Shifting Cultivation in Tripura

Tribal Research and Cultural Institute
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Dr. Gautam Kumar Bera

Hill Tipperah is bounded by the Chachar district of Assam and the Mizo Hills of Mizoram in the eastern side, by Comilla and a part of Noakhali districts of Bangladesh in the western side, by the districts of Chittagong and a part of Noakhali in the southern side, and by the Sylhet district of Bangladesh in the Northern side, the State forms its jurisdiction . Under this backdrop of the State entity the area of the present study is delimited to the ethnic village of Gardhang, comprising the Riang only. The Riang are the second largest tribal group of Tripura. The Riang call themselves Bru, which, in their language, kau Bru, means man. The term Riang is, however, the widely used appellation to denote this second largest tribal group of Tripura. As evident from their legend, they migrated from Burma to Tripura through the forest-clad regions of Chittagong hill tract. After settling down in Tripura, the Riang got patronage from the ruling Tripuri kings of Tripura as defence personnel in the army of the State. But primarily the Riang are *shifting hill* cultivators, which they prefer as the main occupational pursuit. They have a dialect of their own, and nave still retained their individual identity by clinging to their traditional core cultural markers. According to a report of the Tripura Rehabilitation Plantation Corporation Limited, shifting hill cuitivation popularly known as jhum, is carried on Government khas-land, proposed Reserved Forests. Protected Forests and Reserved Forests, which is estimated to be about 25,000 hectares. At present there are about 26000 families involved in jhum cultivation in the State of Tripura. Both men and women participate in agrarian operations. In jhum major activities like selection of exact site, cutting and clearing of forest patch, firing of woods, clearing the debris, sowing, weeding, etc are done communally.

The Riang consider hathai or tilla (hillock covered with forest), as the suitable type of land meant for shifting cultivation. The equipment used to clear the forest patch is called da-khunta (big dagger). In *jhum* field they have a multiple choice of food production with cludes six varieties of paddy in [Kowprouh, Gita, Badia, Garo and Mikra (Kanin)], two types of jute (path and Bond), Mesta (path-mukhoi), three types of Beans (Subai-long. Subai-blu-muxfxation and Kosoi-flat), seven varieties of vegetables (Khauh-khlu, white seed pumpkin, Chakma (gourd or cucurbit), Thamso (chilli) phantho (round brinjal), Phamhao-brouh (long brinjal), Khanting and Hanching (courgetti) four types of leafy vegetables (Manda, Moilao-manda, Khumdry-phoi and ushnui) five types of tube (Tha, Theingo, Manai, Kormo-wousa and kormo-ksom), three types of

cereals (Plao-pasinga, Mansi and plao-maisoi), two types of sugarcane (Masinga and Haduma-masinga), three types of oil seeds (Sping, Sping kphuai and Sping-kson), Cotton (khu), and other plants like Lela-kehanth, Lela-ksom and Ashu.

Technologically shifting cultivation and settled cultivation lie in two different scales of evolutionary ladder. Hence, the nature and extent of qualitative assessment of people and then practice vary to a multiple degree, ideally almost all Riang villages are located on hillocks or elevated areas having patch of forests. Each house hold is widely spaced and in between region is covered with wildly grown vegetation. The construction of a house depends on a suitable site and hence the nearest house hold generally occupies a distant land. The site for jhum cultivation is generally locaed outside the village, though a village does not have a stable boundary as the jhum fields shift evey year leaving behind the already cultivated site as fallow land. The area of land used per crop is not fixed and also beyond any standard measurement where seeds of different crops are mixed and sown simultaneously. Among the Riang the system of shifting cultivation is known as *hukba*: huk (shifting) and ba (cultivatian) The deep emotional attachment for the traditional system of village is amply borne out by the songs of love and work and also by the rituals connected with it. Over and above these strongly felt ties, those who have no land of their own to till or have insufficient land for cultivation resort to huk cultivation. They have a strong belief in dream and divination for selecting a site irrespective of the fact that it is used for jhum or for construction of a house. During the months of Osa (Aswin September-October) and *Kehchi* (Kartik = October- November) a huk site is selected, which is called *huk-naimo*. While the type of soil is an important consideration, preference is usually given to the thickly grown forest-land and also to a type of land, which has bamboo plantation. Although, ten to twelve years constitute an ideal regeneration cycle of *jhum*, but partly because of the non availability of ideal *huk* land at a convenient distance from the dwelling place, the normal practice of cultivation is on the land which has been previously tilled six or seven years ago. It seems there lies a dichotomy between the ideal and the actual, which possibly helps in understanding the shift of paradigm that actually happens through the performance of *huk* operation .The site is confirmed by putting the symbol of ownership with the help of an engraved bamboo at the entrance of the main passage after *huk-naimo* (selection of site). This is called *wakhar-kaimo* to avoid trespassing by another cultivator. This is followed by *huk-haomo* (clearing of the forest) by *dao or takkal* (dagger). The quantum of land determines the number of labour force required. On an average, it takes one full day with brief intervals for meals, etc. for five to seven persons to cut

and fell trees, shrubs and bamboo that stand on one *Kani* (17280 sq. ft. or 40% of an acre) of land. The clearing operations are however performed on socialistic principles for a number of days usually on mutual aid basis called *yago-kshilaimo*.Thus everyone works on everybody's land. During the month of *Choileng (Chaitra*=March-April) the dried up leaves, woods and bamboo are set on fire that are reduced to ashes within a few hours. This is called *huk-saomo* and is exclusively done by the men folk only. The soil also gets burnt to about one feet depth. It is, however, noted that large useful trees are neither felled nor put to fire, but are allowed to remain *in situ*. Only the lower branches are cut and utmost care is taken to save these trees from the spreading fire. These standing trees are regarded as the boundary marks between the adjacent individually owned *huk* clearings, only because no fencing is made to demarcate the areas on hill slopes which look as if commonly owned. Another common but interesting practice is to construct temporary field huts either on raised bamboo poles *(charnouh or noksha)* or on treetops with branches chopped off called *noksha-prowo*. There is a short interval between the phases of *huk-saomo* (burning of forest) and sowing of seeds. During this period before the onset of first monsoon both male and female members clear the ashes and charred parts of the wood and make the soil ready for tilling. This operation is called *huk-khumo*.

In the month of *Sajlang* (Baisakh=April-May) seeds of paddy, sesamum, maize, cotton, vegetables and fruits like pumpkin, melon and cucumber are mixed together in baskets. The seeds are kept in a special type of basket and carried on the back of the cultivator. Whereas the females carry the basket called *kaisni*, the males carry *chinpai*, which differs in shape and size. The males keeping the body parallel to the hill slope, dig the soil with *da-khuntha*. While the right hand is used for digging, left hand is simultaneously used to pick up seeds from the chinpai for sowing. The females follow the trail of the males.

The operation of *huk-tangmo* (weeding) is done thrice by both sexes to ward off bamboo shoots and other weeds. The first weeding starts in (Ashari (Jaistha=May-June) and is called *hagra*. The second and the last weeding called *maiyagu* takes place in Srao (Ashad=June-July) and *Drumboi* (Sravan=July-August) respectively. Before harvesting the paddy the *aukchai* (priest) performs the ritual called *hata maiklumi* by way of sacrificing a pig and/ or a fowl in the *huk* field. From the beginning of Keingrai (Bhadra=August-September) onwards till Osa (Aswin=September-October) the operation of *mai-rao or mai-raimi* (harvesting) is completed where both males and females participate. After the crops ripen, harvesting is done as per the maturity of the

crops. The fastest grown paddy *is Bety*, which is harvested during Srao (Ashad=June-July) and Drumboi (Sravan= July-August). The last paddy to be harvested is *Kowprouh* during keingrai (Bhadra=August-September). Vegetables are taken out as per the requirement of consumption. The late crops are Mesta. jute and cotton and are exclusively grown in *huk* field. Oil seeds particularly sesamum takes the maximum time, which is harvested in Osa (Aswin=September-October). The paddy grown in *huk* is typical to the Riang, which they retain at home for self-consumption. The *huk* land of the Riang not only reflects an arena of economic pursuit but also it is the place and time where the young people show their excellence in cultural activities particularly in drum beating, love song composition and singing, and dancing. The present author has been able to collect some love songs of the Riang sung during *huk* operation. The singing and dancing along with the beating of drums generally takes place when weeding starts in stages. As the crops grow in sizes and get ripened merry making increases till these attain the stage of harvesting.

Discussion:

With a different bent of mind the present study looks into the functional aspects of agrarian practices of primordial nature in a particular frame of time and space. For the Riang the ideal present in their mind does far more than to explain their institutions and the actual is their motive power and their authorization. The narration leads anthropologists to experience the human ideational systems that manifest a literary expression of total social facts. These carry samples and specimens of an oral literature that they ideally believe. The present author has permitted himself the luxury of drawing parallel with the actual practice that has been experienced in the field where he has taken the latitude because of the rarity of the data and also because of the fact that such comparisons may be of some practical value in the discipline of *social-cultural* anthropology. One may presume that the myths and beliefs produced by the Riang are under the influence of such processes that are regular and normative for their particular mental condition. This condition may have gripped the Riang by imagery, and may indeed have portrayed some natural phenomenon or process at a time when mankind had not learnt to probe nature's secrets or to decipher the endless properties of matter. However, these properties like economy, among other social institutions, exist for some reasons, for the contribution to the cohesion and stability of the social group. Since these are developed from collective consciousness, a comparative analysis may yield formative structure underlying this sort of phenomenon.

Shifting Paradigm on Shifting Cultivation: Revisiting Challenges and Options for Transforming "Lives, Landscapes and Livelihoods" in Tripura from the Experiences of NERCORMP-IFAD in Northeast India.

Dr. Vincent T. Darlong
IFAD India Country Presence

1. INTRODUCTION:

A significantly large percentage of the population living in the hilly terrains and mountainous areas of Northeast India continue to be confronted with the twin challenges of environmental and food security due to their inevitable dependency on shifting cultivation. The practice of shifting cultivation is now severely constrained with shortening of cultivation cycle, increasing population, reduced availability of land and land degradation throughout the North Eastern Region (NER) of India. Limited or poor delivery mechanisms of government service outreach, negligible presence of effective private enterprises, simmering socio-ethnic aspirations, isolated geographical locations coupled with the absence of reliable sustainable developmental models for upland areas with ineffective delivery mechanisms are just some of the major challenges confronting the region.

Right from the dawn of the country's sovereignty, the national planners and development thinkers had identified shifting cultivation or *jhum* as constraints to development in Northeast India. Since then, the Governments at the Centre and States have been implementing programmes and schemes to address the 'problems' of shifting cultivation and to wean away the shifting cultivators to alternative livelihoods. In spite of these best efforts, estimated 4,43,336 families in Northeast India (about 43,000 families in Tripura; but 55,049 as per Govt of Tripura of which 21,677 are fully dependent and 33,372 are partially dependent on jhum[1]) continue to practice shifting cultivation in some form or the other impacting about 19.82 lakhs hecto area in the region. Depending on the States, this accounts about 12.4% to 77.4% of forest cover impacted by shifting cultivation in different States of Northeast India[2]. As early 1890s, the British saw the practice detrimental to forestry growth and therefore brought out regulations to carry out the practice as a 'matter of rights, if any' in certain parts of the then Cachar and Sylhet districts of Assam[3].

Responding to the problems of shifting cultivation would require dovetailing of strategies and approaches based on certain ground contexts or situations.

(a) **Situation A:** Areas where the practice ought to continue due to inaccessibility for most part of the year, difficult land gradients and features, where government development interventions remained minimal, and generally where the communities continue to be self-contained economy. Communities generally control or own the jhum land by customary practices or traditions in such areas; many such areas could also be under the legal control of the government.

(b) **Situation B:** Areas where road connectivity had reached, government and other programme interventions can be accessed at ease. This category will have two types of situations: (i) communities that allow transformation or modification of jhum land, and (ii) communities that do not allow jhum land transformation into any other cultivation. Communities generally control or own the jhum land by customary practices or traditions though could also be legally controlled by the government.

(c) **Situation C:** Shifting cultivation is carried out by communities who live in legally notified forest land (as in Tripura and parts of Assam); land not owned by the communities but by the State.

Against such background of situations, one of the first major externally-funded projects that came to Northeast India (besides the IDRC-ICEF funded project in Nagaland) was the North Eastern Region Community Resource Management Project for Upland Areas (NERCORMP), largely funded by IFAD and partially by the Government of India, Villages with predominantly shifting cultivation practices were the target of the project intervention. And therefore, one of the major challenges of NERCORMP has been to promote enabling environment and facilitative role for addressing shifting cultivation or jhum. Known as "jhum modification" the interventions were targeted at both the cropping phase and the fallow phase of jhum cultivation (besides, of course, interventions for community institution development, capacity building, gender mainstreaming, microfinance, markets and so on). The major approaches of jhum modifications included combinations of the following activities:

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[1] *Government of Tripura (1991). Survey Report on the Jhumias of Tripura 1987. Tribal Welfare Department, Government of Tripura, Agartala*

[2] *[a] Satapathy et al. (2003). Developing Lands Affected by Shifting Cultivation. Govt of India, New Delhi; [b] Darlong, V.T. (2004). To Jhum or Not to Jhum. The Missing Link, Guwahati; [c] FSI (1999). State of Forest Report. Forest Survey of India, Dehra Dun; [d] NEC (2006). Basic Statistics of North Eastern Region. North Eastern Council, Shillong.*

3 The Sylhet Jhum Regulation, 1891.

- Conversion of jhum land into terraces;
- Promotion of cash crops, perennial horticultural crops, 'high value low volume' crops (medicinal & aromatic plants) in the jhum fields;
- Conversion of jhum fields into community forests/community reserves, particularly those with very good tree covers and other valuable NTFPs;
- Promotion of crop intensification (by increasing the cropping phase from generally one year of crop cultivation to two years or more by crop modifications / cover crop introduction).
- Promotion of traditional jhum crops/niche crops/vegetables (other than paddy) in jhum for higher cash income.
- Intensification of traditional cash crops in the jhum (eg. Soyabean) for higher income.
- Promotion / introduction of economic trees in the jhum / tree farming;
- Promotion of agro-forestry, such as large cardamom with existing trees in the fallow areas.

