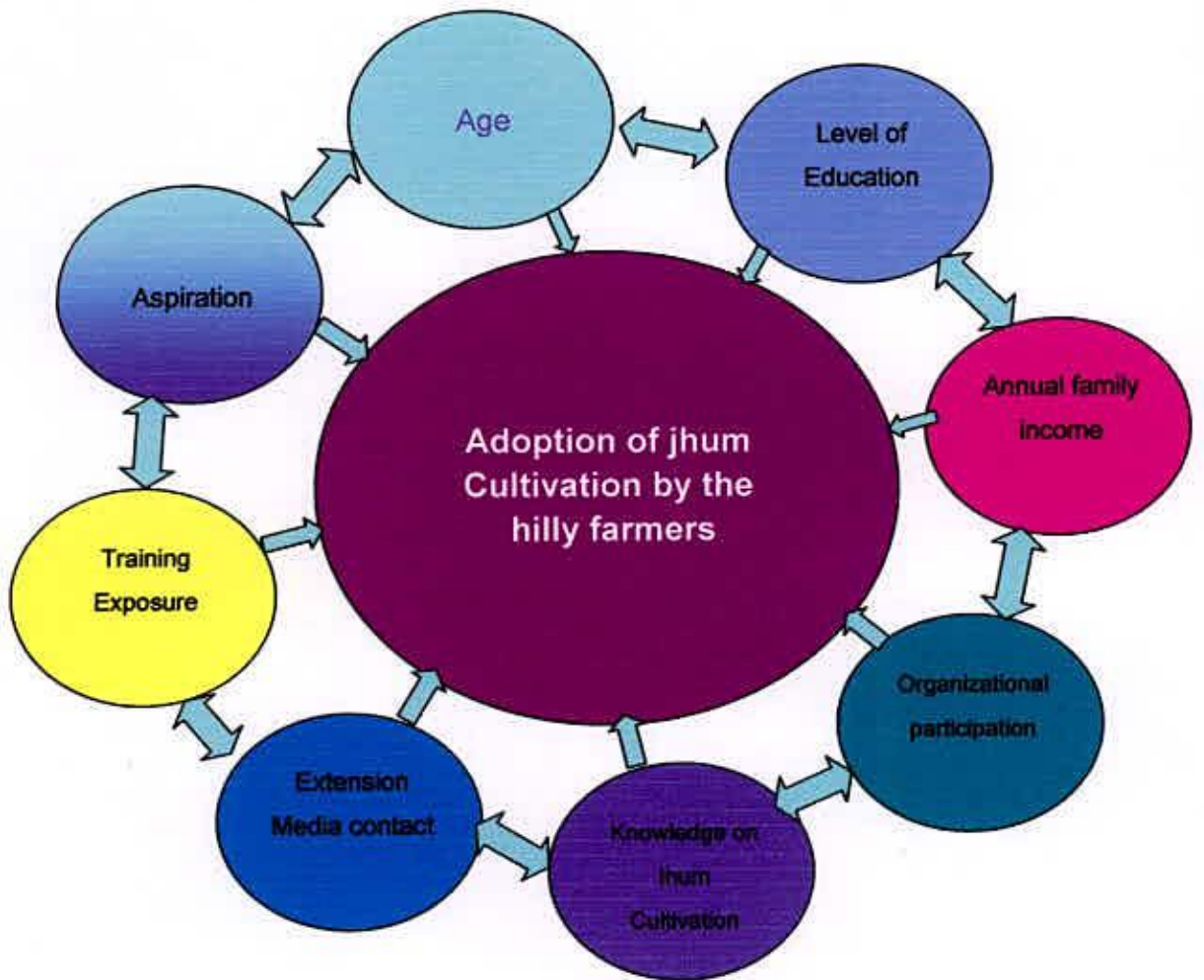
Figure: 2.1 Schematic diagram of conceptual framework of the study

Chapter 3
Materials and Methods

25.04.2008 03:35

CHAPTER III

METHODS OF THE STUDY

The method and procedure used in the study are presented in this chapter. The principal method used in this study ware measurement of variables, structured interview schedule and field survey. Other methods employed were researcher direct observation and group discussion for a wide range of information in order to cross-verify the data and information collected through survey method. Below the methods and procedure used in this study are presented systematically.

3.1 Locale of the study

The study was conducted in Sadar upazila of Rangamati district. The area was selected because of its characteristics of availability of jhum cultivations. Moreover, its socio-economic features were well known to the researcher. The survey area was 20 km far from the district headquarter. Sadar upazila of Rangamati district has 6 unions. Among them two unions namely Sapchhari and Kutukchhari were purposely selected as the locale of the study. The selected unions had 6 mouzas. Out of these three Mouzas namely, Sapchhari, Sukkurchhari and Kutukchhari were randomly selected. Maps of Rangamati districts and Rangamati sadar upazila, are shown in Figure 3.1 and 3.2 respectively.
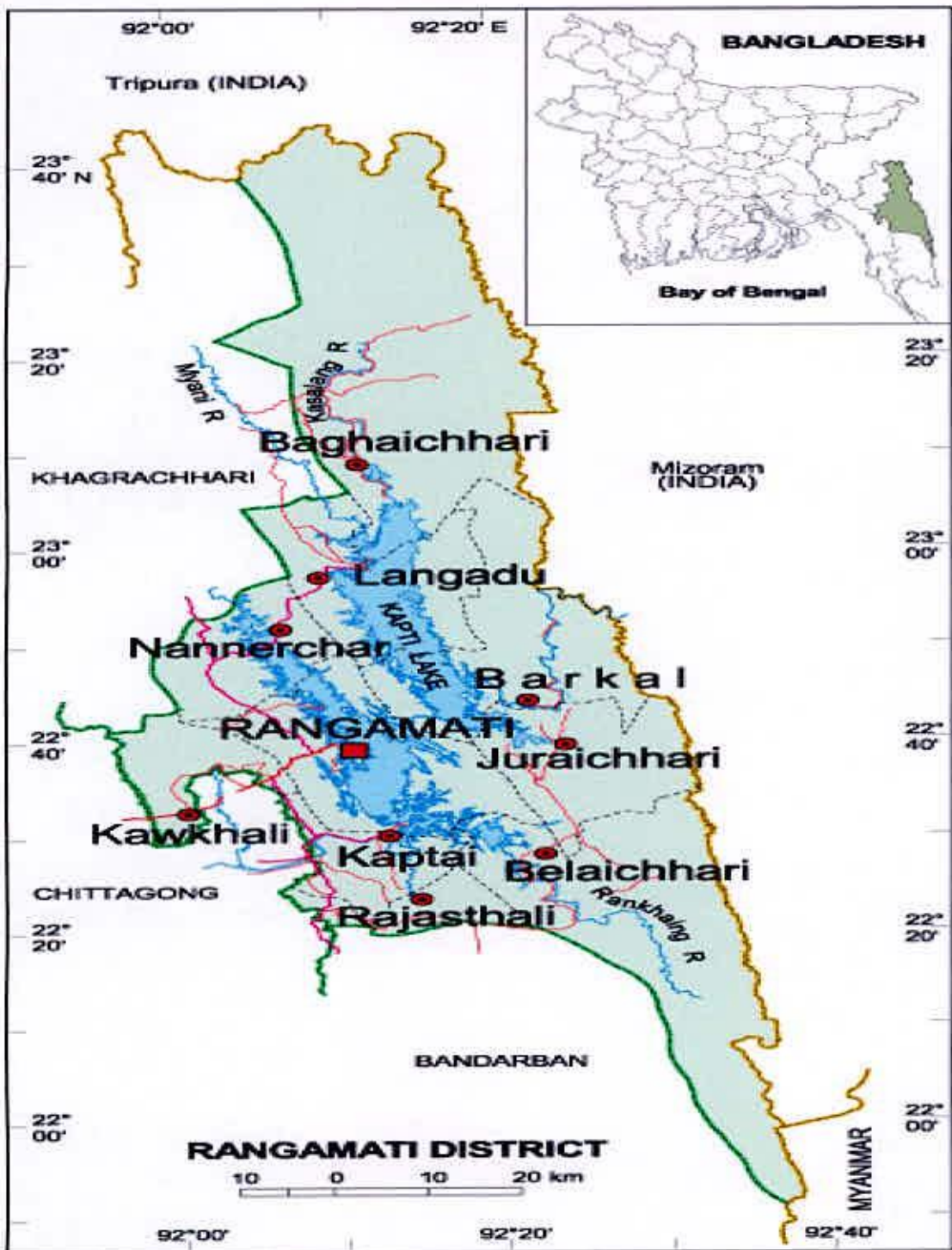
Figure: 3.1 Map of Rangamati district showing the locale of the study
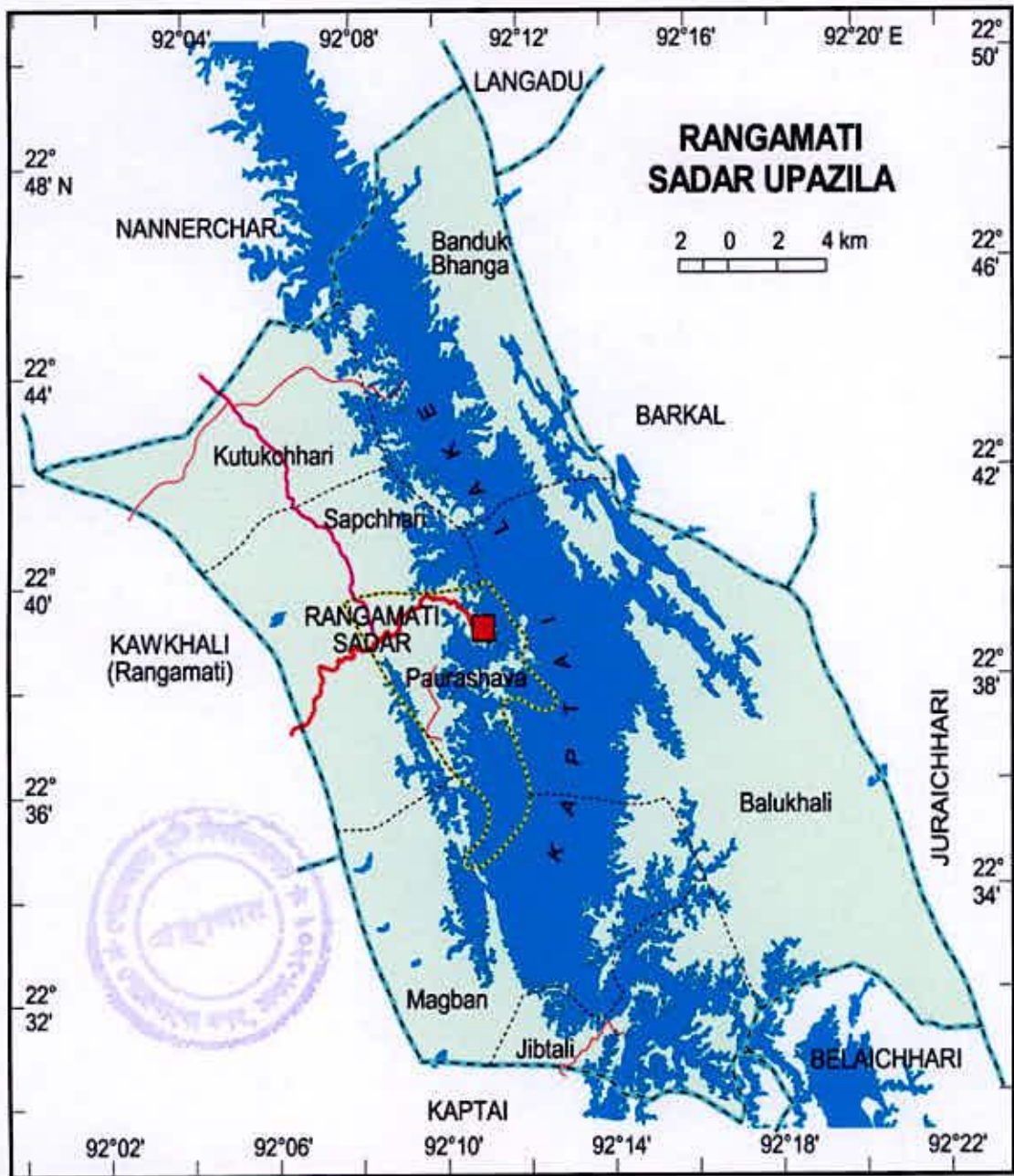
Figure: 3.2 Map of Rangamati sadar upazila of Rangamati district

31

3.2 Population and sampling design

The target population was hilly farmers who engaged in jhum cultivation. An update list of the jhumias selected with the help of Sub Assistant Agriculture Officer (SAAO) from the three mouzas of two unions.

