

## The Success Story of Rehabilitation of Jhumias in Tripura- A Study on Baramura-Deutamura Range

<sup>1</sup>Er.Sujit Das, <sup>2</sup>Er.Subhrajyoti Choudhury, <sup>3</sup>Ar.Arпита Roy.

<sup>1</sup>(Scientist/Engineer, Landuse Planning Division, Tripura Space Applications Centre)

<sup>2</sup>(Scientist/Engineer, Water Resources Division, Tripura Space Applications Centre)

<sup>3</sup>(Agricultural Officer, Deptt. Of Agriculture, Govt. of Tripura)

---

**Abstract** - Shifting cultivation or slash and burn agriculture (locally called as *jhum*) is one of the main form of agriculture in the hills of Tripura. In view of the mountainous terrain, settled cultivation constitutes only in a portion of the total cultivated land, which is mostly confined to the valley lands and plain lands. In order to meet the growing food demand, the *jhum* cycle (the intervening period between two successive slashes) got shortened which resulted in the overall decrease of crop yield. Today the scientists view shifting cultivation as environmentally destructive and a faulty land use practice having very low output-input ratio. So the local tribes are being educated on the curse side of this old practice at Government level and by different local NGOs'. This paper describes the status and change in shifting cultivation in one of the hill ranges of Tripura, called Baramura-Deutamura hill range, using GIS and Remote Sensing technique.

**Keywords:** GIS, Remote Sensing, Jhum, Baramura-Deutamura hill range, Burn Agriculture.

---

### I. INTRODUCTION

The shifting cultivation is a time-tested system of agricultural practice, most often evolved indigenously and is strongly based on traditional knowledge. It used to be an appropriate and sustainable land use practice in diverse socio-economic set ups where the dependent human population was within the carrying capacity of a 10-15 year *jhum* cycle.

Although practices under shifting cultivation vary widely in different parts of north-east and the variability in practices are largely tribe- specific, the shifting cultivation in its any form invariably involves clearing of vegetation, and then slashing and burning the plant parts including debris. After 2-3 years of cropping, the land loses its fertility and the farmer shifts to another piece of virgin forested land for cultivation. The vegetation in the fallow land regenerates during the fallow period. After certain number of years, which varies from 3 to 15 years, depending upon the place, population and land ratio, and tribe, the farmer again comes back for farming to the same piece of land, which he left fallow a few years back. Thus, the cycle of cropping and fallow continues. The period between slash and coming back again to the same plot after completion of intervening fallow period constitute one *jhum* cycle. With rising population, the *jhum* cycle in most areas, which used to be 10-15 years earlier is now reducing to 2-3 years only.

One of the most important negative environmental impacts of shifting cultivation is the damage that it causes to the soil system. It accelerates the soil erosion manifold. Besides causing air pollution due to burning, shifting cultivation is responsible for loss of soil nutrients and useful soil fauna and microbes. Burning of slash lowers soil acidity, organic matter and total nitrogen, but enhances phosphorus and cations. The net change in soil available nutrient pool from pre-cropped stage through slashing and burning and subsequent cropping result in substantial lowering of carbon, nitrogen and magnesium. Most shifting cultivation practices are subsistence level farming system having very low output/ input ratio compared to other farming systems/ methods. The clearing of forest areas at regular and frequent intervals for shifting cultivation results in the loss of primary forests and formation of secondary forests. This causes substantial loss to tree diversity and associated vegetation those are adapted to primary forests.

## II. ENVIRONMENTAL PROBLEMS BY SHIFTING CULTIVATION

Excessive agricultural activity of shifting cultivation not only decreases the forest area, but also changes the primary forest into secondary woodland of shrub. On the phase of soil property, it accelerated the soil and gully erosion, and acidification. To solve these environmental problems, the most important step is to settle the agriculture from shifting cultivation to permanent cropping.

### 2.1 Forest Degradation

Excessive agricultural activity of shifting cultivation bit into the forest changed into primary forest of trees into the secondary woodland of shrubs and bamboo and decreased of the secondary forest these problems are because shifting cultivation could cause more serious flood and serious soil erosion.

