

PROBLEMS OF SUSTAINABLE AGRICULTURE : SHIFTING CULTIVATION IN THE HILLS OF BANGLADESH

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Abstract

Shifting cultivation, more commonly known as "Jhum cultivation" has been in practice for crop production in the hill forests since the neolithic period. The practice is spread to about 14 million square miles in the world and in Asia it comprises of about 50 percent of the deforestation area. This system of cultivation is practiced in the hilly regions of Bangladesh along its eastern and south-eastern border and the people mostly belong to different hill tribes. This paper based on a socio-anthropological study described the specific practices, month-wise practices and identified crops included in the jhum. There are various rituals, beliefs and taboos associated with jhum cultivation practiced by the hill tribes. Deforestation and repeated use of the hill slopes in quick succession threatens sustainability of crop production system in these forest lands.

Key words: Shifting cultivation, Sustainable agriculture, Tribal study and Hill agriculture.

Introduction

Shifting cultivation (Slash and burn/swidden cultivation) was in practice for crop cultivation in the hill forests since the neolithic (Conklin, 1961). According to FAO, total area of shifting cultivation in the world is about 14 million square miles inhabited by 200 million people (Conklin 1961). Bobby (1954) estimated that in Southeast Asia, the shifting cultivation accounts for one third of the total land used for agriculture. The International Rice

Research Institute reports that shifting cultivation accounts for an estimated 50% of the deforestation in Asia, 70% in Africa and 30% in Latin America (IRRI, 1992).

The practice in short may be described as growing crops along the hill slopes by cutting and burning the forests. This results in rapid deforestation and increasing degradation of land which leads to natural disaster and unsustainable hill agriculture.

Shifting cultivation is practiced in the hilly regions of Bangladesh along its east and southeastern border, mostly in the Chittagong Hill Tracts Region inhabited primarily by nearly two dozens of hill tribes.

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The Chittagong Hill Tracts Region includes Khagrachhari, Rangamati and Bandarban Hill districts (Map- 1). Total estimated tribal population is about 4.5 lakhs as per Population Census of 1981. List of tribes is given in Table- 1.

The majority of the tribal people live in the hilly forests with primitive ways of life and practice traditional agriculture which is predominantly integrated farming systems including crop production under shifting cultivation (Jhum cultivation) together with homestead garden, livestock, horticulture and forest trees.

Jhum cultivation is however, the main source of subsistence of these tribal people. The changed circumstances of population pressure and shortage of appropriate land for jhum cultivation possess a threat to bring imbalance in the eco-system and possible modification of these traditional agricultural practices.

However, for any change in the traditional agricultural system like jhum cultivation for more scientific, productive and sustainable agricultural system it is necessary to have deep insight of the traditional systems and its component practices. This paper therefore aims to provide empirical information on jhum cultivation as practiced by the tribal peoples in the hilly regions of Bangladesh for clear understanding of the traditional agricultural production system.