In order to set cross sectional view, these three mouzas were selected purposively for target population from the two unions. These two unions were also selected purposively from the whole upazila.

A list of 750 farmers was constituted the population of the study. However at the rate of 10 percent 75 jhumia were selected randomly to constitute the sample size. A reserve list of 8 jhumias was also prepared at 1 percent rate with a view to interview them when any jhumias of the main list were found to be absent at the time of interview.

Table 3.1 Distribution of the population, sample and beneficiaries included in the reserve list

Name of Unions	Name of Mouza	Population size	Sample size	Reserve list size
1.Sapchhari	Sapchhari	300	30	3
	Sukkurchhari	200	20	2
2.Kutukchhari	Kutukchhari	250	25	3
Total		750	75	8

3.3 Data collection instrumentation

In order to collect valid and reliable information from the jhum farmers, an interview schedule was carefully designed keeping the objectives of the study in mind. Both open and close form, simple and direct questions and different scales were used to obtain information required for measuring the selected characteristics.

3.3.1 Validity of instrument

The validity of contents of the instruments was judged by obtaining expert opinion from the experts of the concern discipline Department of Agricultural Extension & Information System of Sher-e-Bangla Agricultural University (SAU), Tribal Cultural Institute (TCI) of Rangamati. Based on the comments and suggestions of the experts, the instrument was modified to make it an acceptable form.

3.3.2 Reliability of instrument

For reliability of the instruments, pre-test of interview schedule was done before giving final shape to the interview schedule. Necessary correction, addition, alternations and rearrangements were made in the schedule on the basis of experience of pre-test. Then the schedule was adjusted by supervisor of researcher and multiplied in its final form for collection of data.

3.4 Variables of the study

The dependent variable of the study was adoption of jhum cultivation. This variable was the main focus of the study. There were various factors which influenced this phenomenon. But it was not possible in a single study to deal with all the factors. Considering the limitations of time, money and other resources available to the

researcher, eight (8) characteristics were selected as the independent variables for this study. The independent variables were age, education, annual family income, Organization participation, Knowledge of jhum cultivation, Extension media contact, Training exposure, Aspiration.

3.4.1 Measurement of independent variables

The procedures of measurement of independent variables have been stated below.

3.4.1.1. Age

Age of a farmer was measured in terms of years from his/her date of birth to the time of interview. It was measured in terms of actual years on the basis of his/her statement. A score of one was assigned for each year of her/his age.

3.4.1.2. Level of education

Educational level of a respondent was measured on the basis of complete years of her/his schooling. A score of one was assigned for each completed year of schooling. If a respondent does not know reading and writing his/her score was zero (0). A score of 0.5 was assigned to a respondent who only could sign her/his name. Besides, the respondent got actual score of his/her every year of schooling i.e. 1 for class one, 2 for class two and so on.

3.4.1.3. Annual family income

Annual income of a respondent was measured in taka on the basis of total yearly earnings from jhum cultivation and other sources in which the respondent as well as his/her family members were involved. The method of ascertaining income from

farming involved different aspects. The aspects are: agriculture, poultry rearing, livestock, handicrafts, tailoring and dress making. In calculating the annual income of the respondents, the total yield of all the Agriculture, poultry rearing, livestock, handicrafts, tailoring and dress making in the preceding year were converted into cash income according to the prevailing market price. Income from several sources were added together to obtain total income of a respondent. A score of 1 was given for each thousand taka. Data obtained in response to item No. 3 of the interview schedule were used to determine the income of the respondents.

3.4.1.4. Organizational participation

Organizational participation score of a respondent was measured by his/her membership in different organizations for a particular period of time. This was measured by participation of respondent in an organization. For participation, weight was assigned as 0, 1, 2, and 3 for not involved, ordinary member, executive member and officer of the executive committee respectively. Then the scores were multiplied by number of years. In calculating the organizational participation the following formula was used:

$$OP = \sum (OM \times D + EM \times D + O.Ec \times D)$$

Where,

    OP = Organizational participation

    OM = Ordinary member

    EM = Executive member

    O. Ec = Officer of the executive committee

    D = Duration

For example, if a respondent is an ordinary member of Samaby samity, executive member of a bazer committee and officer of the executive committee of school committee for subsequent two years, his score of the organizational participation would be: 1x2+2x2+3x2=12.

3.4.1.5. Knowledge on jhum cultivation

It referred to the knowledge gained by the farmers of different sources and also through their experiences of farming. The farmers were asked 20 questions on different aspects of jhum cultivation. The total assigned score on all the questions was 40. A respondent answering a question correctly obtained the full score of 2, when a respondent answer a question partially, she/he got 1 score, while for wrong answer obtained zero score. The total score obtained by a respondent was taken as the Knowledge on jhum cultivation score of the respondent (item no. 5). The score could range from 0-40. Where, 40 indicates for high Knowledge and zero indicates no knowledge.

3.4.1.6. Extension media contact

It was defined as one's extent of exposure to different information sources related to agricultural extension. It was assumed that the more media contact of an individual make her/him more knowledgeable that brings desirable changes in her/his attitude and practice. In the study an extension media contact score was computed for each respondent on the basis of her/his contact with 11 selected extension media, as shown in item no. 6. The score were assigned according to the degree of contact in the ascending manner of as stated below:

36

Not contact-------------0

Rarely contact---------1

Occasionally contact--2

Regularly contact------3

Extension media	Extent of use	Score assigned
1. UAO	0 Times / year	0- Not at all contact
	1-2 Times / year	1- Rarely contact
	4-6 Times / year	2- Occasionally contact
	>4 Times or more/ year	3- Regularly contact
2. AEO	0 Times / year	0- Not at all contact
	1-3 Times / year	1- Rarely contact
	3-4 Times / year	2- Occasionally contact
	4-5 Times / year	3- Regularly contact
3. Head man	0 Times / month	0- Not at all contact
	1-2 Times /month	1- Rarely contact
	3-4 Times / month	2- Occasionally contact
	5-6 Times /month	3- Regularly contact
4. Neighbors	0 Times / week	0- Not at all contact
	1-2 Times / week	1- Rarely contact
	3-4 Times / week	2- Occasionally contact
	5-6 Times or more /week	3- Regularly contact
5.Method demonstration about any agricultural technique/innovation	0 Times / life	0- Not at all contact
	1-2 Times / life	1- Rarely contact
	3-4 Times /life	2- Occasionally contact
	>4 Times or more/ life	3- Regularly contact
6. Result demonstration about any agricultural practice	0 Times / life	0- Not at all contact
	1-2 Times / life	1- Rarely contact
	3-4 Times /life	2- Occasionally contact
	>4 Times or more/ life	3- Regularly contact

Extension media	Extent of use	Score assigned
7. Group discussion about agricultural subject matter	0 Times / year	0- Not at all contact
	1-3 Times / year	1- Rarely contact
	4-6 Times /year	2- Occasionally contact
	>6 Times or more/ year	3- Regularly contact
8. Listening Agril. Programme in Radio	0 Times / week	0- Not at all contact
	1-2Times / week	1- Rarely contact
	3-4 Times /week	2- Occasionally contact
	>4 Times or more/ week	3- Regularly contact
9. Observing TV Agril. Programme	0 Times / month	0- Not at all contact
	1-2 Times / month	1- Rarely contact
	3-4 Times /month	2- Occasionally contact
	>4 Times or more/ month	3- Regularly contact
10. Visiting Agril. fair	0 Times / year	0- Not at all contact
	1 Times / year	1- Rarely contact
	2 Times /year	2- Occasionally contact
	3 Times or more/ year	3- Regularly contact

The extension media contact of a respondent was therefore determined by adding the total responses against 10 selected extension media. The scores could range from 0-30. Where 0 indicated no contact and 30 indicated very high contact with extension media.

3.4.1.8. Training exposure

Training exposure was determined by total number of days of training received by the respondents in his/her entire lifetime on agriculture related subject matter organized by any organization. A score of one (1) was assigned for each day of received training.

3.4.1.7. Aspiration

The farmers were asked to indicate the aspiration for their own life. The farmers were asked to give their opinion on 5 selected aspects: education, profession, accommodation, modern decoration and politics. A five (5) point rating scale 0, 1, 2, 3 and 4 were assigned against the degree of aspiration as follows:

No aspiration----------0

Low aspiration--------1

A Little aspiration---2

Medium aspiration--3

High aspiration------4

Thus, the possible aspiration score of the respondents could range 0 to 20. Where, 0 indicated no aspiration and 20 indicated very high aspiration.

3.4.2 Measurement of dependent variables

The dependent variable of the study was "Adoption of jhum cultivation by the Rangamati hilly farmers". Adoption of jhum cultivation was measured on the basis of the extent of adoption of 12 technologies in jhum cultivation mentiand in the item of 9 in the interview schedule.

3.4.2.1 Extent of adoption of Jhum cultivation

Adoption of Jhum cultivation by the hilly farmers was measured on the basis of extent of use of different technologies. Twelve technologies related to adoption of Jhum cultivation were included in the Jhum cultivation. The respondent were asked to

mention the extent of adoption of these technologies in the manner of no adoption, rarely adoption, occasionally adoption, frequently adoption and regularly adoption and assigned score according to ascending order as 0, 1, 3 and 4 respectively. Thus the score could range form 0-48. When, 0 indicates no adoption and 48 indicate high adoption. The overall adoption score was calculated using following formula:

$$\text{Extent of adoption} = \frac{\text{Obtained score}}{\text{Highest possible score}} \times 100$$

The possible extent of adoption score of the respondent may range from 0 to100. Where 0 indicates no extent adoption not at all and 100 indicates very high extent of adoption to the high possible extent. Based on the score of extent of adoption the jhumias were categories as follows:

Low extent of adoption (1-25)

Medium extent of adoption (25-50)

High extent of adoption (51-75)

Very high extent of adoption (76-100)

3.5 Problem confrontation in jhum cultivation

It refers to the extent to which a respondent faces difficulties in performing various activities after the jhum cultivation practice. In order to investigate the problems faced by the hilly farmers for jhum cultivation a close type questionnaire was used on the five aspects of problems. For each aspect 5 questions was asked to the respondent to answer the extent of the problems of jhum cultivation of the study area on a five-point

scale: 'Very high', 'high', 'moderate', 'low' and 'very low. Scores assigned according to the degree of severity of problem as are 4, 3, 2, 1and 0 respectively. The scores obtained for all the aspects added together to obtain total problem confrontation score of a respondent. The possible problem confrontation score of the respondent may range from 0 to100. Where 0 indicates no problem confrontation at all and 100 indicates very high problem confrontation.