The objectives of the present paper is [a] to share the experiences of IFAD-funded NERCORMP project in addressing and responding to the problems of shifting cultivation among different communities in three states of NE India, viz. Assam, Manipur and Meghalaya: and [b] drawing lessons from these experiences, to provide synthesis and suggestions for alternative opportunities for communities who live in forest land, as in Tripura, where perhaps they might have the options to continue shifting cultivation in limited ways and/or opportunities to continue to live securely without the need to do any kinds of jhumming.

2. SHIFTING CULTIVATION: GLOBALCONCERNS VIS-A-VIS EXAMPLES OF PROMISING RECENT INTERVENTIONS AND MODELS

Shifting cultivation continues to draw global concern and attention for varieties of reasons. Estimates of the actual number of shifting cultivators vary from 250 million to 300 million globally in a world of nearly 6 billion it might appear to be of no great concern how 3-5% of the population makes its living. But what cannot be ignored is the distribution of shifting cultivators and the iarge area under these 'agro-forestry systems'. Shifting cultivation is the most widespread type of tropical soil land management technique, impacting roughly about 36 million sq km. Various types of shifting cultivation are currently practiced on about 30% of the world's exploitable soils. 45% of tropical agriculture area is under shifting cultivation $^{1}/_{3}$rd of agriculture in Southeast Asia is under shifting cultivation. 60% of Africa's food comes from some kinds of shifting cultivation. Of more recent interest is due to the relationship of shifting cultivation with deforestation and

hence impacts on global warming and climate change. Slashing and burning of young forests or secondary forests that are often considered to be the most efficient in terms of carbon sequestration in tropical areas are the areas of global concern. Recently, Cairns (2007)[4] has published various works on shifting cultivation from different parts of the world, particularly showing how different shifting cultivator communities are responding and adapting to sustainable land use and livelihoods. Similarly. ICIMOD (Kerkhoff and Sharma, 2006)[5] has brought out case studies of different innovations of shifting cultivators from the Eastern Himalayas. Many of these studies showed that rather than the practice being destructive, the farmers knew exactly how to manage and adapt to the challenges of sustainable land use in their own local contexts.

Within Northeast India, there are several examples of promising interventions in the areas of shifting cultivation. State Agriculture Research Stations and projects externally funded have been in the forefront of many of these innovative models. Some of the better known examples are briefly illustrated below although these are not the exclusive ones.

(a) Jhum Crop Intensification: Jhum crop intensification model, developed by SARS[6] in Nagaland attempts to extend the cropping phase (from generally 2 years to 4 years), while at the same time improving soil fertility by incorporating nitrogen-fixing legumes and reducing weed infestation during the cropping phase. The farmers in Nagaland usually cultivate the same plot of land consecutively for 2 years (paddy in both the years mixed with other crops) and allow it to fallow for 7-8 years in a 9-10 year jhum cycle. The Jhum Crop Intensification Model encourages growing leguminous crops (velvet bean, rice bean, soya bean, etc.) as cover crops in the 3rd year and again paddy in the 4th year. The NEPED Project [Nagaland Empowerment of People through Economic Development] has adopted this model for field trials in its project areas with very encouraging results. Interesting, Nagaland also has jhum intensification models in the form of Kollar bean (Rajma) cultivation (average income per hactor per annum is Rs. 1,20,000) in the higher altitudes. Its indigenous alder based jhum model with 2 years of cropping and 2 years of fallowing is another interesting and sustainable model of shifting cultivation.

4 Cairns, M. (2007). Voices from the Forests: Integrating Indigenous Knowledge into Sustainable Upland Farming. Resources for the Future, Washington DC. USA.

5 Kerkhoff, E, & Sharma, E. (2006). Debating Shifting Cultivtion in the Eastern Himalayas Farmers' Innovations as Lessons for Policy. ICIMOD, Kathmandu.

[6] Development of Sustainable Land Use Options for Shifting Research Station (SARS), Yisemyong, Mokokehung, Nagaland (1999).

(b) NEPED, Nagaland: [i] Fuelwood in jhum. The Nagaland Empowerment of People through Economic Development (NEPED) in Nagaland has demonstrated that a family with 1.5 hector of *jhum* land planted with Fuelwood species (mostly Quercus sp.) can easily has sustainable income from the 6th year onwards through the sale of firewood, which has local high demands, 2-3 such plots would give the family very comfortable income, without having to resort to *jhum* cultivation. With a plantation of 1500 trees (Quercus sp.) per hector, or about 2200 trees per 1.5 hector, a farmer can easily earn income of about Rs. 90,000 per annum . With 1500 trees per hector, the farmer can also continue to cultivate many annuals and perennial crops as below ground crops.

[ii] **Agroforestry** Similarly, a family having 1.5 hector of jhum plot and growing more than 40 varieties of agro-forest crop species, including fruit trees, wild edible plants, annual crops, etc. can easily earn an average income of Rs. 2500-3000 per month through sales of vegetables, fruits, etc. from such plots. Inclusion of Fuelwood species would further enhance the income for the families.

Advantages of Improved Jhurn System (as per study done by SARS)

- Improvement of soil fertility due to biomass addition and nitrogen fixation.
- By raising a cover crop in the 3rd year, the land productivity is increased.
- The farmer can cultivate rice in the 4th year and obtain additional income.
- The seeds of cover crops are consumed as pulses, an important constituent in the diet of Naga.
- Leaves of cover crops are used as fodder and as green manure. Cost of farm production is reduced as the same jhum field is used for four years.
- The extent of jhum land is also reduced and thus, may reduce deforestation.

Advantage of leguminous cover crops (as per study done by SARS):

- Cover and protect the soil.
- Fix nitrogen in soil.
- Add biomass to soil and improve soil fertility.
- Improve soil structure.
- Stimulate growth of micro-organ isms.
- Maintain soil temperature, regulate evaporation and conserve micro-organisms

(c) NERCORMP-IFAD: The IFAD-supported NERCORMP project in Northeast India has promoted a number of "jhum modification" interventions. One such successful crop modification model is the one adopted by communities in Senapati district of Manipur in which jhum land is cultivated with potato [during February to June] and green peas [during August to November] instead of traditional crops. Both potato and peas can be intercropped with maize, cabbage, onion, pumpkin, yam, ginger, garlic, etc. As per the project documentation, continuous cultivation of such potato-peas for 5 years did not reduce the yield. The average annual income per acre was found to be Rs. 85,000 to 96.000/-. A more detailed jhum modification intervention by NERCORMP-IFAD is described hereunder.

(d) Emerging international experiences and opportunities: IFAD has been sensitive towards the upland poor and their food security, many of whom are shifting cultivators. Either through direct funding to the governments or through its Technical Assistance Grants. IFAD has been addressing the problems of shifting cultivation both directly and indirectly. One of its current TAG programme with International Rice Research Institute in Philippines is developing models to demonstrate management of rice landscapes in the marginal uplands for household's food security and environmental sustainability in Laos, Vietnam, Nepal and India. IFAD is also funding an interesting project in Southeast Asia on an experimental basis where communities are being rewarded for maintaining their forests and natural resources as 'payment for environmental or ecosystem services'. The project, known as Rewarding Upland Poor for Environmental Services [RUPES] is being implemented by the International Centre for Research in Agro-forestry (ICRAF) in Indonesia. Another global initiated is the REDD (Reduced Emissions from Deforestation and Degradation), which is an initiative to cut greenhouse gas emissions associated with forest clearing by the inclusion of "avoided deforestation" in carbon market mechanisms. More simply, it is payment in return for the active preservation of existing forests. Similarly, the Agriculture Development Economics Division of FAO has initiated what is known as PESAL (Payments for Environmental Services in Agricultural Landscapes) examining the rationale and potential for payments for environmental services to improve incentives for sustainable natural resource management in agncuiture. These kinds of programmes might be possible to implement in Northeast India in near future, including Tripura.

3. NERCORMP-IFAD and SHIFTING CULTIVATION

3.1 The project

The North Eastern Region community Resource Management Project for Upland Areas or NERCORMP is a joint initiative of the Government of India (GoI) and the International Fund for Agricultural Development (IFAD), a specialized agency of United Nations, based in Rome. The principle focus of IFAD is enabling the rural poor to overcome hunger and poverty. The North Eastern Council (NEC) and the Ministry of Development of North Eastern Region (DoNER) represent the Government of India in the Project set-up. Based in Shillong NERCORMP operated in 6 districts and 3 States, viz Karbi Anglong and N.C. Hiils districts in Assam, Senapati and Ukhrul ditricts in Manipur, West Khasi Hills and West Garo Hills in Meghalaya.The Project was declared effective from February 1999 and closed in September 2008. The Project worked among 19 different tribes in these districts/States covering 860 villages with 39,161 households. The project operated through a Regional Society (based in Shillong under the Chairmanship of the Secretary, NEC) and six district level societies, all registered under the Society Registration Act. The District Magistrate & Collector in each district acted as the Chairman of the District Society. The project worked with 50 partner NGOs who provided direct services to the communities (capacity building and supervision) along with the project team. Each village developed Village/ Community Resource Management Plan (CRMP) and funds for implmentations were secured through the Annual Work Plan & Budget (AWPB) at each village by each community or village. At the village level the Natural Resource Management Groups (NaRMGs) had the responsibilities of village level annual action planning, implementation and fund management. All planning and implementation followed the participatory 'bottom-up' approach, in which the communities were the initiators, owners and implementers of their own Development plan. Women were organised into Self Help Groups. The project had the following percentage of fund allotment under 6 different sectors (Table 1).

Table 1. Funds allotment (%) under six different sectors of NERCORMP.

	Sectors	% allotment of fund	Remarks
1.	Community institutions & Capacity building	07.40 51.80	a) VDF-IGA : 50% as grant, 50% as revolving fund for microcredits
2.	Village development Fund	05.40	(b) Community share of contribution
3.	VDF-Social	20.40	for social & infrastructure
4.	VDF-Infrastructure	04.10	development averages to 15-20%
5.	NRM	10.90	of the total cost, generally in the form
6.	Project Management Total	100.0	of labour and/or local material cost.

The summary of major components and interventions of NERCORMP, besides the Project Management, were as given in Table 2:

Tabie 2. Major project components and interventions of NERCORMP-IFAD

Components	Activities / Interventions
A. Community Institution Development	Formation & capacity building of CBOs: [a] Natural Resource Management Groups or NaRMGs, [b] Self Help Groups or SHGs, [c] NaRMG Associations & SHGs Federations; capacity building of partner NGOs, and [e] formation and capacity building of rural specialists and service providers in agriculture-horticulture, livestock, fishery, health care and business agents.
B.Social Sector Development	Drinking water supply, Community health care, Low Cost Toilets, School buildings, Community halls.
C.Village Infrastructure	Inter-village roads, culverts, bridges, rural electrification, common facility centres, processing units, collection centres & village godowns.
D.NRM & Livelihoods	
D1. Land and Water Resource	Terrace development, minor irrigation, jhum modification, water harvesting and management

D2.IGAs & Livelihoods	Land / farm based (Agriculture & Horticulture including home gardens) & non-farm based enterprises.
D3. Conservation	Community forests, Community Biodiversity Conservation
E. Crosscutting	Monitoring & Evaluation, Market linkage, Microfinance and Credit linkage, Gender mainstreaming, Documentation, and Project Management

3.2 Specific Interventions in Jhum

3.2.1 Guiding principles and strategies

The general guiding principles of NERCORMP was the adoption of 'bottom-up planning' of community resource management by the communities tnemselves. The Project role had been to be the enabling and facilitating stakeholder, while planning, implementation and monitoring, including social auditing were done by the communities themselves. The Project of course organized the communities into organizations (eg NaRMGs) to do these tasks, besides building their capacities similar to most other development interventions (PRA,organizational management, financial management, book keeping, record keeping, costing and evaluation). Guided facilitation encompasses providing and educating the communities on the pros and cons (desirable and undesirable impacts) of any activity chosen, towards building their social, human, prysical, financial and natural assets. With respect to shifting cultivation, the project consciously adopted a neutral role, allowing the communities the best options based on their local knowledge and experiences. The Project provided guided facilitation and discourse to enable the communities to deliberate on the issues and decide on the best practical actions. The project had also been able to converge with the line departments to response to the needs of the communities. Often the expertise from the line departments was available for the capacity building of the communities and to provide guidance on other technical matters.

3.2.2 Process Interventions

a) Social engineering

This included social mobilization and motivation through trainings and capacity building activities integrating traditional village institutions with project-induced CBOs enabling equal representation of men and women in organizational

composition and decision making processes. Capacity building also included trainings and education on environment, conservation, natural resource management, biodiversity, and related subjects.

(b) Rationalisation and optimisation of jhum land

- **Site selection:** Selection of jhum sites based on ecological principles such as avoidance of critical water sources, rich in local biodiversity values (medicinal plants, wild edible plants, and other NTFPs). [Also educating the communities on the various precautionary measures to be taken up as per the existing jhum regulations/acts of the state/district],
- **Jhum Plot Size** Determination of each household jhum plot size based on availability of seeds / planting materials, ability to do effective weeding or availability of household hands/labour for weeding, etc.
- **Fire prevention:** Strengthening community based fire management strategies during jhum burning to prevent escape of any fire that might burn nearby forests.
- **Inculcating traditional good practices:** The project identified and inculcated good practices of traditional values such as laying of unburnt logs across the fields for soil and water conservation, planting of local tree seeds along with jhum crops, and avoidance or preservation of sprouting or germinating tree seedlings during weeding.

c) Linking jhum crops with traditional diet for health and nutrition

- Many of the crops grown in jhum are considered to be highly nutritious and used as health diet.
- Upland 'sticky rice' is considered to be highly starchy and good for people who have to do lots of physical labour; so also the taro and yams grown in the jhum fields (which can also meet the needs of the domestic animals, particularly in piggery development).
- Various herbs grown in the jhum are considered to be medicinal plants with curative properties for various ailments.
- Millets grown in the jhum are highly nutritious and good for the diets of old people and growing children in particular. Traditional many of the communities were using millets as diet for the infirm and sick people as well.
- Special awareness educations were conducted with women as they are the traditional custodians of jhum practices among most communities. Interestingly, knowledge about jhum crops and seed preservations is better

known by the women than men. Also almost 70-75% of workload for successful jhum cultivation is contributed by women.