### 2.2 Soil Degradation

When the slopes covered with thick rain forests become bare from shifting cultivation, the soil becomes barren from the erosion by rain wash and the topography is destroyed from erosion by gully. As drainage network analysis reveals, the bifurcation of the first order stream is over 6 values so that gullies are being accelerated recently.

## 3. Study Area

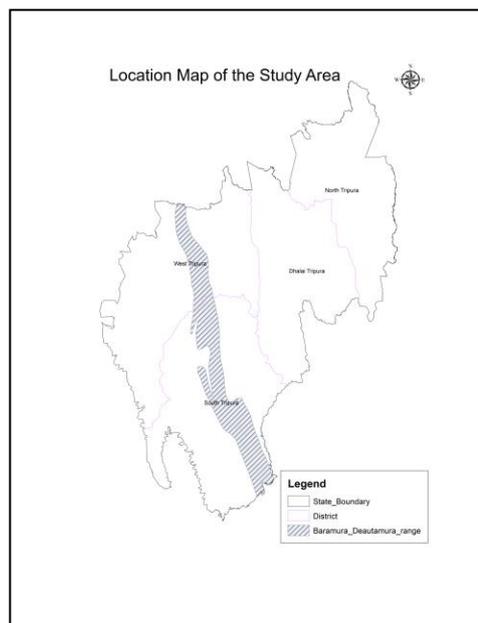


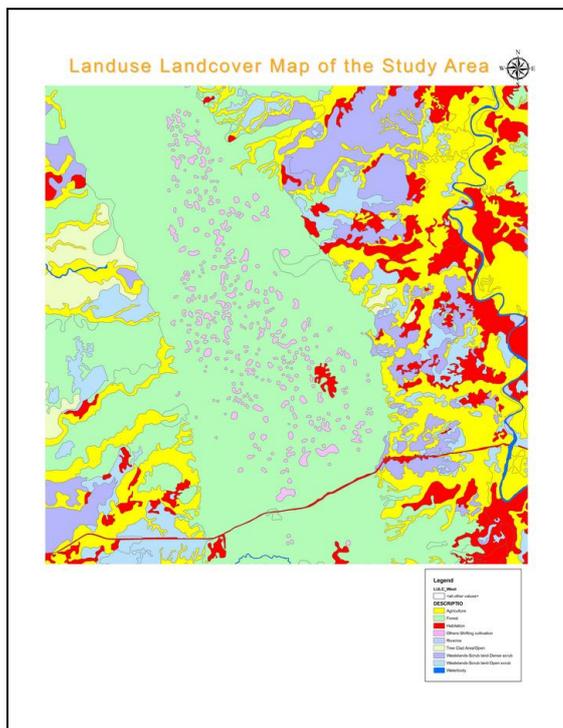
Fig. Location Map of Study Area

As Shifting cultivation or Jhum is normally practiced by the local tribes in hilly region, so for the study, the Baramura-Deutamura range in the west and south district of Tripura has been selected. The study area lies between  $91^{\circ} 36' 51.39''$  E  $22^{\circ} 55' 41.55''$  N and  $91^{\circ} 34' 55.13''$  E  $24^{\circ} 06' 26.76''$  N.

## III. Materials And Methods

The Landuse maps based on the satellite imageries of 2004-2005 and 2011-2012 have been prepared. Comparing the extracted shifting cultivation area of the two seasons, the change in the cultivation area is calculated.

The Landuse landcover map of the west Tripura District has been generated for 2003-2004 and the Baramura-Deotamura range has been clipped. So we get the landuse and landcover map for the study area. From the map, we extract the shifting cultivation areas considering both current and abandoned. The area under shifting cultivation is found to be 27.55 Sq. Km.