3.6 Hypothesis of the study

According to Kerlinger (1973) a hypothesis is a conjectural statement of the relation between two or more variables. Hypothesis are always in declarative sentence form and they are related, either generally or specifically from variables to variables. In broad sense hypotheses are divided into two categories: (a) Research hypothesis and (b) Null hypothesis.

3.6.1 Research hypotheses

To find out relationship between variables a researcher first formulates research hypothesis which narrates anticipated relationships between the variables. Based on review of literature and development of conceptual framework, the following research hypotheses were formulated:

"Adoption of jhum cultivation by the Rangamati hilly farmers' is significantly related with their selected characteristics".

However, when a researcher tries to perform statistical tests, then it becomes necessary to formulate null hypotheses.

3.6.2 Null hypothesis

The following null hypothesis was formulated to explore the relationships. Hence, in order to conduct tests, the earlier research hypothesis was converted into null form as follows:

"There is no significant relationship between the Rangamati hilly farmers' selected characteristics and their adoption of jhum cultivation".

3.7 Data collection procedure

Data were collected using face-to-face interview by the researcher himself by using bengla version schedule. To set valid and relevant information the researcher made all possible efforts to explain the purpose of the study to the respondents. Appointments with the interviewees were made in advance with the help of the SAAO. In case of failure due to their pre-occupation with a revisit was made with prior appointment, while starting the interview with any farmer, the researcher took all possible care to establish rapport with them so that the respondent did not feel my hesitation to furnish proper answers. The researcher received full cooperation forms the respondents during the time of interview. The entire process of data collection took 35 days in the month of 1st Feb. to 5th march 2007. The English version of interview schedule was enclosed in Appendix A.

3.8 Data Coding and Tabulation

Data were coded into a coding sheet and compiled, tabulated and analyzed in accordance with the objectives of the study by using computer system. The qualitative data were converted into quantitative form by assigning appropriate scoring techniques when ever necessary.

42

3.9 Categorization of Data

For clear understanding with discussion, the respondents' characteristics were classified into several categories. These categories were developed by considering the nature of distribution of data and the general conditions prevailing in the social system.

3.10 Data processing and statistical analysis

The computer software SPSS (Statistical Package for Social Sciences) was used to analyze the data. The following statistical treatments were used to describe, represent and explanation of the relationships of the variables included in the study. Various statistical measures like number, percentage distribution, range, mean, standard deviation etc. were used to describe and interpret the data. In order to explore the relationships between Adoption of Jhum cultivation and the selected characteristics of the farmers, the Pearson product moment correlation was computed. Correlation matrix was also computed to determine the interrelation ships among the variables five percent (0.05) level of significance was used as the basis of rejecting or excepting any null hypothesis.

Chapter 4

Results and Discussion
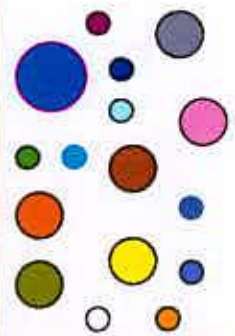
CHAPTER IV

RESULTS AND DISCUSSION

The purpose of this Chapter is to describe the findings of the present study and interpretations of the results have been presented according to the objectives of the study. This chapter has been divided into four sections. In the first section deals with eight selected individual characteristics of the jhumias have been discussed. The second section deals with the extent of adoption of Jhum cultivation. In the third section, discussions have been made on the relationships between selected characteristics of the jhumias with their adoption of Jhum cultivation by the hilly farmers. The fourth section describes the problem faced by the hilly farmers in Jhum cultivation.

Section 4.1 Selected individual Characteristics of the Jhum Farmers

In this section the findings of the jhumias selected characteristics have been discussed. The selected characteristics are (i) age, (ii) level of education, (iii) Annual family income, (iv) Organization participation, (v) Knowladge on jhum cultivation, (vi) Extension media contact, (vii) Aspiration, . (viii) Training exposure.

4.1.1 Age

Age of the jhumias ranged from 25 to 80 years, the average being 42.56, standard deviation was 12.53. On the basis of observed age, the jhumias were classified into three categories viz. 'young aged', 'middle aged' and 'old aged' groups: The categories and distribution of jhumias was shown in Table 4.1.

44

Table 4.1 Distribution of the jhumias according to their age

Age categories	jhumias		Mean	S. D.
	Number (N=75)	Percentage		
Young (up to 35 years)	24	32		
Middle (36 to 50 years)	36	48	42.56	12.53
Old (above 50)	15	20		
Total	75	100		

Data presented in Table 4.1.1 indicated that the highest proportion (48 percent) of the jhumias were middle-aged category compared to (20 percent) old and (32 percent) young aged groups. Data also indicates that the middle-aged farmers constitute near about half of the respondents. The four-fifth portions of the respondents were young to middle aged. Copp and AL (1958) in their study concluded that younger and middle aged peoples seemed to be more inclined to adopt new practices than that of older ones. In the present study, vast majority (80 percent) of the jhumias under young and middle aged category. These young and middle-aged jhumias have potential and energy to develop their life. However, the older respondents because of their longer experience might have some opinions in regard to adoption of jhum cultivation. The extension agents can make using of these views and opinions in designing their extension activities.

4.1.2 Level of education

The level of education scores of the jhumias ranged form 0 to 10, the average being 2.47, standard deviation was 2.98. On the basis of observed data the jhumias were classified into four categories such as 'no education' (0), 'can sign only' (0.5), 'primary education' (1 to 5) and 'secondary education' (6 to 10). The categories and distribution of the jhumias are shown in Table 4.2.

Table 4.2 Distribution of the jhumias by their level of educatio

Education based categories	jhumias		Mean	S. D.
	Number (N=75)	Percentage		
No education (0)	28	37.3		
Can sign only (0.5)	14	18.7		
Primary (1-5)	21	28.0	2.47	2.98
Secondary (6-10)	12	16.0		
Total	75	100		

Table 4.2 shows that jhumias under 'no education' category constitute the highest proportion (37.3 percent) compared to 18.7 percent under 'can sign only' category, 28.0 percent under 'primary level of education' category and 16.0 percent under 'secondary level of education' category. No jhumias were found under above secondary level of education. It was found that high proportions (56.0 percent) of the jhumias were under no education and could sign their name only. These jhumias may face difficulty as because their educational level is low they face difficulty to adopt new technology and they heisted to involve in organizational activities.

4.1.3 Annual family income

The Annual family income scores of the jhumias ranged form 17 to 311. The average being 94.67percent, standard deviation was 58.54percent. On the basis of their Annual family income, the jhumias were classified into four categories, such as very low family income, low family income, medium family income and high family income. The categories and distribution of the jhumias are shown in Table 4.3.

Table 4.3 Distribution of jhumias according to their annual family income

Annual family income based categories (in '1000' Taka)	jhumias		Mean	SD
	Number (n=75)	Percentage		
Very low family income (up to 90)	38	50.7		
Low family income (91 to 163)	27	36.0	94.67	58.54
Medium family income (164 to 236)	8	10.7		
High family income (> 236)	2	2.7		
Total	75	100.0		

It was revealed from the data furnished in table 4.3 show that more than half of the jhumias belong to the category of very low income ranged from Tk 17000 to 90000 only. If low income group is added together it is seen that almost all the jhumia are poor. Only about one-tenth of the respondents belong to medium (10.7%) and high (>2.7%) categories. The average income of the farmers in the study area is much higher than the average per capita income of the country i. e. 599 U.S. dollar (BBS, 2008). This might be due to the fact that the farmers in the study area were not only engaged in Jhum cultivation they also earn form other sources, such as handicrafts, daily labours, tailoring and dress making, business etc. Generally higher income gives an individual better status in the society. However, compared to family annual income of other society their annual family income is still low.

4.1.4 Organizational participation

Organizational participation score of the jhumias ranged from 0 to 5, the average being 1.53, standard deviation was 1.11. On the basis of observed Organizational participation, the jhumias were classified into three categories viz. 'no participation', 'low participation' and 'medium participation' groups: The categories and distribution of jhumias are shown in Table 4.4.

Table 4.4 Distribution of the jhumias according to their organizational participation

Organizational participation based categories	jhumias		Mean	S. D.
	Number (N=75)	Percentage		
No participation(0)	14	18.7		
Low participation (1 to 3)	59	78.6	1.53	1.11
Medium participation (above 3)	2	2.7		
Total	75	100		

It was observed from the data furnished in table 4.4 that about one-fifth (18.7%) of jhumia respondents had no involvement with any organization. The rest of the respondents about four-fifth (78.6%) of the respondent had low participation. From this data of participation, it could be said that the jhumias were not interested to involve with any kind of organizational participation. The reason may be they are traditional and conservative in their social activities.

4.1.5 Knowledge on jhum cultivation

Knowledge on jhum cultivation of the jhumias ranged from 32 to 40, the average being 35.92, standard deviation was 2.45. On the basis of observed knowledge score on jhum cultivation, the jhumias were classified into three categories viz. 'moderate knowledge', 'high knowledge' and 'very high knowledge': The categories and distribution of jhumias are shown in Table 4.5.

Table 4.5 Distribution of the jhumias according to their knowledge on jhum cultivation

knowledge on jhum cultivation based categories	jhumias		Mean	S. D.
	Number (N=75)	Percentage		
Moderate knowledge (up to 33)	25	33.3		
High knowledge (34 to 37)	42	56.0	35.92	2.45
Very high knowledge (above 37)	8	10.7		
Total	75	100		

Data of Table 4.5 reveals that majority (56.0 percent) of the respondents had high knowledge on jhum cultivation category followed by (33.3 percent) had Moderate knowledge and (10.7 percent) high knowledge about one-fifth of the respondent had on jhum cultivation practices. Knowledge is to be considered as vision of an explanation in any aspect of the situation. It is the act or state of understanding; clear perception of fact or truth, that helps an individual to foresee the consequence he/she may have to face in future. It makes individuals to become rational and conscious about related field. The jhum cultivation is the traditional they practices jhum generation after generation so they have high knowledge of jhum cultivation.

4.1.6 Extension media contact

Extension media contact of the jhumias ranged from 14 to 25, the average being 20.49, standard deviation was 2.51 (percent). On the basis of observed extension media contact the jhumias were classified into three categories viz. 'low media contact, 'medium media contact' and 'high media contact. The categories and distribution of jhumias are shown in Table 4.6.