Increasing reduction in jhum areas and changing agro-biodiversity in jhumscapes were found to impact the women more than men in a typical household. The women spent longer hours in the nearby forests for wild vegetables or collection of firewood.

(d) Jhum Intervention Activities

The following jhum intervention activities were facilitated by NERCORMP in partnership with the target communities (Table 3). While crop intensification and system conversion (transformation of jhum land into agro-forests or alder-based jhum) were the most preferred activities in "Situation A" (where jhum must continue), crop diversification and crop commoditization were the preferred choice among majority of the 'Situation B' (where road and market connectivity exist). On the other hand, the fallow land interventions, i.e. conversion of jhum land into terraced fields or community conserved areas were equally chosen by the communities living in both the Situations 'A & B'. With increasing awareness on biodiversity conservation and environmental management as well as availability of other alternative sources of income, many communities have consciously decided to reduce jhum and conserve more areas as community forests as they experienced better local environmental services through such efforts such as increased availability of water, firewood, wild vegetables, etc. Many project villages reported 60% reduction in jhum areas but improved food security, higher income and savings, and local environmental conditions.

Tatote 3. Summary of jhum interventions by NERCORMP-IFAD project.

Interventions	***Activities / Explanation***
CROPPING PHASE	
Crop intensification	• Crop cultivation for 2 years at least (first year with cereals & pulses dominated; second year with tuber crops such as ginger if the village is connected with market) • Improved cropping patterns (line sowing of paddy as per NEPED Model, increased nitrogen fixing crops etc.)
Crop diversification	Instead of traditional crops, few high value crops are promoted as per local knowledge [eg. Promotion of upland potato during February to June and green peas during August to November in Senapati district.]
Jhum Demonstration	Demonstration of good practices in jhum through promotion of lead farmers both males and females including seed production.

Demostration of integrated farming	Through lead farmers, demonstration of integrated farming in jhum areas, which include, terraced cultivation, agro-forestry development, horticultural plantations, water resource cum fishery pond developmen livestock management, etc.
Crop commoditization or crop	Promotion of commodity crops & perennial horticultural crops in jhum areas • Agro-forestry [trees and horticultural crops] commodification • Perennial horticultural crops or combination of cash crops and horticulture crops [horticulture crops, generally mixed, such as various combinations of banana, pineapple and arecanut; cultivation of passion fruit, etc.] • Cash crops [tea, arecanut, cashewnuts, etc.] • Medicinal and aromatic plants [such as Aloe vera] • NTFP cultivation [broom grass, bamboo, roofing grass, bay leaf, etc.] • Tree farming / tree plantation [timber, firewood, etc.]
System conversion (Permanent agro-forest)	Development of jhum plots into permanent cultivable areas by planting multipurpose nitrogen fixing alder tree (Alnus nepalensis) in a particular pattern based on the traditional knowledge of the Nagas.
FALLOW PHASE/FALLOW LAND	
Terraced development	Conversion of jhum fallow areas into terraced fields along with development of minor irrigation for the terraced fields
Community Conserved Areas	Jhum fallows with good vegetation transformed into community biodiversity conservation areas, community forests, NTFP reserves, etc.

(e) System integration

However, for optimum benefits from jhum interventions, each household were encouraged to undertake any one or combinations of other interventions such as livestock, fishery, apiculture, sericulture, home gardens, besides other skill development such as tailoring, knitting, etc. Often it was observed that most households could take up home garden / kitchen garden development, one or two livestock (piggery and poultry) and apiculture without much investment or input. The project termed this as 'system integration' i.e. facilitating each household to take up as many activities along with jhum interventions without feeling of overburden or drudgery of activities. These efforts have indeed yielded much desired results to address the integrated needs of the jhumias and wider choices of livelihoods strategies. Of course, provision of revolving funds for microfinance/micro-credits aided to the processes of transformation and transition.

4. HARMONIZING JHUM WITH PGS ORGANIC STANDARDS

If jhum ought to continue where it must for whatever reasons or values (say livelihoods, agro-biodiversity values), it must innovate itself. One way of doing this could be harmonizing the practice with PGS organic standards. The Participatory Guarantee System (PGS) is a worldwide movement for promoting organic, conservation and sustainable farming, primarily based on 'trust', by which farmers prepared their own 'standards' and take appropriate 'pledge' to maintain and practice ecological or natural farming. Government of India in the Ministry of Agriculture is also encouraging promotion of PGS based on the experiences gain through partnership pilot studies with Food and Agriculture Organization of the United Nations.

The North Eastern Region Community Resource Management Project for Upland Areas (NERCORMP) in partnership with the International Centre for Integrated Mountain Development (ICIMOD), Kathmandu; North Eastern Hill University (NEHU), Shillong; The Missing Link, Guwahati; and Nagaland Environmental Protection and Economic Development / Nagaland Empowerment of People through Economic Development (NEPED); Meghalaya Rural Development Society, Shillong in collaboration with members of the PGS Organic India Council had initiated the process of harmonizing jhum practices with PGS organic standards. This collaborative engagement resulted in developing standard jhum practice that could be harmonized with PGS organic standards. The key features and characteristics of jhum for PGS applications are as briefly described below. These features were actually revisited with the communities [from 3 states of Assam, Manipur and Meghalaya] who are practicing shifting cultivators and drawn extensively from their experiences, besides experiences of NERCORMP, NEPED and NEHU[7]. These standards were also presented in the recently concluded World Organic Congress, held in Modena, Italy, June 18-20, 2008[8].

* **Zoning of PGS jhum:** The area for PGS jhum to be clearly demarcated and protected from non-organic non-PGS area, involving community institutions.
* **Jhum cycle:** 8-12 years, minimum 8 years fallow period for tree-dominated and 10 years for bamboo forests with 1-2 years of cropping; in alder-based *jhum* with systematically planted and pollarded alder trees, a minimum cycle of 4 years with 2 years fallowing and 2 years cropping.

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[7] *Darlong, V., Jamir, A., Barik, S.K., Tiwari, B.K., Choudhury, D. & Nakro, V. (2008). Harmonizing Jhum in Northeast India with PGS Organic Standards: Ways Forward. NERCORMP-NEHU, Shillong, pp. 43.*

[8] *Darlong, V. (2008). Harmonizing jhum (shifting cultivation) with PGS Organic Standards in Northeast India: Key features and characteristics of jhum for process harmonization. In Cultivating the Future Based on Science: Volume 1 : Organic Crop Production, [eds. Daniel Neuhoff ef a/.], pp.718-121.*

* **Site selection:** The PGS jhum sites to be as per local jhum regulations, at least 400 m from major water source; 50 m from main road; not community or government forest reserved area; not primary or pristine forest.
* **Jhum clearing:** Precaution exercised by rationalizing land clearing based on availability of seeds/planting materials, and availability of labour for weeding; trees not clear-felled but looped branches, retaining as many standing trees.
* **Burning & fire management / precaution against fire:** Well established fire line maintained before burning; no destruction of adjacent biodiversity-rich forest by fires from jhum; no crop residues burnt; strong community fire management.
* **Labours :** No child labour employed; men and women share equal work-burden.
* **Seeds /planting materials:** Only local / indigenous seeds used; seeds exchange with other farmers prior to sowing as per local customs; seeds of local species of trees / fruit trees also sowed/planted along with jhum crops; no GMOs or HYV hybrid seeds used; if required, seeds treated only as per PGS organic standards.
* **Agronomic practices:** Well balanced/mixed agro-biodiversity planted or maintained; no tillage; no over planting of nutrient-exhaustive crops; very good mix of nitrogen fixing plants/crops, occupying at least 50% of the crop area; no serious or alarming attacks of pests and diseases; no chemical pesticides used.
* **Soil & water conservation practices:** Good soil and water conservation practices using both agronomic (through indigenous crop mix) and mechanical measures (using locally available materials or traditional good practices) maintained; no visible gully formation or other evidences of soil erosion in the field.
* **Weeding & weed management** : Removed weeds used for mulching; no germinating local tree species destroyed during weeding.
* **Pest management:** Integrated pest management (IPM) practiced; if required, organic pesticides used along with promotion of traditional preventive measures.
* **Harvesting, packaging & transportation:** Bags and containers used to harvest and transport jhum organic produce are clean and uncontaminated; used locally available uncontaminated leaves and bamboo baskets for packaging while transporting; no plastics used.

* **Crop residues:** Crop residues left in the field; no burning of crop residue.
* **Fallow management:** A minimum of 8-10 years of fallow periods maintained in a typical system; and 2 years in a pollarded-alder-based system.
* **Soil nutrients:** Soil properties maintained by appropriate crop mix cultivation, soil and moisture conservation practices, maintenance of at least 8-10 years fallow.
* **Soil flora and fauna:** Soil faunal and floral population maintained, including soil microbial status ensured by recycling of crop residues and optimum fallowing.
* **Biodiversity in the fields:** Crop biodiversity and biodiversity of fallow areas maintained or enhanced; live hedges maintained as jhum boundaries; jhumscapes appear with jhum as islands in the midst of enhanced forest cover.
* **Productivity & food security.** The overall practice is conservation farming with improved land productivity and enhanced food security and income.
* **Land tenure & social equity.** Equitable land access to all members of a given village; effectively prevents unequal or skewed privatization of common property resources, harmonizing with traditional system of social equity.
* **Conversion period:** Suggested period is 12-36 months for general fallow land; a fallow land of 8 years or more may have shorter conversion period (12 months).
* **Markets:** Need for establishing a network of markets and well-established supply chain for organically or naturally produced food crops from Jhum PGS.
* **Pricing and advertising support.** Initially market support for pricing and transport; also support for advertisement of 'niche' crops and consumer education.

It would be desirable, and perhaps possible that every community brings out its own standards of jhum practices based on local experiences and knowledge that could sustain both the productivity and soil fertility besides social and other environmental demands. The challenge however would be regulating the standards.

5. CHALLENGES AND OPTIONS FOR TRIPURA

5.1 Jhum control and Jhumia rehabilitation programmes in Tripura: Understanding the context

Problems relating to shifting cultivation through slash and burn are not new to Tripura. As early as 1876, W.W. Hunter[9] in his book "Statistical Account of the Hill Tipperah" had remarked that the "regression of forests had already started in hills because of shifting cultivation practiced by almost the whole population numbering less than 50,000 who were all tribals". Even successive Maharajas of Tripura were genuinely concerned that the practice be contained or that the tribals should be drawn to settled agriculture in place of jhum.

Tripura has a fairly long history of jhum control and jhumia rehabilitation programmes[10]. The first plan was drawn up in 1953-54 in which each jhumia family was allotted 5 acres of arable land and a grant of Rs. 500/- for land development and purchase of essentials to support settled farming. From this period up to 1955-56, the jhumias were settled sporadically. From 1956-57 onwards, the approach of resettlement or rehabilitation was on compact colony so that other basic amenities can be provided. Tripura has implemented (and/or is implementing) the following various programmes and schemes for rehabilitation of jhumias and jhum land, involving at least 8 various departments or agencies of the government (Table 4). Computed from different sources, this is to show indicative achievement (which requires updating).

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[9] *Hunter, W.W. (1876). Statistical Account of the Hill Tipperah. (Reprint).*

[10] *Dev Varman, S.B.K. (1971). A Study Over the Jhum and Jhumia Rehabilitation in the Union Territory of Tripura. Directorate of Research, Department of Welfare for Scheduled Tribes & Scheduled Castes, Government of Tripura, Agartala.*

Table 4. Summary of jhum control programmes and achievements in Tripura.

Departments/agencies & Schemes/Activities	Achievements			
	Period / Year	Outlay / Amount spent (in lakhs)	Area covered (in ha)	No of Jhumia families benefited
A. Tribal Welfare Department				
(a) Rehabilitation of landless jhumias under settlement programme				
• Rs. 500 per family scheme	1955-70	1058.15		21,163
• Rs. 1910 per family scheme	1970-77	1357.82		7,109
• Rs. 6510 per family scheme	1975-85	5724.89		8,794
• Rs. 8000 per family scheme	1985-88	1003.20		1,254
• Rs. 25,000 per family scheme	1988-92			4,268
• Rs. 30,000 per family scheme	1992-97			4,079
• Rs. 53,000 per family scheme	1997-00			904
(b) Jhumia settlement scheme based on				
• Rubber Plantation	1999-04	368.10		1472
• Tea Plantation	1999-04	203.80		514
• Coffee Plantation	1999-04	36.00		120
• Horticulture Plantation	1999-04	270.10		900
B. Forest Department				
Rehabilitation of shifting cultivators through				641
• Soil & Water Conservation Schemes.	1974-83			
• NEC assisted schemes.	1975-79			400
• Rubber-based rehabilitation schemes.	1983-85			1185

C. Agriculture Department				
Integrated scheme for improvement of production and productivity of jhum crops (supply of seeds, supply of fertilizer, horticultural plantation in homestead, training of jhumias).	1998-04	184.99	-	6379
D. Horticulture Department				
Watershed Development Project in Shifting Cultivation Areas				
• 8th Five Year Plan	1992-97	360.00	3,665	1994
• 9th Five Year Plan	1997-02	649.71	10,757	3000
• 10th Five Year Plan (only the first one year)	2002-03	247.40	2,474	3635
E. Tripura Forest Development Plantation Corporation (TFDPC)				
Jhumia rehabilitation through rubber plantation (data provided by Tribal Welfare Department)	2001-03	14.96	-	60
F. Tripura Rehabilitation Plantation Corporation (TRPC)				
Socio-economic upliftment of tribal jhumias through rubber plantation	-	-	5095.71	3977
G. Tribal Rehabilitation in Plantation & Primitive Group Program (TRP & PGP)				
(a) Economic development through				
• Teak plantation	1986-02	-	14,076	
• Bamboo plantation	2004-05	-	60	11,530
• Cashew nut plantation	1986-98	-	7,850	
(b) Intensive rehabilitation of primitive tribes (to wean away from jhum)	2004-05	116.30	-	95