**Fig. Landuse Map of 2003-2004**

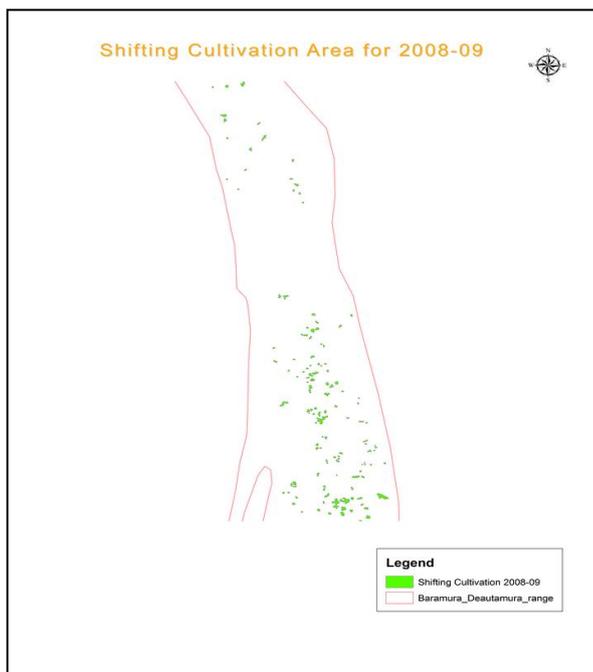
The same practice has been carried out for 2008-2009 for the study area and the area under shifting cultivation has been found to be 8.94 Sq. Km.

Comparing the changes from 2003-04 to 2008-2009, it is observed that there is a major drop down in the shifting cultivation area. There is 67.5% of reduction in shifting cultivation area.

Comparing the changes from 2003-04 to 2008-2009, it is observed that there is a major drop down in the shifting cultivation area. There is 67.5% of reduction in shifting cultivation area.

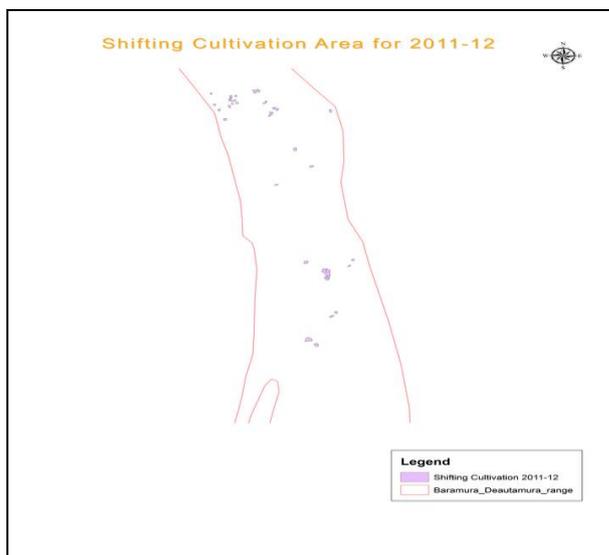


**Fig. Shifting Cultivation for 2003-04**



**Fig. Shifting Cultivation for 2008-09**

Again for 2011-2012, repeating the same practice, it has been noticed the reduction in the old tribal methods of agriculture.



**Fig. Shifting Cultivation for 2011-12**

**VI. Summary and Conclusion:**

<b>TRENDS OF CHANGE IN SHIFTING CULTIVATION FROM 2003-04 TO 2011-12 IN BARAMURA-DEUTAMURA RANGE</b>		
Year	Area in sq.km.	%age reduction with respect to 2003-04
2003-2004	27.55	-
2008-2009	8.94	67.55
2011-2012	12.68	53.97

Comparing the reduction in area of shifting cultivation with respect to 2003-04, it is found that the different rehabilitation programs for Jhumias are showing very good results.

Since independence several steps have been taken up by the government and other organizations to rehabilitate the jhumias. In the state, two resettlement divisions for shifting cultivators were set up under the forest department. Subsequently, for successful implementation of different programmes a separate department named 'Tribal Rehabilitation in Plantation and Primitive Group Programme' was created in October 1985. Several efforts from the Central government (through North Eastern Council), State government (agriculture, forest, animal husbandry, tribal welfare) departments, Indian Council of Agricultural Research (ICAR), nongovernmental organizations, etc. are also being made through implementation of various programmes. But, the progress in rehabilitation of the jhumias is very slow. In both South and North Tripura districts, the rehabilitated jhumias have again reverted to jhum. 'Hunger' seems to play the key role behind such incidents. Lack of proper transport and communication, physiographical isolation, adequate technical know-how, marketing facilities along with their distressed economic condition are the prime hindrances for jhumia rehabilitation. It is not possible to accomplish such rehabilitation programme single-handedly. Scientists, planners, policy makers, extension workers should join hands and work together. One should also keep in mind that jhumias need food, fibre, shelter and a secure future. Thus, care should be taken to see that these programmes continue not for a day or month but for several years; in the process, bondage will be formed among the urban people, the workers and the jhumias.