Table 4.6 Distribution of the jhumias according to their Extension media contacts

Extension media contacts based categories	jhumias		Mean	S. D.
	Number (N=75)	Percentage		
Medium contacts(up to 18)	17	22.7		
High contacts (19 to 22)	39	52.0	20.49	2.51
Very high contacts (above 22)	19	25.3		
Total	75	100		

Data presented in Table 4.6 indicated that the highest proportion (52.0 percent) of the jhumias had high extension media contacts category compared to 25.3 percent very high extension media contacts and 22.7 percent medium extension media contact. From the data it was revel that they were good extension media contact of the jhumias. So, it is easy on the part of extension personnel to deliver new jhum technology among the hilly people. The responsibility lice with the extension people.

4.1.7 Training exposure

The Training exposure scores of the jhumias ranged form 0 to 38, the average being 14.01(percent), standard deviation was 12.95 (percent). Based on their training exposure scores, the respondents were grouped into three categories as 'no training exposure' (0), 'short training exposure' (1 to 13 days), 'medium training exposure' (14 to 26 days) and 'high training exposure' (> 26 days). The distribution of the jhumias according to their training exposure is shown in Table 4.8.

Table 4.8 Distribution of jhumias according to their training exposure score

Training exposure based categories (in days)	jhumias		Mean	SD
	Number (N=75)	Percentage		
No training exposure (0)	18	24.0		
Short training exposure (1 to 13)	11	14.6	14.01	12.95
Medium training exposure (14 to 26)	32	42.7		
high training exposure (> 26)	14	18.7		
Total	75	100.0		

Data in table 4.8 revealed that the more than three-fifth (76%) of the respondents had received short, medium and high duration training. But regrettably about one forth (24%) received no training. Training generally increases knowledge and skills of individuals, which they can apply to their farm operations. Training exposure is an important factor, which enhances demand of knowledge and improves skills on various aspects of agricultural technologies. Therefore, a trained farmer would like to update and incorporate her/his knowledge and skill in her/his jhum practices.

4.1.7 Aspiration

Aspiration of the jhumias ranged from 4 to 22, the average being 14.72, standard deviation was 3.82 (percent). On the basis of observed aspiration, the jhumias were classified into three categories viz. 'low aspiration', 'medium aspiration' and 'high aspiration': The categories and distribution of jhumias are shown in Table 4.7.

Table 4.7 Distribution of the jhumias according to their aspiration

Aspiration based categories	jhumias		Mean	S. D.
	Number (N=75)	Percentage		
Low (up to 12)	20	26.7	14.72	3.82
Medium (13 to 17)	38	50.7		
High (above 17)	17	22.7		
Total	75	100		

Data presented in Table 4.7 indicated that the highest proportion 50.7 percent of the jhumias was the medium aspiration category compared to 26.7 percent and 22.7 percent low and high aspiration category respectively. Data also indicates that the medium aspiration farmers constitute about half of the respondents. Data from the table revel that the jhumias hold high aspiration of education, profession, accommodation, modern decoration and political ambition. So, extension personnel have good environment to work with jhumia on the basis of their aspiration.

4.2 Section II: Extent of adoption of jhum cultivation

Extent of adoption in jhum cultivation by the hilly farmers ranged form 37-100 the average being 78.53, standard deviation was 12.03 (percent). On the basis of observed extent of adoption score respondents were classified into three categories viz. 'Medium extent of adoption, 'High extent of adoption' and 'Very high extent of adoption. The categories and distribution of jhum farmers are shown in Table 4.9.

Table 4.9 Distribution of jhum farmers according to their adoption of jhum cultivation score

Extent of adoption based categories	Jhumias		Mean	S. D.
	Number (N=75)	Percentage		
Medium extent of adoption(26 to 50)	5	6.7	78.53	12.03
High extent of adoption (51 to 75)	13	17.3		
Very high extent of adoption (above 76)	57	76.0		
Total	75	100		

Findings indicated that the highest proportion 76.0 percent of the jhumias fell into very high extent of adoption category compared to 17.3 percent high extent of adoption and 6.7 percent medium extent of adoption category. That is, an overwhelming majority of the jhumias had very high extent of adoption. In this situation it is very difficult to convince the jhumias to adopt the modern practices leaving the jhum cultivation. Unless/until DAE and research institute can provide with better technologies than jhum cultivation the jhumias are suppose to continue their old agricultural practices that is jhum cultivation.

4.3 Section III: Relationship between the selected characteristics of the farmers with their adoption of jhum cultivation by the hilly farmers

This section deals with the relationships of the eight selected characteristics of the farmers with their adoption of jhum cultivation. The selected characteristics are (i) age, (ii) level of education, (iii) Annual family income, (iv) Organization participation, (v) Knowledge on jhum cultivation, (vi) Extension media contact, (vii) Aspiration, . (viii) Training exposure. Pearson's product moment correlation co-efficient 'r' has been used to test the hypothesis concerning the relationships between

two variables. The relationship between the variables has been described in the separate sub-section of this section (each deals with one independent and one dependent variable). Five percent and one percent level of significance were used as the basis for acceptance or rejection of any null hypothesis. The summary of the results of the correlation co-efficient between the selected characteristics of the respondents with their adoption of jhum cultivation is shown in Table 4.10.

Table 4.10 Co-efficient of Correlation (r) showing relationship between the respondents' selected characteristics and the adoption of jhum cultivation

Respondents' selected characteristics (Independent variables)	Dependent variable	Co-efficient of Correlation (r)	Tabulated value of 'r' of 73 degrees of freedom (n = 75)	
			0.05%	0.01%
Age		-0.163_{NS}		
Level of education		-0.080_{NS}		
Annual family income		$0.227*$		
Organization participation	Adoption of jhum cultivation by the hilly farmers	-0.129_{NS}		
Knowledge on jhum cultivation		0.083_{NS}	0.226	0.295
Extension media contact		$0.341**$		
Aspiration		$0.235*$		
Training exposure		0.093_{NS}		

NS = Not significant

** = Significant at the 0.01 level

* = Significant at the 0.05 level

54

4.3.1 Relationship between age and adoption of jhumias of jhum cultivation

In order to determine the relationship between age of the jhumias and their adoption of jhum cultivation, the following null hypothesis was tested:

"There was no relationship between age of the farmers and their adoption of jhum cultivation."

The correlation co-efficient between age of the respondents was computed and found to be -0.163 as shown in table 4.10. This led to the following observations regarding the relationship between the two variables under consideration:

- o The relationship between the two variables was showed a negative trend.
- o The computed value of "r" (r = -0.163) was found to be smaller than the tabulated value (r = 0.226) with 73 degrees of freedom at 0.05 level probability.
- o The correlation co-efficient between the concerned variables was not significant at 0.05 level of probability.
- o The null hypothesis could be accepted.

The findings imply that the age of the farmers had no significant relationship with their adoption of jhum cultivation. It might be concluded that age of the farmers was not play important role in adoption of jhum cultivation. Hossain (2003), Rahman (2001) also found similar result.

4.3.2 Relationship between level of education of the farmers and their adoption of jhum cultivation

In order to determine the relationship between level of education of the farmers and their adoption of jhum cultivation, the following null hypothesis was tested:

"There was no relationship between level of education of the farmers and their adoption of jhum cultivation."

The correlation co-efficient between level of education of the respondents was computed and found to be -0.080 as shown in table 4.10. This led to the following observations regarding the relationship between the two variables under consideration:

- o The relationship between the two variables was showed a negative trend.
- o The computed value of "r" (r = -0.080) was found to be smaller than the tabulated value (r = 0.226) with 73 degrees of freedom at 0.05 level probability.
- o The correlation co-efficient between the concerned variables was not significant at 0.05 level of probability.
- o The null hypothesis could be accepted.

The findings imply that the level of education of the farmers had no significant relationship with their adoption of jhum cultivation. It means that the higher education of the farmers had lower level of adoption in jhum cultivation. Similar result also found by the Raha(1989) and Ali(1978).

4.3.3 Relationship between annual family income of the farmers and their adoption of jhum cultivation

In order to determine the relationship between annual family income of the farmers and their adoption of jhum cultivation, the following null hypothesis was tested:

"There was no relationship between annual family income of the farmers and their adoption of jhum cultivation."

The correlation co-efficient between annual family income of the respondents was computed and found to be 0.227 as shown in table 4.10. This led to the following observations regarding the relationship between the two variables under consideration:

o The relationship between the two variables was showed a positive trend.
o The computed value of "r" (r = 0.227) was found to be greater than the tabulated value (r = 0.226) with 73 degrees of freedom at 0.05 level probability.
o The correlation co-efficient between the concerned variables was significant at 0.05 level of probability.
o The null hypothesis could be rejected.

The findings imply that the annual family income of the farmers had positive significant relationship with their adoption of jhum cultivation. It means higher income is not reflects the higher adoption of jhum cultivation. Because jhum crops are not enough to meet the farmers every day needs, it grown low range. Ahamed (2006) found that the annual family income of the rice growers had a positive significant relationship with the adoption of selected rice production technologies. Hussen (2001), Khan (1993), Pal (1995) and Chowdhury (1997) also found the similar findings.

4.3.4 Relationship between organization participation of the farmers and their adoption of jhum cultivation

In order to determine the relationship between organization participation of the farmers and their adoption of jhum cultivation, the following null hypothesis was tested:

"There was no relationship between organization participation of the farmers and their adoption of jhum cultivation."

The correlation co-efficient between organization participation of the respondents was computed and found to be -0.129 as shown in table 4.10. This led to the following observations regarding the relationship between the two variables under consideration:

- o The relationship between the two variables was showed a negative trend.
- o The computed value of "r" (r = -0.129) was found to be smaller than the tabulated value (r = 0.226) with 73 degrees of freedom at 0.05 level probability.
- o The correlation co-efficient between the concerned variables was not significant at 0.05 level of probability.
- o The null hypothesis could be accepted.

The findings imply that the organization participation of the farmers had no significant relationship with their adoption of jhum cultivation. It might be concluded that the organizational participation of the jhumias was not an important factor for adoption of jhum cultivation. This finding has conformity with the findings of Kher (1992) also found the similar findings.

4.3.4 Relationship between knowledge on jhum cultivation of the farmers and their adoption of jhum cultivation

In order to determine the relationship between knowledge on jhum cultivation of the farmers and their adoption of jhum cultivation, the following null hypothesis was tested:

"There was no relationship between knowledge on jhum cultivation of the farmers and their adoption of jhum cultivation."

The correlation co-efficient between knowledge on jhum cultivation of the respondents was computed and found to be 0.083 as shown in table 4.10. This led to the following observations regarding the relationship between the two variables under consideration:

- o The relationship between the two variables was showed a positive trend.
- o The computed value of "r" (r = 0.083) was found to be smaller than the tabulated value (r = 0.226) with 73 degrees of freedom at 0.05 level probability.
- o The correlation co-efficient between the concerned variables was not significant at 0.05 level of probability.
- o The null hypothesis could be accepted.

The findings imply that the knowledge on jhum cultivation of the farmers had no significant relationship with their adoption of jhum cultivation.

4.3.6 Relationship between extension media contact of the farmers and their adoption of jhum cultivation

In order to determine the relationship between extension media contact of the farmers and their adoption of jhum cultivation, the following null hypothesis was tested:

"There was no relationship between extension media contact of the farmers and their adoption of jhum cultivation."

