



## **Jhum Cultivation Influence the Degradation of Hilly Environment**

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### **Abstract**

This study was designed to identify the status of shifting (jhum) cultivation and its impact on environment in Rangamati district. A total 55 jhum cultivators were selected on the basis of purposive sampling technique from 5 upazillas of Rangamati district. Data were collected during the period October to December, 2009. The researcher collected information himself using direct and open questionnaire. The study revealed that most of the jhum cultivators were middle age (30-50 years), with illiterate (47.27%) and main occupation possessing jhum cultivation. The present status of agricultural land (hill/slope) of jhumia family in the studied area, about 60% of the respondents have only 1-2 acres of land for jhum cultivation and 25% of the respondents have 2.1-3 acres of land. The use of agro-chemical remains limited in the CHT. This is mainly because of financial constraints, lack of market access, and low requirement of chemical for traditional jhum cultivation. The maximum percentage of irrigation (74.55%) was mainly depended on rainfed in jhum cultivation. On the other hand about 45.55% respondents were responded that their income status were medium through shifting cultivation, 30.90% were responded high. Similarly in the study area it was found that a majority (45.45%) portion of respondents were responded that labour utilization in shifting cultivation was medium. This study also found that the environment was degraded gradually day by day. The maximum respondents (94.55%) had given opinion that deforestation was the major environmental problem created by shifting cultivation, 74.55% respondents had given opinion that shifting cultivation accelerated loss of top soil and 60.00% respondents had given opinion that lost of wild animals was occurring due to shifting cultivation. Biodiversity also degraded mostly. Excluding shifting cultivation there were many reasons of environmental degradation in the study area. Population growth is considered by 90% of the respondents as a major factor causing severe degradation of environment. Indiscriminate forest fire was responsible for environmental degradation. In addition cutting of hill, collection of soil, and extraction of stone, river erosion and land slide as responsible for degradation of environment. The study recommended that new methods must be developed, applied, and tested for sustainable management of jhum cultivation and environmental protection.

**Key words:** Jhum cultivation, degradation, hilly environment

### **Introduction**

The Chittagong Hill Tracts (CHT) is located in southeastern of Bangladesh, bordering India and Myanmar. The total area of the Chittagong Hill Tract (CHT) is estimated at around 13,237 sq. km., which is about one tenth of the country. The area is hilly with mild to very steep slopes (from 15% to over 70%) often breaking or ending in cliffs. More than 90 percent of the area is covered by hills with only 129,000 hectares (ha) of cropped land. About 87 per cent of the land is covered with forest (Totaling 11,475 sq. kms) mostly owned by the government (Dasgupta and Ahmed, 1998). Most of the valleys of the CHT area are covered with thick virgin forests. The main features of the vegetation are semi-evergreen (deciduous) or tropical evergreen, dominated by tall trees. Because of its geographical setting and the pristine nature of the CHT area, the potential of crop production from this region is not high; rather, a huge prospect for eco-tourism exists in the area. Thus the need for environmental conservation of natural forest lands of the CHT area is very important. Rangamati is the largest district of CHT. Its area is 6116.13 sq.km (BBS,2001). There are about 29 tribes in Bangladesh. Among them 12

tribes live in Rangamati. The main occupation of the tribes is mostly crop, livestock, horticulture and forestry agriculture. In ancient days the tribal people who lived in hilly areas used to practice shifting cultivation, which is locally called jhum cultivation. It is a traditional crop cultivation system of the tribal hill people. Jhum cultivation is a special kind of agricultural practice on sloppy hills of the indigenous people of Chittagong Hill Tracts region. The method is also known as "Sweden" or "Slash and Burn" cultivation. Jhuming comprises cutting and burning of forest trees, clearing spaces and then sowing a variety of seeds. According to Banglapedia (2009) about 20,000 hectares of land are being brought under jhum cultivation every year.