One of the most important and recent strategies adopted for Jhumia rehabilitation in Tripura is the raising of rubber plantations. The rubber plantation project was conceived to provide a lucrative alternative to Jhum cultivation. By the time of the 9<sup>th</sup> five-year plan, the raising of rubber plantation had become one of the main strategies for rehabilitation of Jhumias through the World Bank Aided India Rubber Project. Here the Central Government, Rubber Board and Bank had come together to aid the Tripura government to raise rubber plantations and development itself as the "Second Rubber Capital of India". The Tripura experiment is modelled on the experiences of the Kerala rubber economy, the Rubber for the Poor Project being one of the main efforts to provide tribal and other marginal farmers with a steady income. But in the process of doing this the marginal rubber farmers have been integrated into the global market and the large industrial sector as providers of labour and raw materials. India is the 3<sup>rd</sup> largest producer of rubber after the Thailand and Indonesia, of this 90% of the rubber is grown in Kerala. The 1980s had however seen the expansion of rubber into non-traditional zones of which Tripura was the most important. The rubber option looked attractive because it had the potential of providing Jhumias with a substantial income along with cash crops like pineapple and pepper which were grown with it. This use of tilla or wastelands for cash crops would also enable the Tripura government to increase its revenue potential by tapping the large industrial and export markets.

## VII. ACKNOWLEDGEMENTS

The authors express their deep sense of gratitude to Tripura Space Applications Centre, Agartala, Tripura (West) for providing all facilities to carry out the study. The authors are also grateful to NRSC, Hyderabad and Department. Of Agriculture, Govt. of Tripura for providing support for this study.

## REFERENCES

### Journal Papers:

- [1] Myung-Hee JO, 1994. "An Analysis of Shifting Cultivation Areas in Luang Prabang Province, Lao PDR, Using Satellite Imagery and Geographic Information Systems", Journal of the Korean Society of Remote Sensing, 10(1), pp.43-53.
- [2] Myung-Hee Jo, 1993. "Preparation Of Thematic Maps for Nam Khane Watershed Management in Luang Prabang Province, Lao PDR, Using Remote Sensing and Geographic Information Systems, Geographical Review, Kyung Pook National Univ., Vol. 12-13 pp. 101-108.
- [3] Chaudhary, R.G, Dwivedi, R.N., Dutta, K.K., Sarma, B.K., Patel, C.S. & Prasad, R.N. 1993. Rice based farming of Apatani - an efficient indigenous system of hill farming. Indian Journal of Hill Farming. 6:93-102. Banai, R. K., 1989. A new method for site suitability analysis: The analytic hierarchy process. *Environment Management*, 6, 685-693.
- [4] Brady, Nyle. "Alternatives to slash-and-burn: a global imperative." *Agriculture Ecosystems and Environment*. Vol. 58 (1996): 3-11.
- [5] Conklin, H.C. "The Study of Shifting Cultivation." *Current Anthropology*. Vol. 2, No. 1 (1961): 27-61.
- [6] Giardina, CP., R.L. Sanford Jr., I.C. Dockersmith, & V.J. Jamarillo. "The effects of slash burning on ecosystem nutrients during the land preparation phase of shifting cultivation." *Plant and Soil*. Vol. 220 (2000): 247-260.

### Proceedings Papers:

- [7] Hansen, P. K. (1998b): Shifting cultivation development in northern Laos. Pp. 34-42 in: Chapman, E. C., Bouahom, B., & Hansen, P. K. (eds.) *Upland Farming Systems in Lao P.D.R. - Problems and Opportunities for Livestock*. Australian Centre for International Agricultural Research, Canberra. ACIAR Proceedings 87.