The correlation co-efficient between extension media contact of the respondents was computed and found to be 0.341 as shown in table 4.10. This led to the following observations regarding the relationship between the two variables under consideration:

- o   The relationship between the two variables was showed a positive trend.
- o   The computed value of "r" (r = 0.341) was found to be greater than the tabulated value (r = 0.295) with 73 degrees of freedom at 0.01 level probability.
- o   The correlation co-efficient between the concerned variables was significant at 0.01 level of probability.
- o   The null hypothesis was rejected.

The findings imply that the extension media contact of the farmers had significant relationship with their adoption of jhum cultivation. It might be concluded that contact with extension agents and other extension teaching method changes attitudes jhumias radically and he/she becomes interested to participate in activities which is profitable. Kashem et al. (1990), Bashar (1993), Sarker (1997), Pal (1995), Chowdhury (1997) also found the similar findings.

4.3.7 Relationship between training exposure of the farmers and their adoption of jhum cultivation

In order to determine the relationship between training exposure of the farmers and their adoption of jhum cultivation, the following null hypothesis was tested:

"There was no relationship between training exposure of the farmers and their adoption of jhum cultivation."

The correlation co-efficient between training exposure of the respondents was computed and found to be 0.093 as shown in table 4.10. This led to the following observations regarding the relationship between the two variables under consideration:

- The relationship between the two variables was showed a positive trend.
- The computed value of "r" (r = 0.093) was found to be smaller than the tabulated value (r = 0.226) with 73 degrees of freedom at 0.05 level probability.
- The correlation co-efficient between the concerned variables was not significant at 0.05 level of probability.
- The null hypothesis could be accepted.

The findings imply that the training exposure of the farmers had no significant relationship with their adoption of jhum cultivation. It might be concluded that the training exposure of the jhumias was an important factor for not adoption of jhum cultivation. This finding has conformity with the findings of Islam (2002) training exposure also found the similar findings

4.3.8 Relationship between aspiration of the farmers and their adoption of jhum cultivation

In order to determine the relationship between aspiration of the farmers and their adoption of jhum cultivation, the following null hypothesis was tested:

"There was no relationship between aspiration of the farmers and their adoption of jhum cultivation."

The correlation co-efficient between aspiration of the respondents was computed and found to be 0.235 as shown in table 4.10. This led to the following observations regarding the relationship between the two variables under consideration:

- The relationship between the two variables was showed a positive trend.
- The computed value of "r" (r = 235) was found to be greater than the tabulated value (r = 0.226) with 73 degrees of freedom at 0.05 level probability.
- The correlation co-efficient between the concerned variables was significant at 0.05 level of probability.
- The null hypothesis could be rejected.

The findings imply that the aspiration of the farmers had significant relationship with their adoption of jhum cultivation. The finding indicates that the low aspiration of the jhumias.

4.4 Problem faced by the hilly farmers in jhum cultivation

Problem confrontation scores of the jhumias ranged from 21 to 70 with an average 47.28 and a standard deviation 12.02. On the basis of problem confrontation of the respondents were classified into four categories viz. very low problem, low problem, medium problem, high problem. The categories and distribution of the jhumias are shown in Table

Table 4.12 Categories of the jhumias according to their problem confrontation

Problem confrontation categories (score)	Jhumias		Mean	SD
	Number (N=75)	Percent		
Very low problem confrontation (up to 33)	09	12.0		
Low problem confrontation (34 to 46)	31	41.3	47.28	12.02
Medium problem confrontation (47 to 58)	17	22.7		
High problem confrontation (>58)	18	24.0		
Total	75	100		

Data contained in table 4.4 reveal that highest proportion (41.3 percent) of the respondents had low problems confrontation in the implementation of jhum cultivation where as 22.7 percent of the respondents had medium problem confrontation in the jhum cultivation, 24 percent problem confrontation of the respondents had high problem confrontation and 12 percent of the jhumias felled into very low problem in the jhum cultivation. So, it was found that the recipients faced low problem in jhum cultivation.

Chapter 5

Summary, Conclusion And Recommendation
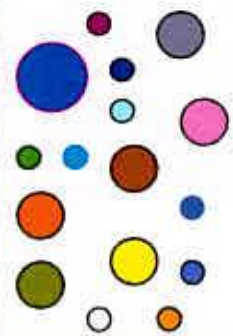
CHAPTER V

SUMMARY, CONCLUSION AND RECOMMENDATION

5.1 Summary

5.1.1 Introduction

The adoption of jhum cultivation depends upon a number of factors including hilly farmers' characteristics. The success of any technology depend on its dissemination among the potential users, which ultimately measured by its level of adoption. The main purpose of the study was to have an understanding on the adoption of jhum cultivation by the hilly farmers and about some selected factor contributing in the adoption of jhum cultivation. To direct the study properly the following objectives were set

1. To ascertain the extent of adoption of jhum cultivation by the hilly farmers
2. To explore the relationship of selected characteristics of the hilly farmers with their extent of adoption of jhum cultivation; and
3. To determine the problems faced by the farmers in jhum cultivation
4. To determine the problems faced by the farmers in jhum cultivation

5.1.2 Methodology

The study was conducted in Sadar upazila of Rangamati district. The area was selected because of its characteristics of availability of jhum cultivations. Moreover, its socio-economic futures were well known to the researcher. The survey area is in 20 km far off from the district headquarter. The study was conducted in Sadar upazila of Rangamati district. The area was selected because of its characteristics of availability of jhum cultivations. Moreover, its socio-economic features were well

known to the researcher. The survey area was 20 km far off from the district headquarter. Sadar upazila of Rangamati district has 6 unions. Among them two unions namely Sapchhari and Kutukchhari were purposely selected as the locale of the study. The selected unions had 6 mouzas. Out of these three Mouzas namely, Sapchhari, Sukkurchhari and Kutukchhari were randomly selected.

The target population was hilly farmers who engaged in jhum cultivation. An update list of the jhumias selected with the help of Sub Assistant Agriculture Officer (SAAO) from the three mouza of two unions. In order to set cross sectional view, these three mouzas were selected purposively for target population from the two unions. These two unions were also selected purposively from the whole upazila. A list of 750 farmers was constituted the population of the study. However at the rate of 10 percent 75 jhumia were selected randomly to constitute the sample size. A reserve list of 8 jhumias was also prepared at 1 percent rate with a view to interview them when any jhumias of the main list were found to be absent at the time of interview.

Collected data were coding and tabulating, categorization, processing and statistical analyzed in accordance with the objectives of the study. Various statistical measures like number, percentage distribution, range, mean, standard deviation, correlation coefficient etc. Correlation coefficient was calculated to explore the relationship between the selected characteristics of the farmers and their adoption of jhum cultivation.

5.1.3 Major findings

According the objectives of the study, the findings were summarized as follows

5.1.3.1 Section I Selected Characteristics of the Jhum Farmers

Age: Age of the jhum farmers ranged from 25 to 80 years, the average being 42.56, standard deviation was 12.53, and coefficient of variation was 29.44 (percent). The highest proportion (48 percent) of the jhum farmers felt in the middle-aged category compared to (20 percent) old and (32 percent) young aged groups.

Level of education: The level of education scores of the jhum farmers ranged form 0 to 10, the average being 2.47, standard deviation was 2.98 and coefficient of variation was 120.65 (percent). The jhum farmers under 'no education' category constitute the highest proportion (37.3 percent) compared to 18.7 percent under 'can sign only' category, 28.0 percent under 'primary level of education' category and 16.0 percent under 'secondary level of education' category.

Annual family income: The Annual family income scores of the jhum farmers ranged form 17 to 311, the average being 94.67, standard deviation was 58.54 and coefficient of variation was 61.84 (percent). The jhum farmers having very low income constitute the highest proportion (50.7 percent) followed by jhum farmers having low annual income (36.0 percent), medium annual family income (10.7 percent) and high annual family income (2.7 percent).

Organizational participation: Organizational participation of the jhum farmers ranged from 0 to 5 years, the average being 1.53, standard deviation was 1.11, and

coefficient of variation was 72.55 (percent). The highest proportion (78.6 percent) of the jhum farmers felt in the low participation category compared to (18.7 percent) no participation and (2.7 percent) medium participation category.

Knowledge on jhum cultivation: Knowledge on jhum cultivation of the jhum farmers ranged from 32 to 40 years, the average being 35.92, standard deviation was 2.45, and coefficient of variation was 6.82 (percent). Majority (56.0 percent) of the respondents fell in moderate knowledge on jhum cultivation category followed by 33.3 percent in low knowledge category and 10.7 percent in high knowledge category.

Extension media contact: Extension media contact of the jhum farmers ranged from 14 to 25, the average being 20.49, standard deviation was 2.51, and coefficient of variation was 12.25 (percent). The highest proportion (52.0 percent) of the jhum farmers felt in the medium extension media contacts category compared to (25.3 percent) high extension media contacts and (22.7 percent) low extension media contact category.

Aspiration: Aspiration of the jhum farmers ranged from 4 to 22 years, the average being 14.72, standard deviation was 3.82, and coefficient of variation was 25.95 (percent). The highest proportion (50.7 percent) of the jhum farmers felt in the medium aspiration category compared to (26.7 percent) low and (22.7 percent) high aspiration category.

Training exposure: The Training exposure scores of the jhum farmers ranged form 0 to 38, the average being 14.01, standard deviation was 12.95 and coefficient of

variation was 92.43 (percent). The majority (42.7 percent) of the jhum farmers had medium training exposure compare to 18.7 percent had high training exposure, 14.7 percent had short training exposure. But 24.0 percent of the respondents were found under no training exposure category.

5.1.3.2 Section II: Extent of adoption of jhum cultivation

Extent of adoption in jhum cultivation by the hilly farmers ranged form 19-48 the average being 78.53, standard deviation was 11.66 percent. The highest proportion 76.0 percent of the jhumias fell into very high extent of adoption category compared to 17.3 percent high extent of adoption and 6.7 percent medium extent of adoption category.

5.1.3.3 Section III: Relationship between the selected characteristics of the farmers with their adoption of jhum cultivation by the hilly farmers

This section deals with the relationships of the eight selected characteristics of the farmers with their adoption of jhum cultivation. Pearson's product moment correlation co-efficient 'r' has been used to test the hypothesis concerning the relationships between two variables. Five (0.05) percent and one (0.01) percent level of significance were used as the basis for acceptance or rejection of any null hypothesis.

5.2 Conclusion:

On the basis of the findings of the study and the logical interpretation of their meaning in the light of other relevant facts enabled the researcher to draw the following conclusions:

1. All of the hilly farmers had medium to very high adoption of jhum cultivation having no low adoption. This means hilly farmers are bound to practices jhum cultivation because of there ecological demand. Hilly farmers live in the hills for generation after generation. No change was found in their jhum cultivation practices. There may be harmful affects of jhum cultivation including soil erosion and deforestation. So, it could be concluded that jhum cultivation could not be stopped without introducing alternative hilly farming systems.

2. Farmers identified 11 items of their jhum cultivation such as rice, bean, brinjal, zinger, lablab, pumpkin, banana, turmeric, ladies finger, rai, chilly. They learent cultivation of these crops from nature. It was not doubt that jhum cultivation harms the soil and nature. Conclusion could be drawn that some other crops to be included with the listed ones so that soil can not be bared and deforestation does not occur.

3. Levels of education and organization participation among hilly farmers were found to be below national average and negligible respectively. No respondent were found above secondary education, no respondent were found high social participation. It is a reality that many International NGOs are working there for decades. But they could not increase hilly people's educational level they

could not increase people's involvement in social organizations. That's why hilly farmers could not bring any change in their jhum cultivation practices.