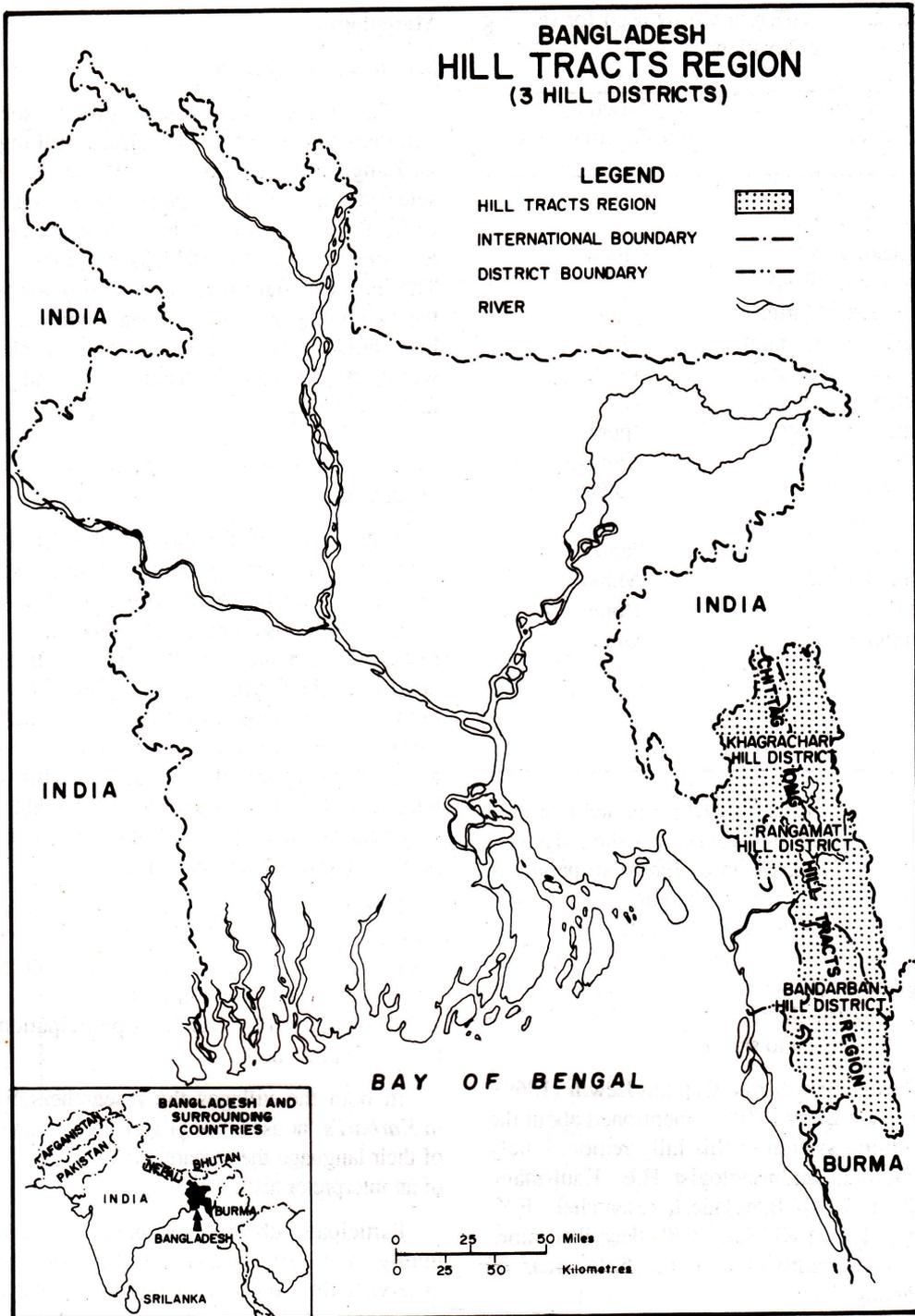
Khisha (1982) listed various terms used in different parts of the world to mean shifting cultivation which have been listed below in Table- 2. In the standard English literature

shifting cultivation is often termed as slash and burn or swidden cultivation as well.

Table 1. List of Tribes and Locations in Bangladesh

Location (District)	Name of Tribe
Chittagong Hill Tracts Region (Rangamati, Bandarban and Khagrachhari Hill Districts)	1. Chakma 2. Marma 3. Mro 4. Tippera 5. Lushai 6. Khumi 7. Tongchangia 8. Bawm 9. Kuki 10. Chak 11. Pankho 12. Banjogi 13. Kheyong 14. Shendu and 15. Riang
Cox's Bazar	1. Rakhain* and
Patuakhali	2. Magh*
Mymensingh	1. Garo and 2. Hajong
Sylhet	1. Khashi and 2. Manipuri
Rajshahi	1. Santal and
Dinajpur	2. Munda
Bogra	
Rangpur	

* Rakhain and Magh are considered to be the same tribe as Marma. There are however some differences in opinion which have been discussed in details elsewhere in this paper.