H. Autonomous District Council				
(a) Assistance for upland (jhum) farming (land preparation, supply of jhum paddy seeds, sowing & weeding).	2000-04	497.80	-	*84,000
(b) Integrated tribal jhumia rehabilitation through rubber plantation.	1998-99	-	1500	1500

*(*It is most likely that many families enjoyed the assistance more than once over the successive four years period under report).*

5.2 Forests, shifting cultivation, tribal rights and Autonomous District Council (ADC)

Almost all the hilly areas of the state fall within the Tripura Tribal Areas Autonomous District Council (TTAADC), which comprises 7132.56 sq km and form about 67.98% of the State. Of the total area of ADC, as much as 5911 sq km (82.87%) is forest land under the effective control/management of the State Forest Department. As per legal status, these forests comprise of (a) 3582 sq km of Reserved Forests (RF), (b) 258 sq km of Proposed Reserved Forests (PRF) and (c) 2071 sq km of Protected Forests (PF), re-designated as Unclassified Government Forests (UGF). The UGF outside the ADC area is only 125 sq km. On strict legal term, no one would be allowed to do shifting cultivation in forest areas, unless otherwise proven that it is needed as part of the forest management practice. On the other hand, the ADC is charged with the constitutional mandate of "Regulation of the practice of shifting cultivation"[11]. There are 40,000 jhumia families within ADC areas, of which 21,099 families reside within the Reserve Forest areas *(Table 5).*

[11] *Refer para 31 (d) of the Tripura Tribal Areas Autonomous District Council Act.1979*

Table 5. Jhumia statistics of Tripura (as per Tribal Welfare Department, Govt of Tripura)

Particulars	No. of families dependent on Jhum		
	Fully dependent	Partially dependent	Total
Jhumias in the State	21,677	33,372	55,049
Jhumias in ADC area	15,830	24,171	40,001
Jhumias outside ADC area	5,847	9,201	15,048
Jhumias in R.F.	8,440	12,659	21,099
Jhumias in R.F. within ADC	5,622	9,082	14,704
Jhumias in R.F. outside ADC	2,818	3,577	6,395

Recent studies by the Department of Agriculture, Government of Tripura[12] showed the number of jhumias and area under jhum in the State as 2,09,200 and 1,08,842 ha respectively. In terms of total area affected by jhum, both Dhalai and North District were higher than the West and South Districts (Table 6).

Table 6. Jhumia statistics of Tripura (as per Agriculture Department, Govt. of Tripura)

Districts	Total jhumia population	Total jhumia households	Jhum area sown in 2004-05 (in ha)	Total area affected by jhum (in ha)
West	38,723	7,569	2,397	15,120
South	65,485	12,713	4,448	28,080
Dhalai	63,568	11,824	5,008	32,400
North	41,424	7,895	5,272	33,242
Total	209,200	40,001	17,125	1,08,842

As early as 1887, the Maharaja of Tripura had prohibited jhumming in the vicinity of Sal (Shorea robusta) forests. However, a plan was drawn up by the Maharaja for setting apart some hilly areas for jhumming (shifting cultivation) with a view to stopping encroachment on reserved forests. Unfortunately, some important areas under this plan were subsequently settled with migrant plain communities[13]. In Tripura, jhum is not permitted in Reserved Forests. However, as per Tripura

[12] *State Agriculture Research Centre, Department of Agriculture, Government of Tripura, Agartala (2005).*
[13] *Government of Tripura (2000). A Compendium of Forests and Forestry in Tripura. Forest Department, Agartala.*

Forest Rules, 1952 *"Jhumming may continue to be practiced in the Protected Forests (now Unclassified Government Forests or UGF) by all hill men who are at the time of this notification lawfully practicing this method of cultivation."* Within the same spirit of the notification, it is clear that the tribals have no tenurial rights, although the jhumias continue to enjoy certain 'concessions' with respect to limited jhumming solely for the purpose of livelihood and no other alternatives being available.

Besides to jhum in Protected Forests (or UGF), certain rights and concessions have also been granted to the tribals in the forests of the State. Under notification No. 1 dated 29.4.1952 of Government of Tripura, the tribals from villages surrounding the Reserved Forest areas have the right to collect forest produce from such Reserved Forests during the period of three months from January to the end of March every year, free of royalty, for their household needs and constructions, on the strength of "Free Permit" issued by the concerned Divisional Forest Officer. The rights to forest or natural resources include house post of ordinary species (15 nos), fencing posts of ordinary species (25 nos), timber in round for plough piece and furniture (15 cft), firewood (100 shoulder-load or 60 maunds, which is about 2400 kg), thatching grass (30 bundles), bamboo (500 nos), cane (25 nos) and other minor forest produce as required.

The tribals also enjoy the rights to (a) Fell, convert, collect and remove to their homes, free of charge, subject to transit rules and issue of free permits, for their own private use, only up to a reasonable quantity and size of all trees, poles and logs of the species not reserved and all other forest produce which by custom they are entitled to be supplied with, (b) Graze free of charge, subject to the issue of free permit, cattle kept by them for their own household and agricultural requirement in Protected Forests (now UGF) up to a reasonable number, (c) To sell trees, not reserved species, which are felled, collected and converted by jhumias in the nearest authorised 'hat' (rural market) between the hours of sunrise and sunset.

Direct and indirect economic loss due to jhum have also been enumerated[14] (Table 7) taking average land cleared by a jhumia family per year to be 1 ha and considering that most forest land cleared for jhum would be dominated by bamboo (Muli bamboo).

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[14] *Deb Barma. C.M. (2004). Jhumming (Shifting Cultivation) and Problems of Natural Regeneration of Bamboo.*

Table 7. Economic loss due to jhum (after Deb Barma, 2004).

	Parameters	Estimated loss
1.	Loss of 10,000-15,000 nos of bamboo (in case of muli, Malocana baccifera) from 1 ha of area cleared and burnt for jhum per year by a jhumia family(Also in the subsequent 2 years or more, the jhumia cannot harvest any bamboo from such plot).	10,000
2.	Value of bamboo shoots, wild vegetables, medicinal plants used by the tribals (per ha/year)	6,000
3.	Loss of fodder, edible fruits and roots/suckers from jhum area (per ha/year)	1,500
4.	Loss of saplings, which act as natural colonizers.	Unaccounted
5.	Loss of ecological services rendered by birds and small mammals for seed dispersal and pollination.	Unaccounted
		Total 17,500

5.3 Integrated Jhum/Jhumia Development [IJD]

5.3.1 Challenges of designing an innovative programme components

Integrated jhum development (IJD) is not new to Tripura. The State Government in the Department of Agriculture is already implementing one model designed with the assistance of Prof. P.S. Ramakrishnan, former professor of Jawaharlal Nehru University (JNU), New Delhi and experts from international centre for Integrated Mountain Development (ICIMOD) in Kathmandu15. However, the fruits of various IJD models continue to evade as many as 40,000-55,000 families in the State. This perhaps calls for a revisit to the entire programme of IJD either lacking practical innovations in design components or delivery mechanisms of the agencies involved.

Based on experiences gained through various programmes and projects, integrated jhum/jhumia development programme can no longer be treated in isolation. Best intentions and programmes of the government have not yielded desired results as different departments or agencies involved have been looking the problems and their solutions from the *prism* of their own departmental perspectives. IJD requires a rather total package to address the *"human, social,*

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[15] *Personal communication with Department of Agrtculture, Govt. of Tripura, Agartala.*

physical, economical, financial and natural dimensions from the perspectives of the jhumias and their livelihoods and livelihoods strategies. Thus the overriding programme should be *'jhumias' development rather than 'jhum' development.*

Based on experiences from other projects, innovative IJD should have at least the following components and activities. The overall goal of IJD, given the context and ground realities of Tripura, could be facilitating and enabling the communities for progressive reduction of jhum and/or weaning away totally from jhum as per current policies of the government through multi-component activities for development of alternative livelihoods and livelihoods strategies based on agriculture, horticulture, forest, soil and water conservation, livestock, non-farm sector, social development, etc.

The needs of the *jhumias* should be addressed both as individual households and as a community living in a given settlement/village. The innovative IJD components should be able to address the three fundamental "L's" of the jhumias, viz. ***"Lives, Landscapes and Livelihoods"***, where 'Lives' signify *the wellbeing of their human life and society,* 'Landscapes' *the wellbeing of the lands on which* they live and 'Livelihoods' *the wellbeing of the activities/occupation upon which their incomes and sustenance depend.*(Wellbeing in this context should be synonymous with the overall meaning and scope of sustainability). In short, the focus must include the security for food, economy and environment.

There is no ideal IJD, but requires to be designed based on local or State context and communities to be addressed. However, ideal IJD components should be able to integrate towards building the assets for the basic livelihoods framework, viz, the human, social, physical, financial and natural capitals of the communities. Based on some of the successful project models within Northeast India [such as NERCORMP-IFAD, NEPED, etc] and elsewhere, and also drawing lessons from the on-going flagship projects in Tripura [such as JBIG & GTZ/Kfw funded projects], the outline of an option for IJD for Tripura can be suggested as given hereunder (Table 8). These suggested activities are for situations where jhum is permitted; for areas under reserved forests perhaps the best way of delivering many of these interventions could be through the JFM mode, and hence would require dovetailing.

Table 8. Options for summary of Integrated Jhum Development

Components	*Key interventions / activities*
Jhum: Institution Development & Capacity Building	*Organizing the communities and building the social and human assets and capacities of the communities with special focus on women and youth. *Trainings and skill development for different alternative livelihoods and livelihoods strategies. *Also awareness and capacity building of the traditional community leaders,village.councils, etc. [Social Engineering]
Jhum: Basic Rural Infrastructure Development	* Development or Provision of basic rural / village infrastructures: road connectivity, drinking water, sanitation, health care, education, electricity, multipurpose community hall, storage godown, etc. * Building the social capitals of the communities for ownerships, management and maintenance of these rural infrastructures through generating of self-sustaining income and saving for some of the services being provided (eg. Monthly contribution for use of the water facilities, use of the roads, etc.) * One the most effective ways of achieving rural infrastructure development is through 're-grouping' of small settlements into a larger one (as already being done by the government) through social engineering (mobilization and motivation for positive voluntary decisions through awareness and conviction). * Ensuring outreach of government extension services and other _service providers.
Jhum: Cropping phase / cultivation phase	* Where jhum must continue, increasing the crop yield by providing good seeds/high yielding seeds, adopting good agronomic practices along with soil and water conservation measures, etc. * Increasing cropping phase from traditional one year to two or more years through crop rotation/crop manipulation/agronomic practices/ green manure/cover crop [State Agriculture Research Station, Mokokchung, Nagaland has successfully demonstrated that cropping

	can be carried out continuously for 4 years maintaining both the yield and soil quality/ soil fertility]
Jhum: Fallow phase / forest regeneration phase	* Plantation of fallow areas with multipurpose and multispecies trees for timber, fuel wood, fodder, etc. * Plantation with useful nitrofixing species such as tree beans *(Parkia roxburghii)*, Sajna or *Drum* stick, *Bahunia* sp, Sesbania *grandiflora*, etc. * Plantation with medicinal trees such as Arjun, Bahera, Palash, Hartaki, Amla, Neem, etc. * Plantation with NTFPs (primarily bamboo, edible plants, etc.) * Plantation with wild fruit trees. * Development of permanent agroforests with combinations of the above species along with horticultural species / fruits. * Promotion of perennial horticultural species.
Jhum: Homestead gardens	* Development of home gardens / agroforest home [seasonal/off-season vegetables, domestication of wild edible plants, tuber crops for livestock/piggery, bamboo, fodder, firewood, medicinal plants, fruit trees, etc.] * Integration with livestock, fishery, apiculture, sericulture, etc.
Jhum: Lunga land development	* Development of valley or lunga land for wet rice cultivation. * Water / rainwater harvesting for irrigation, aquaculture, ground water recharging, etc. * Infusion with high yielding paddy varieties .
Jhum: micro-finance and non-farm sector with market linkage	* Development of microfinance/micro-credits [individuals or groups, particularly for women and youth for enterprise development, self employment, etc.] * Development of handloom, handicrafts, food processing, value chain development and market linkages, enterprise development, business development, etc.
Jhum : Knowledge Management	* Innovations and lessons learned and unlearned must be constantly identified, documented, shared and disseminated between/among the communities, the programme implementers, government departments,

development planners and practitioners, policy makers, academia, civil society organizations, media and various other stakeholders.

5.3.2 Challenges of Delivery and Implementation strategies

Nearly 50 years of concerted government efforts for jhumia rehabilitation through several specialized departments / agencies seemed to have not yielded the desired results at the pace required. The following various options may be examined as a guideline for IJD programme implementation. In fact, innovative options can also be modeled from combinations of these suggested options. In all these options, however, the availability and/or participation of local dedicated non-governmental organizations (NGO) would be crucial. Such NGOs should participate either as facilitating and/or resource NGOs as part of the programme delivery and implementation. If there are none, it would be prudent to promote/ initiate such organizations, perhaps as community based organizations.

Option A: Need for innovative programme delivery designs and implementation strategies; an innovative option couid be creation of a new inter-departmental agency [officers drawn from each key department of the government to form a new body/organization for programme delivery, such as the NEPED Model of Nagaland]. This body could be the convergence point for all the different government programmes and funding for jhumia rehabilitation programmes. This body can function directly under the Planning Department, and ideally should function on mission mode.

Option B: Alternatively, a dedicated autonomous body / corporation / registered society may be set up by the government, exclusively dedicated for the task of addressing jhum and jhumia rehabilitation activities. This body should have representation from all the aforementioned government departments/ agencies mentioned above, or professionals drawn from the market through open competition. This organization or the body above should work on Mission mode.