4. Annual family income of the hilly farmers was found to be low except a few. Its relationship also showed positive but non significant with their adoption of jhum cultivation. To bringing about changes in jhum cultivation it needs capital investment. They lead very poor life. So, it may be concluded that the availability of alternatives methods is more essential to solve the financial hardship of the jhumia.

5. Aspiration of hilly farmers showed positive and significant relationship with their adoption of jhum cultivation. Majority of the jhumia were found high aspirant category but in the study, aspiration of the farmers were related with the adoption of Jhum cultivation. Therefore, it was concluded that aspiration were influential factor not using Jhum cultivation.

6. Extension media contact of hilly farmers showed positive and highly significant relationship with their adoption of jhum cultivation. Thus, it may be concluded that enhancement of extension media contacts regardely non-adoption of jhum cultivation will help the farmers not to adoption of the jhum cultivation.

5.3 Recommendations

5.3.1 Recommendation for policy implication

On the basis of the conclusions of the study and also on the present and past experience, the following recommendations are formulated as bellows:

1. A decrease rate of adoption of jhum cultivation is vitally important for decreasing jhum cultivation. But being the hilly inhabitants most of the jhumias were found to be high adapters. To bringing about changes in jhum cultivation there should be a national commitment. In this regard BARI, BRRI, DAE and other research and extension organization should undertake continues research to develop alternate cultivation methods instead of jhum.

2. Finding of the study reveal that literacy rate among hilly farmers is below national average. Their organizational participation is also low. So, it is recommended that DAE, NGOs and other government and non government organization should undertake separate general and technical programs for hilly farmers.

3. Annual family income of the hilly farmers showed positive and significant relationship with their adoption of jhum cultivation. It is therefore, recommended that concerned authorities could take various types of income generating programs for farmers so that they could decrease their jhum cultivation practices.

4. Extension media contact of hilly farmers showed positive and highly significant relationship. Therefore, it is recommended that the concerned authorities should take cognizance of these facts and take necessary steps to increase the extension media contact of the farmers which will help to decrease the jhum cultivation.

5.3.2 Recommendation for further research

Short term and sporadic study being conducted in some specific location and mainly highlights some aspect of particular dimension (Adoption of jhum cultivation by the hilly farmers) of agricultural development cannot provide all information for proper understanding related to actual adoption of jhum cultivation. Further studies should be undertaken covering more dimensions in the related matters. The following recommendations are suggested in this connection:

1. This study was conducted in the three mouza of two unions under Rangamati sadar upazila. Similar studies are required to be conducted in other sites of the country.

2. The present study was concern only with the extent of adoption of jhum cultivation. It is therefore suggested that future studies should included awareness of jhum cultivation, Attributes of jhum cultivation and use of information sources in relation to adoption stage and categories.

3. This study investigated the relationship of eight characteristics viz. age, education, annual family income, Organization participation, Knowledge of jhum cultivation, Extension media contact, Training exposure, Aspiration of the farmers with their adoption of Jhum cultivation as dependent variables. Therefore, it is recommended that further study be conducted with other independent and dependent variables.

4. The Jhum farmers face other constraints such as social, economic, housing, sanitation, nutrition and domestic etc. There is need for undertaking research on the various constraints faced by the farmers which affect their performance.

Chapter 6

Bibliography
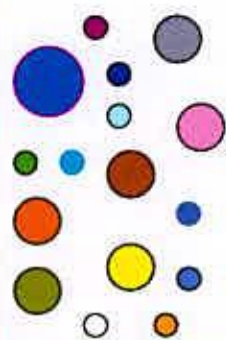
BIBLIOGRAPHY

Alexznder, C. and Goodhue, R.E. 2002. The Pricing of Innovations: An Applications to Specialized corn traits. Agribusiness New York. 18 (3): 333-348.

Aurangozeb, M.K. 2002. Adoption of Integrated Homestead Farming Technologies by the Rural Women in RDRS, M.S. (Ag. Ext. Ed.) Thesis, Department of Agricultural Extension Education. Bangladesh Agricultural University, Mymensingh.

Ali, R.N. and M.M. Rahman (1978). An evaluation of women development programme of Mymensingh district: A programme assessment. Bangladesh Agricultural University, Mymensingh.

Ahamed, F. 2006. Adoption of selected rice production technologies by the garo farmers of Bangladesh. M.S. (Ag.Ext.) Thesis, Department of Agricultural Extension and information system, Sher-e-Bangla Agricultural University, Dhaka, Bangladesh.

Bashar, M.K. 1993. Adopton of Intercropping in Sugarcane Cultivation. M.S. (Ag. Ext. Ed.) Thesis. Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh, Bangladesh.

Bari, M.A. 2000. Attitudes of Farmers towards Hybrid Rice Aalok 6201. M.S. (Ag. Ext. Ed.) Thesis, Depatment of Agricultural Extension Education. Bangladesh Agricultural University. Mymensingh.

BBS. 2008. *Statistical Year Book of Bangladesh. Bangladesh Bureau of Statistics,* Statistics Division. Ministry of Planning, Government of the People's Republic of Bangladesh.

Bavalatti, V.G. and B. Sundaraswamy 1990. "Adoption of Dryland Farming Practices by the Farmers of Bijapur District". Indian Journal of Extension Education, 26 (3 & 4): 67-69.

Bezbora, S.N. 1980. Factors Affecting Adoption of Improved Agricultural Technologies for Paddy Cultivation by the Farmers of Assam. Summary of Extension Research. 6: 24-27. Department of Extension Education, Punjab Agricultural University, Ludhiana.

Chowdhury, M.S.A. 1997. Adoption of Selected BINA Technologies by the Farmers of Boyra Union in Mymensingh District. M.S. (Ag. Ext Ed.) Thesis. Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh, Bangladesh.

Copp, J.H. and E.T. AL. 1958. The Function of Information Sources in Farm Practice Adoption Process. *Rural Sociology.* 23: 146-147 In. Islam, M.S. 2000. Farmers Perception of the Harmful Effects of Using Agro-Chemicals in Crop Production with Regard to Environmental Pollution. Ph.D. Thesis. Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh.

Gebre, T.M. Nigussie and D. Tanner. 2002. Maize Technology Adoption in Ethiopia: experiences from the Sasakawa Globe 2000. Agriculture Programme. Enhancing the Contribution of Maize to Food Security in Ethiopia. Proceedings of the second National Maize Workshop of Ethiopia, 12-16 November, 2001. 153-156, Addis Ababa.

Gogoi, S.K. and Gogoi, D.K. 1989. Adoption of Recommended Plant Protection Practices in Rice. Indian Journal Extension Education. 25 (1&2): 26-29. Goode, W.J. and P.K. Hart 1952. Methods of Social Research. New York: McGraw-Hill Book Company, Inc.

Goode, W.J. and P.K. Hatt. 1952. *Methods of Social Research*. New York: Mc Grow-Hill Book Company, Inc.

Haider, M.R. Halim, A. and Kashem, M.A. 2001. Adoption of Improved Package of practices for Trans-planting Aman Rice Cultivation. Bangladesh Journal of Nuclear Agricultural, Vol. (16 & 17): 77-84.

Haque, M.M. 2003. Fanners' Adoption of Modern Maize Cultivation Technologies. M.S. (Ag.Ext.Ed.) Thesis. Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh, Bangladesh.

Hasan, M.M. 2003. Adoption of Recommended Potato Cultivation Practices by the Fanners in some Selected Area of Rajshahi District. M.S. (Ag.Ext.Ed.) Thesis, Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh, Bangladesh.

Hasan, M.Z. 1996. Adoption of some Selected Agricultural Technologies among the Fanners as Perceived by the Frontline GO and NGO Workers. M.S. (Ag. Ext. Ed.) Thesis, Department of Agricultural Extension Education. Bangladesh Agricultural University, Mymensingh, Bangladesh.

Hossain, M.M. 2003. Farmers' knowledge and Adoption of Modern Boro Rice Cultivation Practices. M.S. (Ag.Ext.Ed.) Thesis, Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh, Bangladesh.

Hossain, A. 1989. Problems Faced by the Researchers and Extension Personnel in Technology Generation and Transfer. *M.S. (Ag. Ext. Ed.) Thesis*. Department of Agricultural Extension Education. Bangladesh Agricultural University. Mymensingh.

Hossain, S.M.A. 1985. A study on the Landless Labourers in Bhabakhali Union of Mymensingh District. *M Sc (Ag. Ext. Ed.) Thesis*. Department of Agricultural Extension and Teachers' Training. Bangladesh Agricultural University. Mymensingh.

Hossain, M.A. 1971. Adoption of Improved Farm Practices by the Transplanted Aman Rice Growers in Gouripur Union of Mymensingh District. *M. Sc. (Ag. Ext. Ed.)Thesis*, Bangladesh Agricultural University, Mymensingh.

Hussen, M.A. 2001. Farmers' Knowledge and Adoption of Modern Sugarcane Cultivation Practices. M.S. (Ag. Ext. Ed.) Thesis. Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh, Bangladesh.

Islam, M.M. 1993. Adoption of Improved Practices on Potato Cultivation by the Potato Farmers of Sonatola Union Under Bogra District. M.S. (Ag. Ext Ed.) Thesis. Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh, Bangladesh.

Islam, M.M. 1996. Farmers use of Indigenous Technical knowledge (ITK) in the Context of Sustainable Agricultural Development. M.S. (Ag. Ext. Ed.) Thesis. Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh, Bangladesh.

Islam, M.S. 2002. Adoption of Modern Agricultural Technologies by the Farmers of Sandwip. M.S. (Ag.Ext.Ed.) Thesis, Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh, Bangladesh.

Islam, M.M. and D. Ahmed. 1987. Analysis of homestead production and utilization, system. Research Report 1986-89. Regional Agricultural Research Station, fshurdi, Pabna, Bangladesh Agricultural Research Institute.

Islam, M.S., A.K.M.A.H. Bhuiyan and A.M.A. Karim. 1996. Women participation in agricultural income generating activities. *Journal of the Asiatic Society of Bangladesh Science*. 22(2): 149-153.

Juliana, C.S., Annamalai, R. and S.S. Daram. 1991. Adoption of Integrated pest Management Practices. Indian Journal of Extension Education. 27 (3 & 4): 21-27.

Karim, A.S.M.Z. 1973. Adoption of Fertilizers by the Transplanted Aman Rice Growers in Kewatkhali Union of Mymensingh District. M. Sc. (Ext. Ed.) Thesis, Bangladesh Agricultural University.

77

Kashem, M.A.and Halim, A. 1991. Use of Communication Media in the Transfer of Technologies of Farmers: a Farm Level Study. Research Monograph No. 2, Department of Agricultural Extension Education. Bangladesh Agricultural University, Mymensingh, Bangladesh.

Kashem, M.A. and M.M. Islam 1990. Comparative Analysis of Knowledge, Attitude and Adoption of Agricultural Practices between the Contact and Non-contact Farmers Under the T & V System. Bangladesh Journal of Extension Education, 5 (1&2): 1-7.

Kaur, M.R. 1988. An Evaluation study of Women Development Programme under Indo-German Dhauhadhar Project Palampur District Kumgra, H.P. Harayana Agricultural University. Thesis Abstract. 16 (4): 258.