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Map 1

Table 2. Different words used for shifting cultivation.

Region/Country (Tribe)	Word used for shifting cultivation
Bangladesh, India (Chakma and Monipuri tribes)	Jhum
Bangladesh (Marma)	Yah
Bangladesh (Tippera)	Hog
Bangladesh (Khiang)	Laing
Bangladesh (Bhom)	Lac
Bangladesh (Chak)	Ippra
Burma	Tongya
Malaysia	Ladang
Indonesia	
Africa	Jante
Central America	Milpa
Brazil	Roke
Philippines	Uma

Khan and Khisha (1970) reported that until 1818 A.D. jhum cultivation was the only form of agriculture practiced by the tribal people in the Hill Tracts of Chittagong. They also mentioned about widespread practice of shifting cultivation in the area now known as Bangladesh. With the gradual introduction of plough agriculture, area under shifting cultivation began to shrink.

During British rule Captain Lewin (1869), and Lucien Bernot (1953) mentioned about the agricultural system in this hilly region. Lately one German anthropologist H.E. Kauffmann (1962) and two Bangladesh researchers F.K. Khan and A.M Khisha (1970) described more about jhum cultivation in the hilly areas of Chittagong.

Methology

Selection of study area

The study was based on a social-anthropological research in selected hill region of Bangladesh. Bandarban Hill District was selected for the study primarily because of difficult law and order situation in other hill districts namely, Khagrachhari and Rangamati. The intensive field investigation was made in the two villages namely Resia Tholipara (58 household), Resia Talukderpara (22 household) within the Bandarban Thana of Bandarban district (Map- 2).

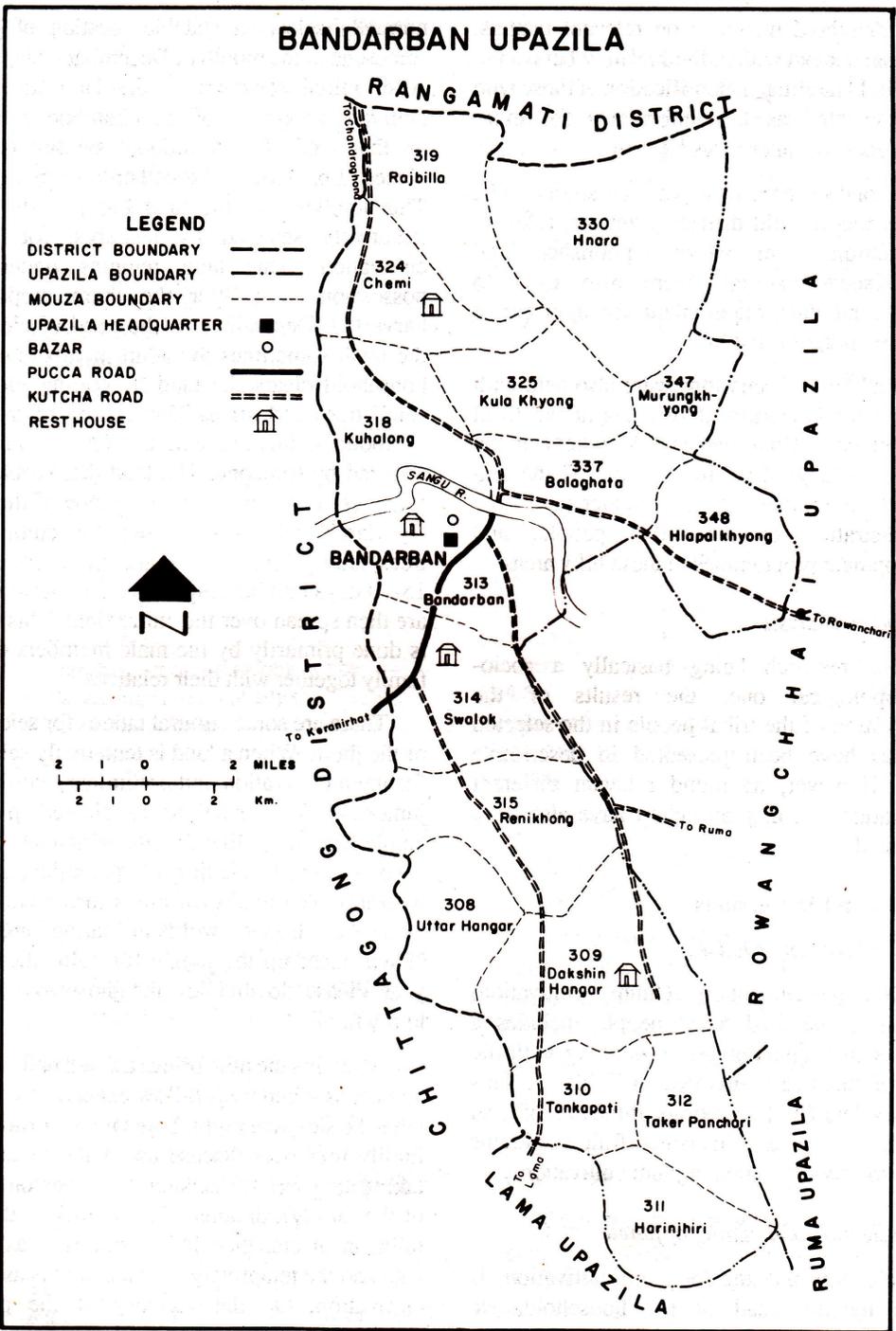
Conduct of field work and method of data collection