Tripura and Harun (2003) carried out a survey to observe the dependency rate of community on jhum cultivation, past and present status of jhum cultivation, its alternatives, and socio-economic status of jhum cultivators. Gafur *et al.* (2003) conducted a research to find out the runoff and losses soil and nutrients from small watersheds under shifting cultivation (jhum) in the Chittagong Hill Tracts. Borggaard *et al.* (2003) carried out a study to analyze the sustainability appraisal of

shifting cultivation in CHT. Dewan (2008) conducted a survey work to analyze the socio-economic status of jhum cultivators.

Jhum cultivation influences land degradation, forest degradation, and biodiversity destruction in hilly region through deforestation and burning as a result the whole environment is destroyed.

Past research reports indicate that little work has been undertaken so far on soil erosion, biodiversity loss, deforestation, factors that contributing environmental degradation and impacts on environment due to shifting (jhum) cultivation practice. Keeping the above views in mind the present research work was undertaken to report in details with the following objectives.

- To determine the extent of jhum cultivation practices by the jhumias;
- To identify the factors which are contributing environmental degradation and
- To observe the impacts of jhum cultivation on environment.

### **Methodology**

#### ***Site selection of the study area***

Within 64 districts of Bangladesh, Rangamati was selected purposively for the study. The criterion for selecting site was the availability of jhum cultivators. Information about jhum cultivators was collected from personal communication with concerned people and also own observation. During the study, a multistage sampling technique was adopted. Initially, from 10 upazillas in Rangamati districts, five upazillas were purposively selected for data collection. The name of selected upazillas are Juraichhari, Rangamati sadar, Kaptai, Belaichhari and Barkol. From each upazilla 11 respondents were chose randomly for interview. A total 55 jhum cultivators were the ultimate sampling who was selected purposively from 5 upazillas.

#### ***Preparation of survey schedule***

According to the objectives of the study a survey schedule was prepared to collect the expected data a. At first a draft schedule was prepared in accordance with the objectives of the study. Then the schedule was pre-tested to verify the relevance of the questions and the nature of the response of the sample procedures. After pre-testing and necessary adjustment, a final survey schedule was prepared for data collection.

#### ***Selection of the respondents***

Eleven respondents were selected from each upazila. In total 55 respondents were selected for the survey. A detailed socio economic survey was conducted to assess educational status, age, sex, land status, present practices, occupation, income per annum of jhum

cultivators and shifting (jhum) cultivation impacts on environment.

#### ***Period of data collection***

For this study, the data were collected intensively by using structured survey schedules in recall method. The data collection covered period of three month starting from October to December, 2009. For this purpose the researcher paid a number of extensive visits himself throughout the period.

#### ***Data collection process***

In order to fulfill the objectives of the study, relevant information and literature were collected from primary sources and secondary sources.

#### ***Primary data collection***

The primary data has been collected by conducting a survey work with a well-prepared semi structured questionnaire. For this reason, interviewers were selected randomly. It is also done by physical visit to the jhum cultivation site and then interviewing the respondent. In it informal discussions with the participants and villagers of the target areas also included. The questions were asked in traditional language (Chakma) but written in English language.

#### ***Secondary data collection***

The secondary sources of data including books, journals, various publications of government, institutions, and other organizations, articles of local and national newspapers and other research papers on same or similar issues have been used for data collection. In addition to this, internet has also been used as secondary source of data collection.

#### ***Collection of photographs***

Five spots were studied during the field survey and from each spot photographs were collected by personal camera. In the studied area, the loss of top soil and other degradation situations were captured by photograph.

#### ***Data processing and analysis***

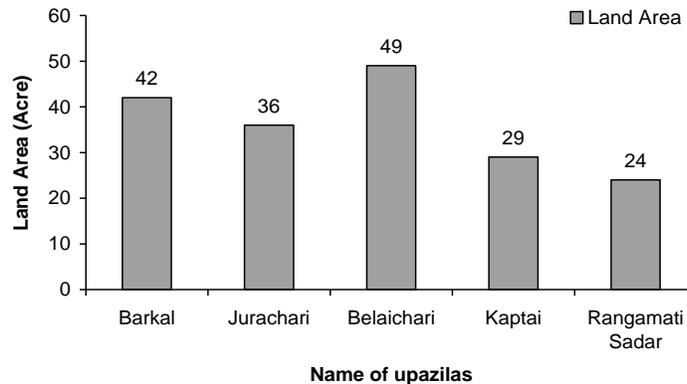
- A. The surveyed data were converted into frequencies and percentage forms. After collecting information from primary and secondary sources, data were processed and analyzed by following steps: Reviewed of collected data and information
- b. Discarded of unnecessary parts of the information and data
- c. Sorted of revised data and information
- d. Analyzed for easy explanation