Kerlinger, F.N. 1973. Foundations of Behabioural Research- 2nd Edn. Delhi: Surjeet Publications.

Khan, M.A. H. 1993. Adoption of Insecticides and Related Issues in the Villages of Pachori Union. Madaripur District. M.S. (Ag. Ext Ed.) Thesis. Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh, Bangladesh.

Kher, S.K. 1992. "Adoption of Wheat Cultivation Practices". Indian Journal of Extension Education, 22 (1 & 2): 97-99.

Koch, B.H. 1985. "The Agricultural Development Practices." *South African Journal of Agricultural Extension.* XXVI (3&4): 86-91

Mohammad, A. 1974. A study on the Farmers' Adoption of Insect Control Measures and Related Aspects. M.Sc. (Ag.Ext.Ed.) Thesis, Department of Agricultural Extension and Teachers' Training. Bangladesh Agricultural university, Mymensingh, Bangladesh.

Mostafa, M.G. 1999. Adoption of Recommended Mango Cultivation Practices by the Mango Growers of Nawabganj Sadar Thana. M.S. (Ag. Ext. Ed.) Thesis. Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh, Bangladesh.

Muttaleb, A. 1998. Relationship of Selected Characteristics of Potato Growers with their Adoption of Improved Potato Technologies. M.S. (Ag.Ext.Ed.) Thesis, Bangladesh Agricultural University, Mymensingh, Bangladesh.

Mansur, M.A.A. 1989. Farmer's Problem Confrontation in Feeds and Feeding Cattle in Sonapur union of Raipur upazila under Lakshmipur District. An *M.S. (Ag. Ext. Ed.) Thesis.* Department of Agricultural Extension Education. Bangladesh Agricultural University. Mymensingh.

Nikhade, D.M., R.S. Bhople and N.M. Kale, 1995. Adoption Gaps Among Small and Big Cotton Growers. Indian Journal of Extension Education. XXXI (1 to 4): 120-123.

Osunloogun, A., Ademoyo, R. and Ariyanwu, E. 1996. "The Adoption of Innovations by Co-operative Farmers in Nigeria." Tropical Agriculture, 63(2): 158-160.

Pal, S.K.1995. Adoption of Recommended Sugarcane Cultivation Practices by the Farmers of Two Selected Centres of North Bengal Sugar Mills. M.S. (Ag. Ext. Ed.) Thesis. Department of Agricultural Extension Education, Bangladesh Agricultural University. Mymensingh, Bangladesh.

Rahman, A. 1987. Socio-economic impact of pomora community forestry project. A paper presented to the 12th Bangladesh Science Conference, 10-14 January 1987. Jahangir Nagar University, Savar, Dhaka.

Raha. A.K. 1989. Deep Tubewell Irrigation Problem of the Farmers in the cultivation of Modern Variety of Boro Paddy in two Selected Blocks of Muktagacha Upazila under Mymensingh District. *M.Sc. (Ag. Ext. Ed.) Thesis.* Department of Agricultural Extension and Teachers' Training, Bangladesh Agricultural University. Mymensingh.

Rahman, J. 2005. *Essay on Garo Society (compiled publication),* Garo National Council Of Bangladesh, Birishiri, Netrakona, Bangladesh.

]Rahman, M.H. 2003. Adoption of Year round Homestead Fruit Cultivation Practices in Selected Area of Meherpur District. M.S. (Ag.Ext.Ed.) Thesis, Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh, Bangladesh.

Rahman, M.S. 2001. Knowledge, Attitude and Adoption of the Farmers Regarding Aalok 6201 Hybrid Rice in Sadar l'pazila of Mymensingh

Ray, G.L. 1991. Extension Communication and Management. Calcutta: Naya Prokash.

Razzaque, A. 1999. The Garo Lives (Ph. D. assignment). IPSA, Salna, Gazipur.

Reddy, P.R., Reddy, M.M. and Reddy, D.R. 1987. "Impact of National Demonstration on Knowledge level Attitude and Adoption Behaviour of Farmers in Ranaga Reddy District of Andhra Pradesh state." Journal of Research APAU, 15 (1): 35-38.

Rogers, E.M. 1995. Diffusion of innovations, 4th Edn. New York: The Free Press.

Rosenberg, M. and Hovland. 1960. Research on communication and attitude coated in Triandis, H.C. 1971. Attitude and attitude change, John Willey Publisher, New York.

Raha, A.K. 1989. Deep Tube-well Irrigation Problems of the Farmers in the Cultivation of Boro Paddy in two Selected Blocks of Muktagacha Upazila under Mymensingh district. *M.Sc. (Ag. Ext. Ed.) Thesis,* Bangladesh Agricultural University, Mymensingh.

Rahman, M.A. 1995. "Participation of the Muslim Religious Leaders in Rural Development Activities. M.S. *(Ag. Ext. Ed.) Thesis,* Bangladesh Agricultural University, Mymensingh.

Rahman, M.S. 2001. Knowledge. Attitude and Adoption of the Farmers Regarding Aalok 620! Hybrid Rice in Sadar Upazila of Mymensingh District. *M.S. (Ag. Ext. Ed.) Thesis.* Department of Agricultural Extension Education. Bangladesh Agricultural University. Mymensingh.

Salam, M.A. 2003. Constraints Faced by the Farmers in Adopting Environmentally Friendly Farming Practices. M.S. (Ag.Ext.Ed.) Thesis, Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh, Bangladesh.

Sardar, M.H.U. 2002. "Adoption of IPM Practices by the Farmers Under PETRA Project of RDRS. M.S. (Ag.Ext.Ed) Thesis, Department of Agricultural Extension Education. Bangladesh Agricultural University, Mymensingh, Bangladesh.

Sarker, D.C. 1997. Correlates of Selected Characteristics of Potato Growers with Their Adoption of Improved Potato Cultivation Practices in Five Village of Comilla District. M.S. (Ag. Ext. Ed.) Thesis. Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh, Bangladesh.

Singh, P.K. 1991. Extent of Adoption of selected Recommended Practices by Kinnow Growers of Ferozepur and Faridkot Districts of Punjab. Directorate of Publication, Hariyana, Agricultural University, Thesis Abstract. 17 (3): 209-210.

Sarker, D.C. 1997. Correlates of Selected Characteristics of Potato Growers with Their Adoption of Improved Potato Cultivation Practices in Five Village of Comilla District. M.S. (Ag. Ext. Ed.) Thesis. Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh, Bangladesh.

Slade, R.G. Feder and Shikaria 1988. Reforming Agricultural Extension. The Training and Visit System in India. Quarterly Journal of International Agricultural (3 & 4): 228-246.

Sobhan, M.A. 1975. Adoption of Winter Vegetable Cultivation by the Farmers in Boilor Union of Mymensingh District. M.Sc. (Ag.Ext.Ed.) Thesis, Bangladesh Agricultural University, Mymensingh, Bangladesh.

Swinkels, R.A., K.D. Shepherd, S. Franzel, J.K. Ndufa, E. Ohisson, H. Sjogren, S. Franzel, (ed.) and S.J. Scherr. 2002. Assessing the Adoption Potential of Hedgerow Intercropping for improving soil Fertility. Western Kenya. Trees on the farm: Assessing the Adoption Potential of Agro forestry Practices in Africa, 2002, 86-110.

Saha, B.K 1983. Farmers Problem Confrontation in Respect of Breeding of Poultry through Cockrel Exchange Program and other related aspects in Dewkhali *Union* of Phulbaria Thana under Mymensingh District, *M.S. (Ag. Ext. Ed.) Thesis.* Department of Agricultural Extension and Teachers Training, Bangladesh Agricultural Uimersity, Mymensingh..

Sardar, M.H.U. 2002. Adoption of IPM Practices by the Farmers under PETRA Project of RDRS *M.S. (Ag. Ext. Ed.) Thesis.* Department of Agricultural Extension Education. Bangladesh Agricultural University, Mymensingh.

Townsend, J.C. 1953. *Introduction of Experimental Methods.* International Student Edition, New York. McGraw-Hill-Book Company, Inc.

Zegeye, T., B. Tadesse, S. Tesfaye, M. Nigussie, D. Tanner and S. Afriye. 2002. Determinants of adoption of Improved Maize Technology in Major Maize Growing Regions of Ethiopia. Enhancing the Contribution of Maize of Food Security in Ethiopia. Proceeding of the National Maize Workshop of Ethiopia, 12-16, November 2001. 125-136,Addis Ababa.

Appendices
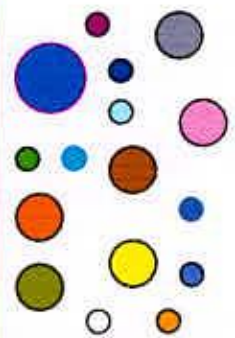
(English Version of the Interview Schedule)

Department of Agricultural Extension and Information System
Sher-e-Bangla Agricultural University
Dhaka-1207

An Interview Schedule
On
Adoption of Jhum cultivation by the Rangamati Hilly Farmers

Sample No...............
Date........................

Name of the respondent	:
Husband / Father's Name	:
Mouza	:
Union	:
Upazilla	:
District	:

(Please answer the following questions)

1. Age

What is your present age? .... years

2. Education

Please state your level of educational? Give (√) to appropriate please / Gill in the blanks

    i.   I can't read and write (--------)

    ii.   I can sign only (---------)

    iii.   I have passed class (---------)

    iv.   I have studies up to (-----------)

3. Annual family income

Please indicate your annual family income in Taka from the following sources:

Sl. No	Source of income	Total amount of income	Per unit market value (Tk)	Total market value
(a) Form the Agricultural sectors				
01.	Rice			
02.	Maize			
03.	Rang			
04.	Bean			
05.	Mustard			
06.	Lin seed			
07.	Cucumber			
08.	Pumpkin			
09.	Brinjal			
10.	Papaya			
11.	Chilli			
12.	Banana			
13.	Potato			
14.	Cotton			
15.	Zinger			
16.	Turmeric			
17.	Bamboo & tree			
18.	Fruit & vegetables			
19.	Poultry rearing			
20.	Livestock			
(b) Form the non – Agricultural sector				
1.	Handicrafts			
2.	Tailoring & Dress making			
3.	Business			
4.	Daily labours			
Total = a + b				

4. Organizational Participation

Sl. No	Name of Organization	Not involved	Nature of participation		
			Ordinary member	Executive member	Officer of the executive committee
1.	Samaby samity				
2.	Tribal Organization				
3.	School committee				
4.	Masque/ Mandir/ Girza/ Kyang committee				
5.	Bazar committee				
6.	Local Panchayet committee				
7.	Club or others				

5. Knowledge on jhum cultivation

Sl. No.	Questions	Total scores	Scores obtained
01.	What is jhum cultivation?		
02.	When seeds are sown for jhum cultivation?		
03.	What kind of crops is grown in jhum cultivation?		
04.	When crops are harvested?		
05.	When hills are burn in jhum cultivation?		
06.	Mention two harmful insect of Brinjal.		
07.	Mention one insect of chilli		
08.	What is the main problem of Turmeric cultivation?		
09.	What is the main problem of Bean cultivation?		
10.	What is the main problem of cotton cultivation?		
11.	What is the main problem of Banana cultivation?		
12.	In which month Banana is cultivated?		
13.	Name three variety of Banana plant.		
14.	When Rice seed are sown?		
15.	Name two hybrids variety of Rice.		
16.	Name two harmful insects of Rice.		
17.	Name two variety of ladies finger.		
18.	Name two winter vegetables.		
19.	What type of soil needs for vegetables cultivation?		
20.	What is compost?		
Total			