Option C: Forest Department may have an autonomous body/cell under its department for implementation of IJD in areas under reserved forest through JFM mode or as per legally permissible activities. Similar body/cell may be set up under the Tribal Welfare Department for implementation of IJD outside the forest land. In both these body/cell, officers from related departments may be drawn on fixed term deputation.

Option D: The TTAADC may form a separate agency/body for the purpose,

in which officers from State Government departments may be drawn on deputation and allowed to function in an autonomous ways. All fund meant for jhumia rehabilitation from each of the departments may be pooled together for this purpose.

Option E: Invite a reputed national or international development agency who can take up the task on end to end basis, i.e. formulating and designing the programme as well as implementing or delivering the programmes within a specific but comfortable time period. Of course, the government has to provide all the enabling policy environment and financial security for the programme. Alternatively, secure externally funded project for this purpose or integrate the current ones [JBIC and GTZ/Kfw funded projects] into focusing jhumia rehabilitation as much as natural resource development. Current government programmes on jhumia rehabilitation can be converged with these externally-funded programmes so that there are greater efforts of activities and funding supports for achieving the optimum results.

5.3.3 Challenges of building a dedicated and motivated team for delivery of IJD

The people and professionals who work in programmes charged with rehabilitation of jhumias and jhum development activities require a different set of orientation and mindset. Such kinds of programme cannot be effectively and productively delivered through routine system of works and people. The IJD Team would require a great deal of sensitivity and ability to put themselves along with the feelings and perceptions of the jhumias. They will require the ability to listen to the poor, understand their special needs and expectations, and the humility that will require mingling along with them. At the same time, they should be able to inspire, lead and provide practical solutions to practical problems. They will also require earning the trust of the people they are working with. They should be people who are not afraid to take risks and challenges; they should be people with full of imaginations and dreams, with desires to translate those dreams into realities. The team, as much as they are with the people (jhumias), they would also require to be able to effectively communicate and convince the authorities at appropriate level. And above all, they should be people with natural aptitude for the type of works, gender sensitive and empathy towards jhumias, tribals and disadvantaged groups.

6. CONCLUDING REMARKS

Tripura does have a fairly long history of dealing with shifting cultivation and shifting cultivators. From this perspective, the State is well experienced and perhaps does not require external expertise for this purpose. What the State

might require is serious introspection of all its programmes relating to rehabilitation and resettlement of jhumias, past and present and critical analysis to identify the gaps and to innovate ideas that can be infused to address these gaps. Synthesis from these efforts could yield a crystallised model for developing updated version of programmes for addressing the emerging problems of shifting cultivation in the State.

Not just in Tripura or Northeast India, but across the world, shifting cultivation continue to be under sharper focus in recent years. While the traditional form of shifting cultivation (long years of fallow period with mixed cropping) has been diluted in most places, and thereby impacting the ecosystem, the question today is "Should jhum persist or perish"? It is this change in traditional practice, arising out of changing conditions, that has given the jhum practice a sharp focus and severe criticism. The State Governments of the region have come out with various schemes to provide the jhumias with alternate means of livelihood and wean them away from jhumming. However, during the practical implementation of most of these programmes, the needs of the jhum cultivators have not been assessed rightly and therefore the schemes have met with limited successes in most cases.

There are emerging new ideas based on critical analysis of shifting cultivation in recent years. Studies by ICIMOD (through the funding assistance from IFAD) and other agencies in Northeast India showed that forced conversions from shifting agriculture to permanent forms of agriculture have been counterproductive in many cases, alienating the poorest farmers from their land and forests and causing further degradation. Hence there is a need for policy change and a new perspective that addresses the bias against shifting cultivation. On the other hand, many of the government programmes on eradication of shifting cultivation are not yielding the desired results due to lack of proper assessment of the requirements of the people, the kinds of alternatives needed, lack of participatory approaches to programme planning and implementation, inadequate follow-up by Government institutions for support for developing agricultural production and improving agrarian conditions. A more integrated and location-specific approach in relation to the land-allocation programme is also necessary.

There has also been emerging trends of acceptance of Jhum in more positive perspectives in recent years. The Shillong Declaration on shifting agriculture in 2004[16] was extensive in its coverage of *jhum* cultivation; several governments in the participating countries have placed it on their agenda. In India, many developments have been taken up, both at the central and the State Government level. The recommendations have been advocated during important policy meetings and in reports, including the Farmers' Commission Report on North-East India, and an initiative on participatory forestry. The MoEF has set up a task force on 'Rehabilitation of Shifting Cultivation (Jhum) Fallows'. Government of Meghalaya has been trying to strengthen the process of integrating soil and water conservation practices within the practice of *jhum*. Government of Nagaland has trained government extension staff in participatory mapping and developing new ways of making jhum more productive through NEPED interventions and SARS's models.

The present seminar is encouraging indication that Government of Tripura is also with positive attitudes and serious efforts in addressing the issues of shifting cultivation in the State through innovative perspectives. However, unlike most other States of Northeast India, Tripura has a special challenge in that most shifting cultivators are living in notified forest land. How to balance or compromise between the forest conservation efforts and the livelihoods of the jhumias? Perhaps most practical answers lie within the initiatives already being undertaken by Tripura. Participatory based re-grouping of the *jhumias* with integrated packages of swift delivery and extension service systems together with more 'humane' JFM [re-defining forest landscapes within the immediate impact areas of human settlements in which the meaning of 'forest' could be made wider towards agro-forests, educating the people for informed choices and participatory decisions, etc.] could be the right directions. Also strengthen the process of improving tree covers outside the forest land. The on-going externally funded-projects could also test models that are most practical and sustainable, which addresses the economic security, environmental security and social security of the shifting cultivators. The integrated jhum development programmes and delivery mechanisms need to be redesigned through the participatory processes that should be inclusive and based on overriding perspectives of the *jhumias* or shifting cultivators to build and strengthen the

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[16] *Kerkhoff, E Sharma, E. (2006). Debating Shifting Cultivation in the Eastern Himalayas. Famers. innovations as Lessons for policy. ICIMOD, Kathmandu.*

human, social, physical, financial and natural capitals, both as individual households and communities.

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Shifting Cultivation : Land Degradation and An Approach to Remedial Measures in North East-India

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Introduction:

In India, the people of eastern and north-eastern region practice shifting cultivation on hill slopes. Orissa accounts for the largest area under shifting cultivation in India. Shifting cultivation is locally known as the *podu* cultivation. About 5298 sq km area annually is under this primitive agriculture practice. About 1.5 lakh tribal families are engaged in *podu* cultivation (Patro and Panda, 1994). Based on the task force of Government of India report, more than 30,000 sq km of land (about 1/5 land surface of Orissa) is under such cultivation. Shifting cultivation is prevalent in Kalahandi, Koraput, Phulbani and other southern and western districts, covering 119 blocks . Various tribal communities are involved in this practice (Ashish ,1982). In north-eastern region, mountains have restricting influence on settlement and movement thus having a considerable effect on the economic life of the inhabitants (Neog, 1997). They accepted the nature as it is and fought it valiantly, working on the mountain slopes for centuries in the way as their ancestor did. The prevalent primitive form of shifting agriculture (jhum) is the result of their urge for survival in the most difficult hilly terrains of the region. This slash and burn agriculture regarded as the first step in food gathering and hunting to food production , is believed to have originated in Neolithic period around 7000 BC (Sharma,1976). In 1983, the Task Force on shifting cultivation (Ministry of Agriculture) estimated that the total area under this system was 14,66,000 hectares (3,86,900 hectares annually) and 4,43,336 tribal families were engaged (Table 1)

Table 1. Area under shifting cultivation

NE States	Area under Jhum (Lakh ha)	Jhumia family (Lakh nos)
Arunachal Pradesh	2.10	0.54
Assam	1.39	0.58
Manipur	3.60	0.70
Meghalaya	2.65	0.52
Mizoram	1.89	0.50
Nagaland	1.91	1.16
Tripura	1.12	0.43
Total	**14.66**	**4.43**

The shifting cultivation is generally practised in the following sequence:

- Selecting a forest patch and clear fell the vegetation normally in December and January.
- Burning of the vegetation. Small, cut-trunks portion and roots are normally not removed. The herbs, shrubs and twigs and branches (slashed vegetation) are burnt in February and March.
- Sowing of seeds, by dibbling, generally of cereals, vegetables and oil seeds in April -May.
- Abandoning the cultivated site and shifting to other forest sites.
- Returning to the former site, and once again practise shifting cultivation on it.

With reduction in *jhum* cycle from 20-30 years to 2-3 years, the land under shifting cultivation looses its nutrients and the top soil. With reduction in crop yield, the families start moving to other virgin areas. Now a stage has come that it has already affected 2.7 million ha of land in northeast India. Due to increasing requirement for cultivation of land, cycle of cultivation followed by leaving land fallow has drastically reduced . Earlier the fallow cycle was of 20-30 years duration, thereby permitting the land to return to natural condition(Patro and Panda,1994). Due to reduction of cycle to 2-3 years, the resilience of ecosystem (Ramakrishna, 1992) has broken down and the land is increasingly deteriorating. Moreover, frequent shifting from one land to the other has affected the ecology of these regions. The area under natural forest has declined; the fragmentation of habitat, local disappearance of native species and invasion by exotic weeds

and other plants are some of the other ecological consequences of shifting agricul-ture. The area having *jhum* cycle of 5 and 10 years is more vulnerable to weed invasion compared to *jhum* cycle of 15 years. The area with fifteen-year jhum cycle has more soil nutrients, larger number of species, and higher agronomic yield with ratio of energy output to input as 25.6 compared to jhum cycle of 10 and 5 years (4.6-9.8). Repeated short-cycle jhuming (Borthakur et al.1982) has created forest-canopy gaps which are evident from the barren hills.

Effect of Shifting Cultivation

The destabilization of mountain slopes through shifting agriculture is one of the factors to increase the floods in Brahmaputra plains, extension of delta and formation of islands in the Bay of Bengal, massive siltation and reduction of the available water resources. Shifting cultivation causes a huge land degradation. Soil/land degradation is the principal component of soil quality/health deterioration, due to adverse changes in pedosphere. Soil quality/health is directly related to the health of individual and therefore to the health of nation. If basic resources of land and water are neglected, it is bound to have serious economical, social, and political repercussion on the living community and nation as a whole. Degraded lands are those lands, the quality of which has been deteriorated to such an extent that it cannot be put to any productive use, except current fallow due to various constraints. Soil degradation is the reverse of soil health, resulting persistent decrease of soil potential productivity and loss of environmental regulatory capacity. According to Global Assessment of Soil Degradation (GLASOD) ,soil degradation(Lal,1999) is a process that describes human-induced phenomenon, which lowers the current and/or future capacity of the soil to support human life. The GLASOD has divided the degree of soil degradation to reflect the decline of productivity into four classes:

1. **Light :**Still suitable for local farming system, restoration of full productivity possible by proper management.
2. **Moderate:** Major improvement required to restore productivity.
3. **Strong:** Original biotic functions largely destroyed, major engineering works required.
4. **Extreme:** Original biotic functions fully destroyed, state beyond restoration.

The most important and critical types among the problems are soil erosion and degradation of the hills. Soil erosion and other related processes are the major causes of land/soil degradation leading to appreciable loss of soil

productivity in the region .The major areas of the river catchments of the region can have serious consequences in terms of soil erosion, run-off and rainwater which is excessive and far too quick an outflow of rainwater causing floods and devastation in the lower reaches as well as adjoining States. The loss of top fertile soil through erosion during monsoon season as suspended sediments in the main drainage areas of the river Brahmaputra, is higher as compared to western Himalayas originating the Ganges. Dibang, Teesta and Lohit tributaries of the Brahmaputra have reflected the high rates of land denudation (Sharma and Sharma,2003) in the Himalayas and are extremely high in sedimentation load (26.8 to 98.2 ha-m 100 /km^2/$year^1$). Soil erosion is one of the major causes of soil degradation on steeply sloping lands ,devoid of vegetative cover and often subjected to landslides or landslips during rainy season (May to September). Landslides during monsoon adversely affect utility services such as roads, power generation, reservoirs, human settlements, trade, tourism and other developmental and economic activity. This devastating process of landslides not only affects the land/soil but also causes loss of biodiversity and also human life.

Visual and morphological observations in the field caused by degradation can be recognised by;

1. Loss of top soil,
2. Water erosion as indicated by presence of rills, gullies, stones on the exposed soil surface, exposed roots, and uneven topsoil,
3. Acidification , biological and chemical degradation as indicated by poor growth of crops,
4. Physical degradation (crusting, hard pan, poor physical condition and waterlogging of foot hill lands), and
5. Field is dominated by unproductive grassy vegetation.

Farmers engaged in jhum cultivation in hills

Farmers practising jhum cultivation in steep hills of South Tripura

Soil loss in shifting cultivation sites

The annual soil and nutrient loss in shifting cultivation sites is quantified and the data are presented in Table 2.

Table 2. Soil/nutrient loss parameters in Tripura

Parameters	Annual loss
Soil(t/ha)	74
Organic matter(kg/ha)	2112
Available nutrients (kg/ha)	62

If the total area under shifting cultivation in Tripura is considered to be around 67,000 ha, the account of soil and nutrient loss in Tripura is annually presented in Table 3.

Table 3. Account of soil/nutrient loss in shifting cultivation sites

Parameters	**Soil/nutrient loss (ton)**
Soil	49.6 lakh
Organic matter	1.42 lakh
Available nutrients	4,154

Out of the available nutrients, the loss in available nitrogen constitutes 40 % and the total quantity from 67,000 ha of land is 1662 ton and such a huge

quantity annually lost is valued as Rs. 216 lakh in terms of nitrogenous fertilizers. Erosion is slight in soils well covered by dense grasses or forest but is enormous from steep, poorly covered *jhum* lands as reported in Meghalya (Prasad and Sharma, 1994).