### **Results and Discussion**

#### ***Status of the land use for jhum cultivation of the respondents in studied upazillas:***

In this field survey, 55 jhum cultivators were interviewed about the quantity of land only used for jhum cultivation in five upazillas of Rangamati district. In Barkal upazilla the jhum cultivators are using 42 acres of land for jhum cultivation. In Juraichhari upazilla 36 acres of land is being used for jhuming and the jhum cultivators in Bilaichhari upazilla are using 49 acres of land for jhum cultivation which is the highest amount of land used

for jhuming in this district. The jhum cultivators of Kaptai upazilla are using 29 acres of land for jhum. The lowest amount of land used by jhum cultivators in Rangamati sadar upazilla and the amount is 24 acres. Total 180 acres of land is being used by jhum cultivation of five upazillas in Rangamati district.



**Fig. 1.** Status of the land use for jhum cultivation of the respondents in studied upazillas

***Jhum cycle practices in shifting cultivation:***

Jhum cycle means the fallow period of shifting cultivation. In this study it was observed that in past period most of the cultivators (67.27%) were practiced jhum cycle more than 6 years. About 29.09% and 3.64% respondents were practiced 4-6

years and  $\leq 3$  years jhum cycle respectively. But in present situation  $> 6$  years jhum cycle practice is nil. Most of the respondents about 80.00% were said that they practiced fallow period  $\leq 3$  years for shifting cultivation and the rest of the respondents said that they practiced 4-6 years of jhum cycle (Table 1).

**Table 1.** Duration of Jhum cycle practices for shifting (jhum) cultivation

Period	Range	Respondents	
		Number	%
Past	$\leq 3$ Years	2	3.64
	4-6 Years	16	29.09
	$> 6$ Years	37	67.27
Present	$\leq 3$ Years	44	80.00
	4-6 Years	11	20.00
	$> 6$ Years	-	-

***Impact of Jhum cultivation on environment***

This study indicated that the environment of the studied area was degraded through jhum cultivation. Among the respondents maximum respondents (94.55%) had given opinion that deforestation was the major environmental problem created by jhum cultivation (Table 2 & Fig. 2). About 74.55% respondents had given opinion that shifting cultivation accelerated landslide (Fig. 3) and loss of top soil (Fig. 4). In this study 60.00% respondent had given opinion that lost of wild animals was occurring

due to burn bushes and trees for Jhum cultivation (Fig.5) and also land degradation was occurred due to slash and burn practices (Fig. 6). In Table 2, 50.91% respondents were responded that loss of bird species was also occurred due to jhum cultivation, 20.00% and 23.64% respondents opinion were decreased environmental balance and increased global temperature, respectively. Only 67.27% respondents were responded that jhum cultivation were created decrease crop yield (Table 2).

**Table 2.** Impact on environment due to Jhum cultivation

Types of impact	Respondents		Ranking
	Number	%	
Loss of forest area (Deforestation)	52	94.55	1
Loss of top soil	41	74.55	2
Loss of wild animals	33	60.00	4
Loss of bird species	28	50.91	5
Decrease environmental balance	11	20.00	7
Increase temperature	13	23.64	6
Decrease crop yield	37	67.27	3



**Fig. 2.** Preparation of hill slopes for jhum cultivation by cutting bushes and trees.



**Fig. 5.** Bushes and trees were burning for Jhum cultivation



**Fig. 3.** Landslide was occurred due to Jhum cultivation



**Fig. 6.** Land degradation were occurred due to slash and burn practices (jhum)



**Fig. 4.** Hill without forest cover vulnerable to losses of top soil

***Nature of soil erosion due to jhum (shifting) cultivation***

According to the personal interview of people of the study area it was found that among the interviewees 38.18% peoples replied that the nature of soil erosion is high due to shifting cultivation practices. Similarly 45.45% and 16.36% peoples informed that the nature of soil erosion is medium and low respectively (Table 3).