Data collection for this research has been made through intensive field work in the study villages. Application of anthropological method of participant observation was followed for this research. Since, these tribal people are illiterate and live in the forest areas, therefore, the other method for collection of data is not suitable. The researchers lived with the people to become accepted members of the society. This was necessary for the researchers to be able to understand their society and culture and to make proper interpretation of the same.

Field work was done for 15 months from January, 1987 to March, 1988. During this period the researchers participated in all their religious, social and cultural events in the villages under study including participation in the jhum cultivation.

In both the villages the researchers lived in *Karbari's* houses. For proper understanding of their language the researchers had to get help of an interpreter also.

Participant observation included visiting family and compounds of the household, observing their daily activities and discussion



GRAPHOSMAN

Map 2

with household members on relevant matters. Personal contact with individual members of the household facilitated identification of those who were selected as key informants for more comprehensive interviews later on.

Secondary data from various sources viz. census reports, old district gazetteer, relevant information from various published and unpublished materials were also used to supplement data requirement for appropriate interpretation of tribal life.

In addition discussions were also held with the various Government officials at the local level namely, Chairman and Members of the Union Parishad, Chairman of the Thana and district administrators to understand the administration of the tribal people, and development programmes in these hilly areas.

Method of analysis

This research being basically a socio-anthropological one, the results of the observation of the tribal people in the selected villages have been presented in descriptive form. However, as found relevant different illustration viz. map and chart have also been presented.

Results and Discussions

Jhum cultivation practices

Shifting cultivation (Jhum cultivation) among the studied tribal people includes a number of sequential practices along with the time of practice mentioned in Table- 3. This follows detailed descriptions of the agricultural practices as well as other rituals followed in this tribal society in relation to jhum cultivation.

Site selection and cutting of jungle

Selection of a site for jhum cultivation is made by the head of the household. He

normally selects a suitable location of jhum sometime in the month of December or January. After initial selection of the land for jhum cultivation a symbol of cross bamboo is posted on that land. The traditional symbol is two pieces of bamboo tied together to form a cross. This implies that the land has already been tentatively selected by someone for jhum cultivation. This land remains under his possession even after the jhum crops are harvested. Depending on the need of clearing the land, sometimes the adult members of the household clears the land by cutting jungles, small trees and grass. This cutting of trees is symbolic indicating that the land is already selected by someone. The land that is selected for jhum is always along the slope of the hill. By March, the land is cleared after cutting the trees, letting the cut leaves and branches dry for 15-20 days and burning these. The burnt ashes are then spread over the entire field. This work is done primarily by the male members of the family together with their relatives.