Table 4. Loss of soil through erosion under different land use practices

Land use	Soil loss (t /ha/yr)
Shifting cultivation(7 ha area)	5.1- 83.3
Tuber crops on raised beds (bun)	40.0-50.0
Pineapple cultivation along the slope (first two years)	24.0-62.6
Homestead area	16.8
Mixed crop of maize and rice	19.7-21.0
Rice on slope	32.9-45.0
Bare fallow	83.8
Cropping systems	51.0-83.8
Planted grass cover	10.83
Natural bamboo forest	0.04-0.52

The second year of *jhum* cycle is comparatively hazardous than the first year from the point of soil erosion. The possible implications of actual soil loss vis-a-vis productivity loss is given in Table 5 (Higgins et al, 1982). Normally, soil loss tolerance ranges from 7.5 to 12 t /ha. These areas are exposed to hazards of intense rains and often on terrain which promotes erosion. However, most of the areas have been under use for centuries and therefore, subjected to many times different degrees of degradation. Since 50 t/ha corresponds to a soil depth of reduction of only 3-4 mm, soil losses of such magnitude as reported are hardly noticed by the shifting cultivator even they are convinced of their occurrence. The loss of the top few millimeters of shallow depth soil, where organic matter and biological activity are concentrated, may significantly decrease soil fertility and crop yield.

Table 5. Relationship between soil erosion and decline in land productivity

Soil loss, t /ha	*Anticipated productivity losses*
<12	No change in land productivity.
12-15	50% of the area of very productive land shows a diminishing trend to productive land: the remainder remains unchanged.
50-100	100% of all productive land shows a diminishing trend by one productive class.
101-200	50% of the area of all productive land is converted to not suitable land., the remainder shows a diminishing trend by one productivity class.
>201	The entire area of productive land is converted to not suitable class.

The changes in the soil properties of shifting cultivation sites need to be documented and regularly monitored to bring about an improvement in the areas under the practice of shifting cultivation over the centuries.As such ,soil samples were collected over a period of 1 - 3 years in Tripura and were analysed (Datta et al, 2001). Soils were acidic(Table 6) with pH ranging from 4.5 to 5.1. A decline from 0.1 to 0.2 units was registered with the rise in shifting cycle from 1 to 3 years. The exchange acidity varying from 1.95 to 2.51 showed a rise from 1st to 3rd year of shifting cycle. Due to rapid mineralization over the shifting cycle, organic carbon underwent rapid oxidation as noted from the decrease in values from 7.3 to 6.5 and 8.3 to 6.1 g kg^{-1} in soil sites under study. Bulk density remained unchanged but water holding capacity showed a decline from 34 to 32% and 40 to 35% probably due to reduction in organic matter and erosion of finer soil fraction from the soil matrix. On the other hand, cation exchange capacity (CEC) showed a decreasing trend primarily due to erosive loss of soil clay and organic matter. Exchangeable cations underwent a decline with the rise in shifting cycle owing to leaching losses. But base saturation showed an increasing trend mainly due to sharp decline in CEC.

Table 6. Effect of shifting cultivation on soil physico chemical properties.

Properties	West Tripura			South Tripura		
	I	II	III	I	II	III
pH (H_2O)	4.70	4.60	4.50	5.10	5.10	5.00
Exchangeable acidity [c mol (p+)/ kg]	2.33	2.30	2.46	1.95	2.31	2.51
Org. Carbon (g/kg)	7.30	6.70	6.50	8.30	7.00	6.10
Bulk density (mg/ m3)	1.30	1.30	1.30	1.20	1.30	1.30
Water holding capacity (%)	34	32	32	40	35	35
Cation exchange capacity [c mol (p+)/ kg]	4.22	3.86	3.38	4.29	4.20	3.33
Exchangeable cations [c mole (p+)/kg]	0.84	0.76	0.75	1.10	1.37	1.06
Base saturation (%)	20.40	19.90	22.40	25.80	32.10	34.40

I,II & III denote 1st, 2nd and 3rd year of shifting cycle.

Data on nutrient availability in soils under shifting cultivation are presented in Table 7.

Table 7. Nutrient availability in soils influenced by shifting cultivation.

Nutrient	West Tripura			South Tripura		
	I	II	II	I	II	III
N (kg/ha)	589	561	522	567	558	511
p (kg /ha)	1.89	3.59	2.70	4.34	6.21	5.31
K (kg/ ha)	150	125	134	259	319	203
Fe (mg/kg)	47	87	49	36	51	53
Mn (mg/ kg)	23	20	21	20	20	21

I,II & III denote 1st, 2nd and 3rd year of shifting cycle

Available nitrogen, the status of which varied from high to medium showed a sharp decline with the rise in shifting cycle. Available phosphorus (Bray P/1) was low. Available potassium varying from low to medium also showed a decreasing trend in soils under shifting cultivation. The DTPA extractable Fe/Mn underwent an inconsistent variation but the soils were found to contain adequate amounts of these cations. Soil humic acid (Table 8) extracted from surface soils

under shifting cycle was analysed for its characterization.

Table 8. Properties of humic acid in surface soils over the shifting cycle.

Shifting cycle	E_4/E_6	CEC [cmol(p^+)/kg]	N_{sp}/C (mL /g)	Molecular weight	IR spectral bands (cm^{-1})
1st year	3.88	250	10.55	6520	3915 (M), 3700 (W), 3580 (Pay) 2340 (Sh), 1873 (Sh) 1800 (S),1600 (Sh), 1461 (Sh),1039 (S), 913 (M), 690 (M), 535 (M), 470 (Sh), 425 (Sh), 348 (Sh), 261 (Sh)
2nd year	4.24	370	10.85	6805	3700 (M), 3624 (S), 2940 (Sh), 1610 (S),1034 (S), 915 (S), 750 (M), 688 (S), 535 (S), 469 (Sh), 420 (W), 345 (Sh)
3rd year	4.66	375	8.05	4300	3700 (M),3620 (S),2000 . (M), 1860 (Sh),1 845 (M), 1830 (Sh), 1640 (S), 1558 (Sh), 1030 (Sh), 1000 (S), 910 (M), 790 (W), 750 (Sh), 690 (M), 525 (M), 460 (M), 420 (Sh), 340 (Sh).

S = Strong, M = Medium, W = Weak, Sh = Shoulder.

The ratio of optical densities at 465 and 665 mm (E_4/E_6) of humic acid showed a concomitant rise from 3.88 to 4.66 over the shifting cycle of 3 years. A high ratio of E_4/E_6 reflects a low degree of aromatic condensation and large proportion of *aliphatic* structures. So humic material with high E_4/E_6 ratio may be considered to have low aromatic condensation after 2nd and 3rd year of shifting cultivation like E_4/E_6 ratio, the CEC of humic acids also underwent an increasing trend from 250 to 375 c mol (p^+)/ kg. Both the reduced viscosity and molecular weight showed an increase followed by a sharp decline from 10.85 to 8.05 ml/g and 6805 to 4300, respectively. This indicated smaller molecules of low molecular weight and low viscosity in soils under 3rd year of shifting cycle. Infrared studies showed the predominance of polymeric hydroxyl, carboxylic, carbonyl or quinone, groups in humic acids with the rise in shifting cycle.

Soil fertility as evaluated in the area under shifting cultivation stands for mention.

- Acidic pH (4.5 to 5.8) noted in shifting cultivation sites.
- A decline in soil pH by 0.1 to 0.2 units noted with the rise in shifting cycle from 1 to 3 years.
- Dominance of exchangeable acidity in soils under shifting cultivation.
- A decline in soil organic carbon by 0.8 to 2.2 g /kg.
- Low aromatic condensation of humic acids after 2nd and 3rd year of shifting cultivation.
- Low cation exchange capacity in soils and decreasing trend over shifting cycle.
- A decline in exchangeable cations in soils.
- An average of 20.4 to 22.4% and 25.8 to 34.4% base saturation in soils.
- 9.8 to 11.4% decline in nitrogen availability in soils under study.
- Very low phosphorus availability.
- A decline in available potassium from 150 to 125 kg /ha and 319 to 203 kg/ ha in soils.

Strategy in Improvement

Clandestinely, shifting cultivation is being practised on the Revenue, Reserve Forests and protected forests. Although shifting cultivation is a non-viable resource-utilization practice, tribals are still clinging to this primitive practice to sustain themselves and their families mainly due to non-availability of timely employment avenues. Various attempts have been made by the Government to settle the tribals involved in shifting cultivation, (i) Arable land is provided to the tribals for carrying out agriculture and also to settle in the area; a few schemes are being implemented under integrated tribal development programme in the districts of Koraput, Keonjhar and Phulbani in Orissa. These schemes have however, not yielded the desired results perhaps because of the ignorance of the authorities about the socio-economic and agro-ecological conditions of shifting cultivation and also due to minimal involvement of Forest Department officials, who are more informed about the above factors, in implementation of the scheme. Failure of the scheme led the National Commission of Agriculture to reformulate the schemes only after considering the impact of the forest management, (ii) An Agroforestry project known as Nagaland Environment Protection for Economic Development (NEPED) funded by Canadian International Development Agency (CIDA) through India-Canada Environment Facility (ICEF) was initiated in 1995 to make Nagaland self-sufficient in agro-forestry. The objectives of the project were: (a) identification of trees by local tribes and

demonstration of method leading to more sustainable resource management; (b) addressing people's need, and evolving better management systems; and (c) promoting marketing initiatives. Under this project, experienced Government officials convince the villagers to set aside 6 ha of land, known as test plot, in *jhum* areas for over two-and-half years. Owner of this plot is required to plant 1200 seedlings, along with usual crop, under supervision of village council and project team. These test plots become open school-cum-research station, as well as demonstration plots to teach new technology. Thus, NEPED project does not aim at eliminating *jhum* cultivation, but making it more stable and profitable. This novel project may give us a more scientific way to tackle tribal-forest conflict. The strategies are as follows.

1. Providing employment opportunities and income generation on a regular basis through proper utilization of the land resources, i.e. by equitable distribution of waste land among the tribals. But, the various schemes of the Government, under the tribal plan, will have to pump in sufficient resources for proper reclamation and development of the wasteland through agro-forestry and silvi-pasture practices.
2. By encouraging cooperative efforts for carrying out forest-based activities, i.e. basket making, rope making, cane furniture processing of minor forest produce, honey collection, etc. have to be made commercially viable by providing proper marketing facilities. This will not only discourage tribals from practising shifting cultivation but will also help them monetarily.
3. By forming Village Forest Committees for the protection and development of the degraded forests. These committees by providing suitable incentives to the tribals, after the time of harvest can divert some of the tribals away from the shifting cultivation. Generating employment opportunities during the lean season of forestry operations will also prevent tribals from shifting to other areas. Employing the tribals for collection of *kendu* leaves and *sal* seeds and also involving the tribals in the various rural employment schemes are also the need of the hour.
4. By ensuring implementation of total literacy campaign; which due to remoteness and un-supportive attitude of tribals, has not been successful. For educating tribal women and children, services of various non-Governmental organizations and voluntary agencies, besides the regular Government machinery, are on required sustainable basis rather than with a targeted approach.

Efforts made by Govt. for Settlement of Jhumias

The *jhum* control programme of the Government of India ,started in mid fifties, gained momentum in the fifth plan with the introduction of a variety of schemes by different States and Central Government. In the seventh five year plan as per recommendation of the task force on the shifting cultivation (1983), a scheme for the control of shifting cultivation was in operation during 1987-88 to 1990-91 . Govt. of India has launched watershed project for shifting cultivation areas (WDPSCA) of the NE region with 100 % grant in the State Plan. The main objectives of the programme are:

a) To protect the hill slopes of *jhum* areas through soil an water conservation measures on watershed basis and to reduce further land degradation.
b) Encourage relocation of jhumia families by providing developed productive land and improved cultivation packages.
c) To improve the socio-economic status of jhumia families through household/ land based activities.
d) To mitigate the ill effects of shifting cultivation by introducing appropriate land use as per land capability and improved technologies.

Some of the programmes as adopted in the different States of the NE region are presented in Table 9.

Table 9.Nature of efforts made by the States of NE region

States	*Aim and objective of control efforts*
Arunachal Pradesh	a. Reclamation and development of land for permanent cultivation provided with assured irrigation facility. b.Watershed management schemes with integrated programme of agriculture, horticulture, forestry, and animal husbandry on the basis of land use classification.
Assam	Soil conservation scheme to settle the farmers on a permanent agriculture of varied form.
Manipur and Nagaland	To settle each shifting cultivator family on 1-2 ha of wetland terraces for permanent agriculture.
Mizoram and Meghalaya,	Allotment of dry as well as wet terraced land with sloppy land for horticultural purpose to each shifting cultivator family.
Tripura	a. In forest sector, shifting cultivators engaged as wage earners in rubber plantations are to be settled

	on forest land in small colonies with provision of basic civic facilities like schools, sales departments, etc. b. In Agriculture sector, tne cultivators are to be settled on a new area far away from *jhum* fields with allotment of developed *tilla* land for agriculture and horticultural crops.

The aim of these programmes is restoration of ecological balance in hill areas and improvement of socio-economic conditions of tribal families through various activities like land development for permanent cultivation with irrigation facilities, horticulture, forest, and plantation crops, animal husbandry, pisciculture, etc.