**Table 3.** Nature of soil erosion due to jhum (shifting) cultivation

Rate of Erosion	Respondents		Ranking
	Number	%	
High	21	38.18	2
Medium	25	45.45	1
Low	9	16.36	3

**Contributing Factors of environmental degradation:**

Population growth is considered by 90% of the respondents as a major factor causing severe degradation of environment in the study area. The effects of population on degradation of environment are considered moderate and insignificant by 9.7% and 0.2% of the respondents respectively. Besides population growth, deforestation and over use of natural resources are identified as causes of severe degradation by 82.1% 70.5% of the respondents respectively. Lack of knowledge / technologies and lack of proper planning are treated as severe cause of degradation by 54% and 52% of the respondents respectively. Jhum cultivation is viewed as a severe

cause by 38% and a moderate cause by 46.6% and an insignificant cause of degradation of environment by 15.4% of the respondents under survey. Lack of alternative livelihood is identified by 44.2% as a severe cause, by 40.4% as a moderate cause and by 15.4% as insignificant causes of degradation of environment. The effects of water pollution and forest fire are considered severe by less than 50% of the respondents. Use of fertilizers/pesticides cause severe degradation of environment by opined 21.9% of the respondents. In addition cutting of hill, collection of soil, extraction of stone, river erosion and land slide as responsible for degradation of environment (Table 4).

**Table 4.** Contributing factors for degradation of environment as perceived by the Jhum cultivators

Factors	% of the Respondents			
	Extent of Degradation			
	Severe	Moderate	Insignificant	Total
Population growth	90.1	9.7	0.2	100
Deforestation	82.1	17.7	0.2	100
Jhum cultivation/Shortening of fallow period	38.0	46.6	15.4	100
Over use of natural resources	70.5	21.8	7.7	100
Use of fertilizers/pesticides	21.9	63.4	14.7	100
Lack of alternative livelihood opportunities	44.2	40.4	15.4	100
Lack of knowledge/technologies	54.0	36.0	10.0	100
Lack of proper planning	51.8	39.7	8.5	100
Forest fire	47.2	38.4	14.4	100
Water pollution	44.2	50.8	5.0	100
Monoculture plantation	26.4	50.6	23.0	100

**Shifting cultivation as a controversial practices**

According to the opinion of the respondents were responded that 85.45% of the respondents had given the opinion that deforestation was occurring mainly

for shifting cultivation. It was top ranked against other controversial practices. The second highest ranked loss of biodiversity (69.09%) was occurring for shifting cultivation.

**Table 5.** Opinion of respondents that Jhum cultivation as a controversial practice

Items	Respondents		Ranking
	Number	%	
Deforestation	47	85.45	1
Loss of biodiversity	38	69.09	2
Hilly area cultivation	37	67.27	3
Old method of cultivation	33	60.00	4

**Conclusion**

The arresting or eradicating of shifting cultivation had been underway since the start of the 20th Century. After Independence, jhum control programmes started in earnest. However, it was soon realized that cash crop cultivation couldn't be adopted as an alternative to jhuming which people practice mainly to meet their essential food requirement. The agroecological systems of the CHT have led to a shift in emphasis in recent years from jhum control to jhum management, more specifically, to the management of fallows. The Government of Bangladesh pioneered agro-forestry interventions in jhum farming cycles. The environment in the Chittagong Hill Tracts (CHT) is under pressure. Demographic and environmental conditions are changing. Jhum cultivation is becoming unsustainable. This, combined with other factors such as forest over exploitation, is the cause of increased land degradation, such as soil erosion, nutrient decline, and decreased biodiversity. Information on the status of the environment is required for the formulation of alternative strategies for sustainable management. The pressures on the environment and the causative factors and processes must be analyzed. New methods must be developed, applied, and tested for sustainable management of jhum cultivation.

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