There are some cultural taboos for selection of the jhum. When a land is tentatively selected for jhum cultivation and preliminary cutting of jungles is done, a small area is cleared up and a bamboo structure like a platform is made there. Two large earthen balls are kept on the bamboo platform. The man then prays to the God and utters the following words in Marma language, "I will clear up the jungle for cultivation this year. Please do not allow the ghosts to do harm to my family."

After this the man brings a small ball of mud and keeps it under his pillow expecting a dream when he sleeps at night. In the next morning the family members discuss about the dream for taking appropriate decision. If the person (head of the family), dreams of eating rice with fish, milk, meat etc. then it is considered as good sign and the tentatively selected land is used for cultivation. On the contrary, if the person

Table 3. Practices of shifting cultivation

Practices	Name of month		
	English	Bengali	Marma
1. Cutting jungles	January	Poush	Braso
2. Drying and Burning jungles	March	Falgun	Tobbon
3. Dibbling seeds (Rice, Marfa, Cotton, Beans, Maize etc.)	April	Chaitra	Taikhuh
4. Broadcasting seeds (Coriander, Mesta)	April	Chaitra	Taikhuh
5. Planting seedling (Lady's finger, Spinach)	April	Chaitra	Taikhuh
6. Line sowing of seeds (Taro, Ginger, Turmeric, Special Flower)	April	Chaitra	Taikhuh
7. First weeding	May	Baishakh	Kassung
8. First harvesting (Coriander, Spinach)	May	Baishakh	Kassung
9. Second weeding	June	Jaishtha	Naiu
10. Harvesting of Marfa	June	Jaishtha	Naiu
11. Third weeding	July	Asharh	Caso
12. Rice Harvesting	September	Bhadra	Toslong
13. Threshing, drying & storing of rice	October	Aswin	Oagyo
14. Harvesting of Maize, Lady's finger, Bean, Potato	October	Aswin	Oagyo
15. Harvesting of Cotton, Ginger, Sesame, Turmeric, Taro	November	Kartik	Tainthongo
	December	Agrahayan	Naitoh

dreams of hair cutting, fun making or wearing white clothing, these are considered as bad signs and the tentatively identified land is not cultivated. He will then search for a new swidden and perform the similar test of whether to select or reject the land for jhum cultivation.

Another way of selecting area for jhum cultivation is also prevailing among the tribal people. After a hill slope is tentatively selected they take few pieces of long (4 inches) leaves in which the following are written in Marma language:

1. Production will be higher.
2. The jhum cultivator will die.
3. Rice production will be lower but the

production of cotton and other crops will be higher.

These leaves are then kept on the top of the head of the farmer. Another person is then asked to draw (select) at random one of the leaves. If the selected leaf is the one with the words "the jhum cultivator will die" then the hill slope is not selected for jhum cultivation. On the contrary if the other leaves are selected then the location is chosen for the jhum cultivation.

Once the jhum is selected, the man stands near the bamboo platform made earlier there is the form of meditation to hear special sound. If he hears only the sound of a dove, it is not

considered as a good sign, whereas if he hears of something else then it is believed that the production of crops will be good that year.

Size of the jhum

The size of the area for jhum cultivation is determined by the head of the family depending on approximate requirements of food and other crops basically for subsistence of the family conditioned primarily by the availability of appropriate area for jhum cultivation. The area for jhum cultivation is determined primarily according to eye-estimation. The unit of measurement of the jhum land as expressed among the tribal people is "one ari jhum". One *ari* is the area in jhum land which can be planted with one *ari* of paddy seeds (approximately 10 seers or 9.20 kg) dibbed with 8-10 grains 10-12 inches apart. The list of various crops grown in jhum cultivation is given in Table 4.