Since inception upto the end of IX Five Year Plan, an area of 2.58 lakh ha has been reclaimed with expenditure of Rs. 166.27 crore. During first four years of X Five Years Plan (2002-06) also an area of 0.93 lakh ha has been developed with expenditure of Rs.92.30 crore. Since inception upto end of 2005-06, an area of 3.51 lakh ha has been developed with expenditure of Rs.258.58 crore. During 2006-07, an amount of Rs.40.00 crore has been allocated to different States for development of 0.40 lakh ha area. Out of 19.08 lakh ha of shifting cultivation area in North Eastern States, only 3.51 lakh hectare has been developed till 2005-06. At present, the unit cost of treatment of shifting cultivation area is Rs. 10,000/- hector prevailing from 2000. Now wage rate and material cost etc. has gone up. Considering the enhanced wage rate and material cost etc., unit cost of Rs. 15,000/ha would be needed during XI Plan and Rs. 20,000/ha during XII Plan. For treatment of 3.0 lakh ha area during XI plan Rs. 450.0 crore and for treatment of similar area during XII plan an amount of Rs.600.0 crore will be required. Similarly the programme will continue till development of entire shifting cultivation areas. The major impacts as studied by National Productivity Council (NPC), New Delhi, for selected watersheds of Nagaland and Tripura are reported below :

a) Significant decrease (30%) in shifting cultivation area due to adoption of permanent/ settled cultivation has been noticed.

b) About 27% Jhumias have abounded Jhum practice.

c) Jhum area per family has been reduced from 0.84 ha. to 0.56 ha.

d) Sustainable increase in productivity of agricultural crops, horticultural crops,livestock, inland fisheries, etc. was observed. In case of Paddy cultivation 13% increase in level of productivity was reported.

e) Increase in overall income by 25% of the Jhumia family as compared to preproject was reported.
f) Increase in cropping intensity by 40 % was observed.
g) Active participation and contribution of the watershed community in completion of all the planned works/activities for development of the watershed was effective and very *useful in after care* of assets created.
h) The new institutional set up viz Watershed Assocation/ Panchayats has helped in promoting participatory approach during project period and even beyond project period.

An Approach to Remedial Measures

All forms of land/soil degradation under *jhum* have negative manifestation and disastrous consequences for fragile mountain and hill ecosystems of this region. The fragile and marginal lands degrade easily and have limited resilience to recover back to original state.The process is sometimes irreversible in nature. Soil erosion by running water is the most important for land degradation under heavy downpour during the period of monsoon. To know the category of soil degradation is an important stage to restore the soil quality and its productivity by preventing soil erosion, promoting high biological activity, increasing soil organic matter content and increasing rooting depth of plants.

Mechanical Approaches

Mechanical approaches are used in cases of extreme degradation, where other approaches are not possible or slow. Mechanical measures uses infrastructures to manipulate land surfaces and minimize, if not control, accelerated surface runoff, soil erosion, loss of nutrients and other degradative processes. These measures include: check dams (masonry, stone, loose rock, wooden log, check dams, etc.), level bench terraces, stone terracing, contour drains, contour ridges, contour bunds, earthen dams/reservoirs, gabon, stream channeling, etc. to absorb most of the surface water into the soil before reaching to streams. By adopting terracing and protected waterways, the steep slopes could be cultivated safely and profitably. Any small damages in terraces should be immediately repaired before it becomes worse. The terrace risers can be planted with local grasses to protect the soil loss and produce forage for livestock. Culverts and bridges are needed in large numbers for crossing small streams, sediment, debris etc. to remove the accumulation of water before it has a chance to concentrate and cause erosion. The main drawback of the mechanical measures is the high cost of construction and maintenance relative to gain in productivity. In this region, where engineering works are not compatible with the socio-economic condition of the community/farmers, they loose interest in maintaining these structures

when project funds dry up or are withdrawn. During construction of road, to avoid mass movement of soil, the best way is to place the culverts to the natural stream channel as closely as possible.

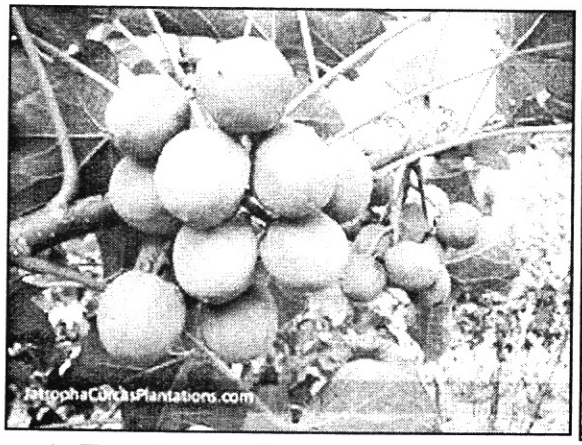
Biological Approaches

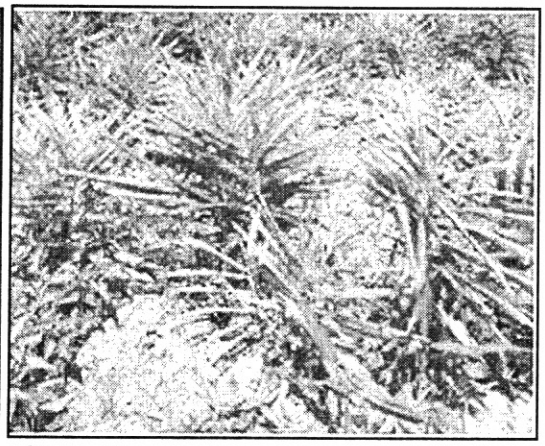
Contour ridges, check dams, and bench terraces involve high cost of construction and maintenance, which poor farmers cannot afford to invest. Vegetative practices are the first line of defence against soil erosion by running water. This approach not only protects soil but also has the economic benefits in terms of yield and production. Vegetation protects the soil from erosion by intercepting raindrops and absorbing their kinetic energy harmlessly. Biological measures are more effective when used in combination with engineering techniques. Vegetative cover protects the soil by the following processes:

- Physical binding of soil by plant roots.
- Enrichment of soil nutrient reserves by recycling between roots, litter fall and soil.
- Improvement of soil infiltration along the dead and living root channels.
- Build up of soil organic matter for structural and moisture retention qualities.

For practical methods of controlling water erosion, a cover is required to be maintained over the soil at all times to break the erosive force of the rain. These approaches include vegetative barriers on field boundaries, contour bunds and ridges, appropriate agroforestry practices, vegetative filter strips, live checks etc, to promote *in-situ* moisture conservation with the following objectives:

i) To stabilize slopes and control of sedimentation in the stream,
ii) To establish dense and diverse vegetative cover to provide ecological stability to the site and act as soil amendments,
iii) To ensure nutrient cycling and enrichment of soil,
iv) To fulfill fuel, fodder and other requirements of local people, and





v) To enhance the ameliorative value of the site.

Afforestation and Improved Fallows

Forests provide more protection against erosion due to closed system as long as they are maintained as forest lands. Open/degraded forest land + forest blank + scrubs in reserve forest and alpine scrub can be restored with an integrated approach through afforestation. Restoration or afforestation makes the unproductive lands to productive by minimizing erosion and rebuilding of the nutrient reserve.In the initial stage, severely eroded lands require complete forest cover of local origin coupled with protection from grazing. The local perennial tall tufted grass species Amliso *(Thysanolaena agrostis)*, can reclaim and protect the degraded land, terrace risers, water ways, land between trees, and vulnerable points thus providing fodder to animals in winter and spikes for brooms.

Agroforestry (Datta et al.,2004) which is a combination of tree and crops, offers the viable alternative to reclaim the degraded land in shifting cultivation. The agroforestry systems comprise of Agrisilvicultural systems (improved fallow species in shifting agriculture), hedgerow intercropping (alley cropping), multispecies tree gardens, multipurpose trees/shrubs on farmlands, plantation and other crops, shade trees for commercial plantation crops, soil conservation hedges, agrisilvipastoral systems , silvipastoral systems , aquaculture with trees, etc. In this region, tribal people are surviving directly or indirectly through tree based farming system. Agroforestry would also attract the community at large because the same patch of land is capable of supplying food and fodder to the farmer, timber and wood product for artisan and cottage industries. Agroforestry has a long tradition in this region, wherein grain crops, rhizomatous crops, pineapple, coffee, tea, spices and vegetables are being taken with a number of fruit and other trees, such as pine, pear, plum, arecanut, mandarin, guava, coconut, jackfruit, banana, large cardamom ,*Alnus nepalensis , Schima wallichii, Erithrina sp.,Ficus sp, Bauhunia sp. Artocarpus lakooch and Litsaea polyantha,* etc. in the different agroclimatic zones. The land not suitable for agriculture due to high slope (50%) and above can be used for grasslands or forestry. Agroforestry is suited to middle level terrain on the hill slope and has the advantage of better soil protection against erosion, tapping nutrients from different depths by shallow rooted agricultural crops and deep rooted tree crops, conservation of soil moisture *in situ* and partially leveling the land in between tree rows to make it more suitable for agricultural crops.

The agroforestry practices can enhance the soil productivity by (i) pumping up of nutrients from the subsoil through deep-rooted perennials, (ii) reduction in leaching losses through the capture of mobile nutrients by the well developed

deep, spreading root systems of perennials, (iii) maintenance of soil organic matter through the supply of above-arid belowground litter and pruning of tree leaves and branches, (iv) addition of nitrogen through biological N-fixation (v) protection from soil erosion, and (vi) maintenance or improvement of soil physical properties. In time, the sediment trapped behind each hedgerow in agroforestry systems builds up to form a bench like terrace. Such terraces, when grassed, require only minimum maintenance. In NEH region, Nagas use *Alnus nepalensis* for fertility rejuvenation of *jhum* land. Large cardamom with shade trees on hill slopes in Sikkim is ecologically sustainable . The multistory homestead gardening possesses the inherent capacity to arrest land denudation.-*Thysanolina maximum* can be grown on degraded lands for broom and fodder, minor forest produce such as food, fibre, and medicine etc. The positive interaction among components (trees/shrubs and crops/animals) to obtain a more diversified and/ or more sustainable production from the available resources and physical environments is possible under socio-economic conditions. The variation of climate due to altitude further provide ample scope for growing a variety of agricultural crops, multipurpose tree species and fruits of tropical to temperate climates for the effective utilization of land under agro-forestry for its sustainability. Agroforestry in addition to rehabilitation of wastelands and providing fuel, fodder and timber, play the important role in curbing deforestation.

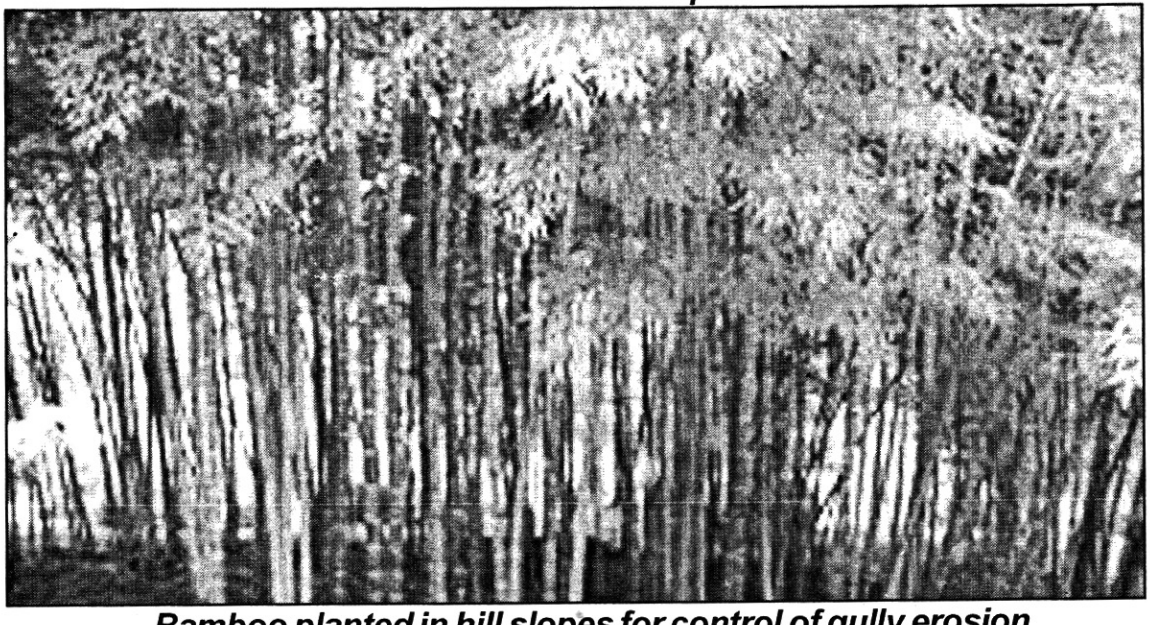
Rapid restoration and maintenance of soil productivity can be achieved by improved fallow with woody and herbaceous legumes .The main legumes of the genus *Sesbania, Tephrosia, Leucaena, Mucuna, Centrosema, Pueraria, Crotolaria, Cajanus, Indigofera and Mimosa* can be successfully used as the short fallow to rejuvenate the soil fertility lost during cropping through shifting cultivation . In addition, a secondary benefit of such fallow systems may reduce the impact of weeds on crops. Herbaceous cultivated fallow species require less time for establishment and fertility restoration, but they do not provide the secondary products associated with woody species (such as wood for building and fuel). However, planting an improved fallow is quite different from the traditional *jhum* and may not be culturally acceptable. Litter fall through nitrogen fixing tree species can provide carbon as an energy source for soil microbes to enhance nutrient recycling and improve the soil physical properties.

Plantation and Horticultural Crops

A shift to horticulture/plantation crops along with forestry would ensure plant cover which might, perhaps, be the ideal alternative to *jhum* in the hilly terrain. The north eastern region of India offers much scope for a variety of tropical and temperate fruits. The introduction of plantation and horticultural crops like rubber, coffee, tea, banana, citrus, black pepper, cashew, spice trees, pineapple etc.on *jhum* fields in the sloppy terrains are the promising alternatives. In this regards, first step should, therefore, be of determining with degrees of firmness the kind of plantation that would be taken up in the location specific area. During the establishment of plantation crops, immediate plan for resettlement of *jhumias* on permanent terraced cultivation can be achieved through providing them sufficient employment for their subsistence. Action should be taken simultaneously to discourage whatever possible to prohibit the practice of the shifting agriculture in the area. The success of the strategy would depend on whether the plantation could provide sustainability, sufficient income to the families to buy their own food and sufficient surplus for better economic conditions. The locals without breaking their traditions can achieve this through a reasonable share of profits after processing and marketing. Tree and bush crops would represent a relatively high replacement of original forest land put under *jhum* and can sustain a large number of people for whom food may be purchased without loss of land resources.