6. Extension Media contact

Mention your nature of contact with the following Extension media

Sl. No.	Extension media	Nature of contact			
		Regularly(3)	Occasionally(2)	Rarely(1)	Not at all(0)
01.	UAO	>4 Time or more/ year	3-4 Time/ year	1-2 Time/ year	0/ year
02.	AEO	> 6/ year	4-6/ year	1-3/ year	0/ year
03.	Head man	5-6/ month	3-4/ month	1-2/ month	0/ month
04.	Neighbors	5-6/ week	3-4/ week	1-2/ week	0/ week
05.	Method demonstration	>4 times/ life	3-4 times/ life	1-2 times/ life	0 times/ life
06.	Result demonstration	>4 times/ life	3-4 times/ life	1-2 times/ life	0 times/ life
07.	Group discussion	>6 times/ year	>4-6 times/ year	1-3 times/ year	0 times/ year
08.	Listening Agril. Programme in Radio	>4 times/ week	3-4 times/ week	1-2 times/ week	0 times/ week
19.	Observing TV Agril. Programme	>4 times/ month	3-4 times/ month	1-2 times/ month	0 times/ month
10.	Visiting Agril. fair	3 times/ year	2 times/ year	1 times/ year	0 times/ year

7. Aspiration

Please mention your own aspiration on the following jobs:

Aspiration		Extent of aspiration				
		No aspiration	Low aspiration	A little aspiration	Medium aspiration	High aspiration
1. **Educational aspiration:** up to which class you want to make your child education?	Keep free for education					
	Up to primary school					
	Up to S.S.C					
	Up to H.S.C					
	Up to Graduate					
	Up to post Graduate					

Aspiration		Extent of aspiration				
		No aspiration	Low aspiration	A little aspiration	Medium aspiration	High aspiration
2. Professional aspiration: what type of job you prefer four your child?	Have no plan					
	Labour					
	Family profession					
	Independent job					
	Commercial farming					
	Government job					
3. Aspiration for accommo- dation: what type of house you want to make in future?	Nothing					
	Only repairing the existing house					
	One thatched house					
	One tin house					
	More than one thatched house					
	Half-wall building					
4. Aspiration for modern decoration: what types of assets do you want to have in future?	Nothing					
	Window screen					
	Bedstead					
	Showcase of take wood made					
	Ornaments					
	Radio / TV					
5. Political aspiration: You gate any opportunity, what is your aspiration politically?	No					
	Occasional supporter					
	Regular supporter					
	Active supporter					
	Mid Leader					
	Top Leader					

8. Training exposure

Did you participate in agricultural training programme? If yes, furnish the following information: Yes/ No

Sl. no	Name of The subject matter	Frequency of the training	Concern organization	Duration of training		Venue of training
				Day	Month	

9. Extent of adoption of jhum cultivation

Please answer the extent of your use on the following practices

Sl. no	Name of the practice technologies	Extent of adoption				
		Regularly	Frequently	Occasionally	Rarely	No adoption
01.	Do you adopt the variety of rice in jhum cultivation?					
02.	Do you adopt the variety of Bean in jhum cultivation?					
03.	Do you adopt the Brinjal in jhum cultivation					
04.	Do you adopt the Zinger in jhum cultivation					
05.	Do you adopt the improved variety of lablab in jhum cultivation?					
06.	Do you adopt the variety of Pumpkin in jhum cultivation?					

Sl. no	Name of the practice technologies	Extent of adoption				
		Regularly	Frequently	Occasionally	Rarely	No adoption
07.	Do you adopt the Banana in jhum cultivation?					
08.	Do you adopt the Turmeric in jhum cultivation?					
09.	Do you adopt the Ladies finger in jhum cultivation?					
10.	Do you adopt the Rang in jhum cultivation?					
11.	Do you adopt the Chilli in jhum cultivation?					
12.	Do you adopt the ash in jhum cultivation to increase soil fertility?					

10. Problem face by the hilly farmers in jhum cultivation

Please mention the problem which you face in jhum cultivation on the following aspect:

A. Lack of land in jhum cultivation

Sl. no	List of problems	Extent of problems				
		Very high	High	Moderate	Low	Very low
1.	Lack of land according to crop demand					
2.	Non-availability of land near the house					
3.	No security to get land					
4.	Land are not available in due time					
5.	Do not have own registered land					

B. Lack of inputs and credit

Sl. no	List of problems	Extent of problems				
		Very high	High	Moderate	Low	Very low
1.	Lack of improved variety					
2.	Seed not-available in time					
3.	Lack of storing facilities for seed preservation					
4.	Credit not available in due time					
5.	High rate of interest for agril. credit					

C. Labour crisis

Sl. no	List of problems	Extent of problems				
		Very high	High	Moderate	Low	Very low
1.	Labour unavailability in the time of forest cutting					
2.	Labour un availability of cheap rate during seed sowing/ dibbling					
3.	Lack of skill labour in peak period					
4.	High cost of laboure during harvesting time					
5.	Unavailability of labour in crop transporting					

D. Harvesting problem

Sl. no	List of problems	Extent of problems				
		Very high	High	Moderate	Low	Very low
1.	Lack of skill Labour for crop harvesting					
2.	Lack of transport to bring crop from the fild to house					
3.	Demand of other crops in the time of Rice harvesting					
4.	Bad effect of one crop residue to other remaining crops yield					
5.	Lack of machinery during crop harvesing					

E. Crop damage by animals (wild pig, Monkey, birds etc.)

Sl. no	List of problems	Extent of problems				
		Very high	High	Moderate	Low	Very low
1.	Crops are damaged Through turn over of soil by pig					
2.	Crops are eaten by stray animals					
3.	Crops are damage by monkey					
4.	Ripen crops are etten by wild bireds					
5.	Crops are eaten by wild cock or hen					

Thank you for your well co-operation

Date: ------------------------------------
                                         Signature of respondent

92

APPENDIX B

CHTs (Chittagong Hill Tracts)

Introduction:

The Chittagong Hill Tracts (CHT), 5093 sq. miles in extent or 10% of Bangladesh- is a unique territory with mountains and beautiful landscapes. While rest of the country is flat and a few feet above the sea level, the CHT in the Southeast is completely different in physical features, landscapes, agricultural practices and soil conditions from the rest of Bangladesh. Plough cultivation, which is a common feature in the plains, is seen only in the plain patches in the mountain valleys. The terrace farming, a common agricultural practice in the mountains is also not seen in the CHT hills, the highest of which is close.

The Chittagong Hill Tracts represents one of the finest scenic views of Bangladesh. Rangamati is one of the special from other two areas. Its 'majestic natural beauty' had been described by Hutchinson as 'The scenery throughout the District is very picturesque, the mixture of hill and valley densely covered with forest and luxurious vegetation, yields the most beautiful and varied effects of light and shade. To be viewed at the best it should be seen from the summits of the main ranges, where the apparently boundless sea of forest is grand in the extreme. The cultivated area of the valleys, dotted here and there, appear as islands carpeted with emerald green, cloths of gold, or sober brown according to the season of the year. The rivers slowly meandering on their way to the sea, now shimmering like liquid gold, and again reflecting in heavy dark shadows every object within reach, all combine to make a picture not easily forgotten.

The DAE sources alleged that the 'jhum' cultivators burn all the shrubs in the area for cultivation, causing soil erosion, (United News of Bangladesh, Rangamati). Khisa (1982) listed various terms used in different parts of the word to mean jhum cultivation which have been listed in table

Table Different name of jhum cultivation used by the different areas tribals

Name of the Region/ Country (Tribe)	Area basis different name
Bangladesh, India (Chakma & Monipuri tribes)	Jhum
Bangladesh (Marma)	Yah
Bangladesh (Tripura)	Hong
Bangladesh (Khiang)	Laing
Bangladesh (Bhom)	Lac
Bangladesh(Chak)	Ippra
Burma	Tongya
Malaysia	Ladang
Africa	Jante
Central America	Milpa
Brazil	Roke
Philippines	Uma

Study area Profile

Rangamati is one of the important places at CHT region. It is covered by tertiary hills in the context of geological formation. Its background is given bellow-

Situation

Rangamati is situated from $21^0 52' N$ latitude to $23^0 45' N$ latitude an $91^0 55' E$ longitude to $92^0 38' E$ longitude.

Historical background

Before the Muslim conquest Rangamati region was a contesting ground between the king of the Tripura and Arakan. In 1966 this region came under the Mughals. It was leased to the English East India Company in 1760-61. in 1737 one tribal leader Sher Mosta Khan took refuge with the Mughals. From this time onward the Chakma settled in this region. That was followed by other ethnic nationals.

Area and Boundary

Rangamati district, with an area of 6116.13 sq km, is bounded by the Tripura State of India on the north, Bandarban district on the south, Mizoram State of India and Chin State of Myanmar on the east, Khagrachhari and Chittagong districts on the west.

Rangamati is a municipal town, consists of 9 wards and 35 mahallas. The area of the town is 64.75 sq km. Rangamati subdivision was turned into a district in 1983. It consists of 10 upzillas, 50 union parishads, 162 mouzas and 1347 villages.

Temperature and Rainfall

Average annual temperature at Rangamati district maximum 34.6^0C and minimum 13.4^0C. Temperature is highest at June-July and lowest at December-January. On the other hand annual average rainfall is 3031 mm.

Major Rivers

Kaptai Lake and major rivers cover one-third area of Rangamati. The H-shaped Kaptai Lake has two arms, Joined by a narrow gorge near Shubolong, a part of old Kornofuli river. Kasalong, the right arm of the lake, is fed by two streams, the Mayni and the Kasalong. Major rivers are Karnofuli, Shubolong, Chingri, Rainkhiang and Kaptai etc.

Population

Total population at Rangamati district 507180 where male 53.59% and female 46.41%. On the other hand the town has a population of 65294 where male 57.68% and female 42.32%. Density of population is 1008 per sq km. at main town. Literacy rate at town people is 60.8%.

Religion

The area of Rangamati is mainly famous for tribal popultion. So, various religious people are found here. According to governmental survey there's found 39.28% Muslim, 5.62% Hindu, 1.12% Christan, 53.83% Buddist, and others 0.15%.

Correlation Matrix

Inter-correlation between 8 characteristics and the dependent variable (N=75)

	X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8	Y
X_1	1								
X_2	-.154	1							
X_3	.241(*)	.139	1						
X_4	-.107	.177	.053	1					
X_5	-.296(**)	.157	-.118	.355(**)	1				
X_6	-.188	-.244(*)	.058	-.038	.068	1			
X_7	-.169	.466(**)	.324(*)	.199	.102	-.104	1		
X_8	.001	-.049	.106	.381(**)	.354(**)	.178	-.043	1	
Y	-.163	-.080	.227(*)	-.129	.083	.341(**)	.235(*)	.093	1

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

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

Legend:

X_1 = Age

X_2 = Level of education

X_3 = Annual income

X_4 = Organization participation

X_5 = Knowledge on Jhum cultivation

X_6 = Extension media contacts

X_7 = Aspiration

X_8 = Training exposure

Y = Extent of adoption in Jhum cultivation