Planting of saich (Rice) and other crops (Kikkhya)

Sometimes in the month of April after the first heavy shower, *saich* (rice) seeds are planted on the swidden together with seeds of the crops namely, *lahpyn* (cotton), *mokka* (maize), *marfa* (a kind of squash), *peat* (beans), *pruin* (arum) and *mroh* (potato). Both male and female members of the family take part in sowing of seeds. Sowing of seeds is done in small pits in the ground made by a special type of tool named *dauju*. The people work from below slope upwards with a basket full of seeds at the back hanging from forehead by a strong stripe.

The seeds are placed at a depth of about 2 inches in the pits about 10-12 inches part. *Hnain* (sesame) seeds are usually broadcasted all over the field. Similar broadcasting is done with the seeds of coriander and *pungbung* (*mesta*). Along the border of the swidden

nondhuo (turmeric), *Kheanq* (ginger), wild flowers are grown. These wild flowers are used by young tribal girls for their hair doing. Tribal people normally use their own seeds or obtain seeds from the neighbours on barter arrangements.

Before first sowing of seeds they pray to God to seek blessings so that the seeds are protected from diseases, insects and predatory animals and they also pray for good harvest.

Protection of the jhum

Within a week of sowing the entire swidden appears to have dotted with young green rice plants. The area is then kept under close surveillance to protect it from wild animals including wild pigs, deer and porcupines as well as from birds. Temporary raised shelters (field-hut named *Yabo*) made of bamboo are constructed with a thatched roof near the swidden and people live there throughout the cultivation period till harvest of the crops. The swidden do not have any fence but sometimes small trees are planted along the border.

During this period, the tribal people offer prayers to God and various spirits and supernatural powers for protection of crops.

Birds and animals are usually driven by shouting, throwing stones, moving sticks and making other kinds of noises. Normally young boys and girls and elderly men and women who are not able to do hard works are engaged in this practice. If an animal can be killed in the swidden, they arrange a feast in the village and everybody share eating the meat of the animal.

Pong (Weeding)

The tribal people try to keep the swidden weed free as far as possible for which weeding is done three times : First weeding is done when the rice plants are about 6 inches tall. Weeding is done by both male and female

members of the family and neighbors by pulling out of the weeds by hand and as well as with the help of a tool which is a hand chopper called *Pongkhuyaidah*. The weeds are collected and left along the border. The second and third weeding are done about 4-5 weeks apart from the previous weeding.

Boauk (Jhum hut)

In every jhum land, a small hut is made with bamboo which is called *boauk* (jhum hut) prior to harvesting time. The *boauk* is used for temporary storing of the crop which require post harvest operations for example, threshing of paddy. The working people including the jhum cultivator and the other laborers (family members, neighbours and exchange laborers, if any) who work during harvesting and post harvesting practices live in the *boauk* for those days together.

Chakre (Harvesting)

Harvesting jhum way starts in the month of May when coriander leaves and spinach are harvested. Marfa is harvested first in the month of *Oaso* (June-July). Harvesting of rice starts in the month of *Oagyo* (September - October). Before harvest of rice there is arrangements for special prayer in every trival family. On the first day of harvest, the jhum cultivator invites the priest and the neighbors to eat rice together. The well-to-do cultivators present enough rice to the priest to meet his requirement for the whole year. Cash money usually Tk. 10 is also given to the priest. Relatively poor cultivator sends cooked rice to the *kiang* (Temple). The Marma people starts harvesting on a good day. They regard Wednesday as the good day to start harvesting.

The special ceremony called *Abongma* is held before paddy harvest. The ceremony is conducted by the *karbari* or *Reisa* head. A few elites are also invited to this *Abongma*

ceremony. Among them some are members of the Raj family. *Karbari* alongwith his wife and other family members and some neighbors offer special prayer. Everybody is served with some snacks which include boiled *binni* rice with coconut. This is a special preparation for the occasion. They feel that feeding this special food to the people brings good to the family.

On a decorated bamboo stage (Platform) *karbari*, the host keeps some rice on a banana leaf. A crab is hanged by a thread from above the platform. Also a pig is tied by a rope and kept there. This pig is slaughtered on this special occasion.

On another platform made of bamboo *karbari* keeps a bowl containing chicken blood, two eggs, a bottle of wine, different varieties of rice crisps, one boiled full chicken, one roll of thread, two bunches of flowers, different varieties of boiled vegetables, a jug of water, a plate with cooked rice, one piece of boiled prawn, three pieces of chillis and two silver coins (old rupee).

All these items are then washed with water. Everybody present there offer their prayer in front of these items kept on the platform. Then two men carry the platform alongwith all these things on it to a pre-arranged place in the rice field. The pig is also brought there. Everybody go there in a procession following the platform with the items of *worship* on it. A healer *Sithma* is then called to perform the ceremony. The healer then called the goddess of blessings with utterance of a prayer. At this time the food is distributed to all present there. The pig is then moved by two persons to the rice field and later on slaughtered and cooked. Everybody enjoy eating meat with rice and wine. This continues till the end of the day.

Rice harvest starts in the month of *Toslong* (September). Harvesting is done by all members of the family as well by active

Table 4. Name of crops grown in jhum fields

English name	Botanical name	Marma name	Bengali name
Paddy	<i>Oryza sativa</i>	Chabbah	Dhan
Cotton	<i>Gossypium herbereum</i>	Oey	Toola
Sesame	<i>Sesamum indicum</i>	Hnai	Til
Nozelle	<i>Hibiscus sabdarifa</i>	Pungbung	Mesta
Cucumber	<i>Cucumis sativus</i>	Yoprosee	Marfa
String Beans	<i>Vigna sesquipedalis</i>	Peetee	Barbati
Maize	<i>Zea mays</i>	Mokka	Bhutta
Sugarcane	<i>Saccharum officinarum</i>	Prong	Akh
Yam	<i>Dioscorea alata</i>	Mrok	Mete Aloo
Holy basil	<i>Ocimum sabctum</i>	Hnung	Toolshi pata
Coriander	<i>Coriandrum sativum</i>	Song	Dhane pata
Musk melon	<i>Cucumis melo</i>	Sungsee	Bangi
Indian spinach	<i>Basella alba</i>	Kamui	Puishak
White gourd	<i>Benincasa hispida</i>	Frungaisee	Chalkumra
Sweet gourd	<i>Cucurbita moschata</i>	Fring	Mistikumra

neighbor. Harvested rice plants are kept in bundles in the *Yobo* (jhum hut) near the swidden. Then these are threshed by treading by men on a *fiah* (mat). The threshed rice is then dried and brought to their houses. If the harvest is good then after keeping enough rice for home consumption the remaining rice is sold to Bengali middlemen who come to their villages to buy rice. The rice for home consumption is stored in the bamboo made large containers called *soi* and kept in a separate room within their house.

After harvesting of rice in the jhum, harvest of other crops follow. Harvesting of maize, lady's finger and beans starts in the month of *Oaqyo* (September-October) and cotton, ginger, sesame, turmeric and arum are harvested from the month of *Naitoh* (November-December).

Various activities under jhum cultivation in different months have been shown in Figure-1.

Socio-Economic Development of Hill Areas

The concept of socio-economic development for the hilly areas was totally absent in the past colonial administrative system. The administration was geared for revenue collection only. The efforts for planned and organized development of this area started only in mid 1970s when the new Government of Bangladesh in 1975 confronted with insurgency and intensified conflicts with the tribal rebels. In attempt of tackling the socio-economic roots of insurgency a comprehensive development program was officially taken up in 1976 through establishment of Chittagong Hill Tracts Development Board. The objective behind creation of this Board was to ensure socio-economic development of Hill Tracts region for the benefit of the tribal people. Government also had the desire of encouraging participation

Figure-1
CALENDAR OF ACTIVITIES FOR JHUM CULTIVATION BY MONTHS

ACTIVITIES	MONTHS													
	English month		DEC.	JANU.	FEB.	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPT.	OCT.	NOV.
	Marma month		HARCH	BWARCH	TOBATH	TOBCHI	TAFVAM	WASUNG	NAU	CABO	OHAKO	TOILONG	OHAYO	TAM THONG
1. Cutting Jungles.			1. ██████████											
2. Firing Jungles			2. ██████████											
3. Dibbling Seeds (Rice, Marfa, Cotton, beans, Malze, Seasome, Potato, Taro..)					3. ██████████									
4. Broadcasting Seeds (Corlander, Mesta).					4. ██████████									
5. Planting seedings (lady's finger, spinach-pulsak)					5. ██████████									
6. Line sowing of seeds Olkachu, Ginga, Turmaric and special flower along jhum border.					6. ██████████									
7. Weeding (first time)							7. ██████████							
8. Harvesting of corlander leaf, spinach (Pulsak)							8. ██████████							
9. Weeding (Second time)							9. ██████████							
10. Harvesting of Marfa							10. ██████████							
11. Weeding (third time)							11. ██████████							
12. Worship prior to rice harvst.							12. ██████████							
13. Harvest of rice							13. ██████████							
14. Threshing, Drying & storing of rice.							14. ██████████							
15. Harvesting of malze, Lady's finger, beans, special potato.							15. ██████████							
16. Harvesting of cotton GINGER, Seasame, turmeric, Olkachu.							16. ██████████		16. ██████████					

Figure- 1. Calendar of activities for jhum cultivation by months

of local people in the development pursuits.

The Chittagong Hill Tracts Development Board had the mandate to prepare project and schemes for development of Chittagong Hill Tracts region. One of the efforts of this Board addressed to the problem of hill agriculture through a project for rehabilitation of Jhum cultivators and appropriate use of land resources, popularly known as Joutha Khamar. Joutha Khamar is a project for resettlement of jhum cultivators at a new place where each

family was allotted 5 acres of land for cultivation of vegetables, fruits and tree crops. Each Joutha Khamar has an area of 315 acres of land on the hill slope where sixty tribal families drawn from different tribes have been settled as clusters. The objectives of this Joutha Khamar project was to provide a permanent subsistence instead of shifting cultivation which lately became unproductive and confronted with problems of land scarcity. The five acre land of each resettled family was designed for planned use pattern as follows:

1. Banana	1 acre.
2. Pineapple	1 acre.
3. Vegetables	1 acre.
4. Standing fruit trees	1 acre.
5. Rubber plantation	1 acre.
Total	5 acre.

The impact of the project is yet to be seen as the project had a very slow start because of financial paucity and management problem.

Recommendations

- The seriousness of the problem of hill agriculture should be better realized and understood through intensive and in depth studies.
 - to identify the constraints as well as for removal of these constraints to development of hill agriculture.
 - to investigate the problems of technology transfer and introduction of various agricultural development projects suitable to the ecological conditions of the hilly areas.
 - to determine the need for appropriate institutional innovation to support agricultural development in the hilly areas.
- The indigenous hill farming system has been in practice among the hill people for over the centuries. The farming conditions confronted with difficult setting, remoteness and degrading soil fertility and ecological imbalance needs immediate attention from the planners and policy makers for initiating programmes for improving soil fertility through soil conservation programmes, and improving ecological conditions by preventing deforestation.
- Hill areas have comparative economic advantages for cultivation of fruits and vegetable subject to improvement of market facilities and availability of inputs and services for productive agriculture. This needs improvement in physical infrastructure like roads and storage facilities and introduction of appropriate technology and relevant research undertaking.

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