Arecanut planted in hill slopes

Banana in hill slopes



Bamboo planted in hill slopes for control of gully erosion

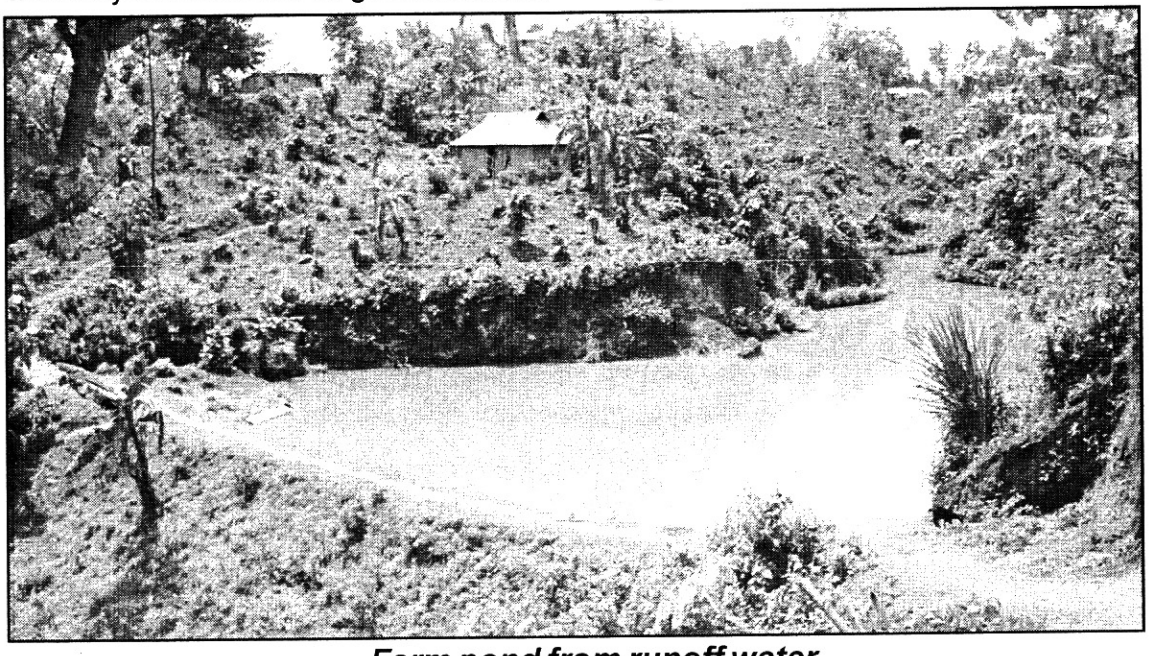
Livestock Farming

Dairy /goatary/piggery/poultry based farming is an alternative to *jhum* cultivator, to improve the deteriorating fragile hill ecosystem and is therefore, one of the best utilization of wastelands. The land can be utilized for silvi-pasture and pasture to meet the feed and fodder requirement of reared animals. Now many people are engaged in dairy farming particularly those residing nearby road heads with the help of Governments. This would not only overcome the problems of land degradation and overgrazing but

would meet the need of fodder, fuelwood, and timber. The characteristics of the silvi-pasture should be with the objective of fast growth in poor soil, good under growth and over ground biomass production, palatable to animals, good nutritive value, and can survive in water deficient winter months. Fodder trees around the field, all along the stream banks and drainage channels, on field bunds and stony patches can provide fodder during winter season by partial lopping of the trees. Soil fertility gets improved through recycling of nutrients via animal manures .The stall feeding of animal can check (Ives and Messerli, 1989) the environmental deterioration through various ways. They are : 1) it is easier to organize the rotational grazing; 2) Young tree seedlings are not destroyed 3) All dung goes to cultivated land; 4) Parasite loads of livestock are less; 5) Damage to standing crops and terrace risers is reduced . In the interest of effective feeding of livestock, the use of trees, which provide green leaf fodder during the dry season, should be part of the rehabilitation programme, and offers an added advantage of producing timber and fuelwood as a by-product. By adopting contour grass strips on mild sloping lands with fodder trees, farmers can maintain the livestock for milk and meat to generate the cash income and excreta for recycling the nutrients removed from the land.

Pisciculture

Pisciculture is one of the important components of the farming systems (Datta et al.,2006) which are natural resource management units operated by farm households and comprise of the entire range of economic activities of the family members. In the lower reaches of the hills , farm ponds may be made to collect the runoff water and composite fish culture may be encouraged to make the rehabilitation programme highly remunerative. Percolation tank may also be in use for groundnut water recharge as well as fish culture.



Farm pond from runoff water

Conclusion

The planning of the development of an area can be best done on a natural drainage unit called 'watersheds' with a view to develop resources in such a manner so as to get maximum benefits to the people by maintaining ecological balance through continued long-term efforts and commitments ,for example, maintenance of infra-structure, protection and judicious use of land, water and forest resources to meet the continued demands, etc. In order to implement the land use planning at catchments for the hilly terrains, there should have been the following objectives:

- Optimization of production from agriculture, forests, plantation, mixed farming systems and others on a sustained yield basis for self-sufficiency in basic needs.
- Control of land degradation for their primary production potential.
- Development of wasteland for profitable biomass production.
- Efficient utilization of perennial water resources by reducing run-off and sedimentation.
- To provide the security for food, fodder, fibre, fuel, timber etc.
- Protection of scenic beauty, natural vegetation, wildlife and birds of the region.
- The modification of indigenous technological knowledge (ITK) for the benefit of local inhabitants.

The preservation of natural ecosystems, scenic areas and wildlife habitat represents another dimension of many watershed projects. According to established practice, climate, soil, landform, hydrology etc. of an area, the human intervention should be restricted to the choice of a crop, a livestock or a forest type. Information on soil and related properties can be obtained from soil survey and geological information system (GIS) to delineate the soil and land suitability for different useful purposes depending upon the household and community needs for sustainable hill ecosystem. Following is the road map to properly adopt the remedial measures in order to avert the ill effects of shifting cultivation.

—>Preparation of soil fertility map and land capability classification for suggesting/ planning suitable land use.

—> An approach to adopt suitable soil and water conservation measures in the area.

—> Various avenues of soil conservation measures, such as mechanical, mixed cropping and vegetative hedge methods may be encouraged for adoption among the farmers followed by suitable trainings. Vegetative hedge methods using the locally available tree/shrub species may be given top priority.

—> Among water conservation measures, utilization of both ground and surface water may be taken into consideration with a priority in the latter approach for increasing the cropping intensity in the particular area. Attempt may also be undertaken to remove the stagnation of rainwater causing an occasional flood and incurring a huge loss to the crops. Drinking water facility may also be ensured.

—> A crop planning is definitely useful for utilization of hilly/sloppy areas in accordance with slope gradients. Under moderate slopes upto 15%, arable crops preferably rice based cropping systems with legumes in rotation may be implemented with suitable soil conservation approach. Vegetable/ floriculture cropping systems may also be in use for getting more economic return. In the slopes having 15-20 %, fruit tree based cropping systems such as banana, pineapple, mango, litchi etc may be thought upon. In the slopes having 20-30%, plantation crops such as, cashew , rubber, arecanut etc with pineapple as vegetative barrier may be planted. In the area having still steep slopes (>30%) or in denuded hill tops, tree based systems may be in use. Biodiesel plantation such as jatropha may be undertaken. Various types of bamboo plantation may be undertaken particularly in the control of gully erosion.

—> Farming system approach involving animal /fishery components may be of utmost importance to increase the economic return of the farmers.

—> Training and participatory resource appraisal methods may be of necessity for adoption among the farmers .A strong market linkage may have to be in operation for helping the farmers to avoid the distress sale of their commodities.

References

Ashish, S. M.(1982) A working paper presented to the task force for the study of eco-development in the Himalayan region, Planning Commission, Govt. of India, New Delhi.

Borthakur, D. N., Singh, A., Awasthi, R. P. and Rai, R. N (1980) In Proceedings of National Seminar on Resources, Development and Environment in Himalayan Region, D. S. J., New Delhi, pp. 330-342.

Sharma, U.C. and Sharma,Vikas (2003)The 'Zabo' soil and water management and conservation system in northeast India : tribal beliefs in the development of water resources and their impact on society an historical account of a success story. In: The Basis of Civilization- water Science (edn.J.C. Rodda and L/Ubertini). IAHS Publ.286,pp. 184-191. Rome, Italy.

RETHINKING OF REGROUPING VILLAGES FOR REHABILITATION OF SHIFTING CULTIVATORS IN TRIPURA

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Shifting cultivation is regarded to be a most primitive method of agriculture as food gathering activities of primitive people. This food production system is sustainable as long as a site slashed, burnt and cropped at an interval of 20 years or longer. As a result of high population density and demands for land for purposes other than shifting culture at present, the fallow period is often as short as 3 to 4 years which causes land degradation and associated environment-development problems. More than 5 million tribal families practice shifting agriculture locally referred to as *Jhum* in the north-eastern region of India including the States of Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland and Tripura. This agricultural system is also practiced by a few hill tribes Kalrayan hills, Panchmalai hills and Anamalai hills in Tamilnadu and some regions of Orissa and Andhra Pradesh. A huge area of about 2.3 million ha (22.78 lakh hectare) of the country is affected by shifting agriculture spread over. (Darlong, 2004)

Shifting Cultivation in Tripura : An Idea

Tripura is a tiny State in North Eastern region of India, shifting cultivation is deeply integrated into the social, cultural and economic life style of many tribal groups that constitute about 31% of the total population of the State.According to a survey conducted by Tribal Welfare Department, Government of Tripura (1987), except for two tribal communities viz., the Bhutias and the Chaimals, all tribal communities practice *jhum*. Out of a total of 55,049 *jhumia* (shifting cultivator) households in Tripura, 21,677 (39.3%) households were entirely dependent on jhum for their livelihood. The Tripuri and Reang tribes were the two major *jhumia* communities accounting for about 55 % of all *jhumia* families in the State. The majorities (70.8%) of *jhumias* have only 0.8 - 2 hectares of *jhumming* land per family, and only 6.1 % had more than two hectares. After that there was not such survey regarding the actual number of *jhumias* in the State. Different efforts had been made time to time for estimation of numbers of *jhumias* by different departments but till date the above mentioned figure is being considered for official records. It is necessary to mention that the number of *jhumias* and land holding has been changed over the time but no official record is available.

Efforts of Rehabilitation of Jhumias in Tripura : A Historical Journey

The transformation of jhumias from the shifting cultivation to settled cultivation in Tripura started in the long ago. There have two types of forces driving this: (a) influence of settled Bengali farmers on the shifting cultivators, (b) the development programmes providing financial and technical support to settle shifting cultivators in low lands. The first such kind of attempt was taken in the regime of Maharaja Bir Bikram Manikya. In 1930-31 A.D. an area of 28,490 hectares in Khowai Sub-division, called Kalayanpur Reserve, was set up as reserved for the settlement of *jhumias*. Subsequently, the total area reserved for this purpose was raised to 5,05,053 hectares in 1941. (Shah, 2004).

After the merging of Tripura with the Indian union in 1949, systematic efforts to control *jhumming* and settle the *jhumias* in the State started in 1953 when a pilot project addressing both short term and long term problems related to *Jhum* was initiated in Belonia Sub-division of South district of Tripura. The short-term approach included measures to improve yields from *jhumming* and relief measures pending their resettlement, while the long-term measures were designed to wean the *jhumias* away from *jhumming* and resettle them through alternate occupations in the specially set up colonies. Both these Settlement and Colonisation Schemes were part of the overall strategy of the "Shifting Cultivation Control Scheme" initiated in the first plan period (1951-56).Under this scheme in an average 1 hector. land was provided and a lump sum amount was given for construction of hut and for purchasing of bullock and agricultural inputs. The amount varied time to time. These schemes, operated through the Tribal Welfare Department, continued successfully for about three decades as long as suitable plain lands were available. Later the scheme was extended in other parts of Tripura and due to land scarcity, the *jhumias* were allotted inaccessible, unproductive and unsuitable (for plough cultivation) tilla (hilly) lands, and consequently they deserted the settlement colonies. (Gupta, 2002)

A Diversified Settlement Scheme based on horticulture, animal husbandry and pisciculture was started in 1985 - 86 to make up for the shortage of cultivable land. Simultaneously, the Restoration Assistance Scheme was initiated which provides financial assistance to tribal families whose previously alienated land is restored under the provisions of Tripura Land Revenue and Land Reforms Act (1960). The Tribal Welfare Department also started a new scheme, "Purchase of Land for Rehabilitation of *Jhumias* and Landless Tribal (1985-86)" in which *jhumias* were provided a grant (50% of the total cost of land purchased, seed which was maximum Rs.30000 /-) and a loan (for remaining 50% or maximum

Rs.10000 /-) from Schedule Tribe Development Corporation. The Tribal Rehabilitation Plantation and the Primitive Group Programme Department (TRP and PGP) was specifically created (1985) for settling *jhumias* of Reang tribal community.

Again, State government set up the Autonomous District Council (ADC) in 1985 to fulfill the twin objectives of development and autonomy for the tribal populations. The ADC has been engaged in finding viable alternatives to *jhumming* by using agri-hortiforestry species models for *jhumia* resettlement schemes. The Agriculture Department (1986-87) launched schemes to increase production and productivity of major agricultural crops in settled and shifting cultivation, to provide training in and transfer of modern agriculture technology, to generate family income on a continuing basis, and to develop markets and marketing facilities, including price supports to eliminate exploitation of *jhumias* by middlemen.

Most of the *jhummias* in Tripura lives in forest area and therefore for the development of *jhummias* and more specifically for decreasing of dependency of jhummias on forest, Forest Department of Government of Tripura had taken various steps. Coffee, areca-nut, black pepper, rubber, betel, jackfruit, and orange, are important plantation crops in Tripura. Rubber (all over the State) and orange (in North Tripura) plantations have given a tremendous boost to *jhumia* economy. About 64% of the total rubber plantations in Northeast India are in Tripura. The commercial success of rubber in Tripura led to the creation of the Tripura Forest Development and Plantation Corporation (TFDPC) in 1976 to establish large-scale rubber plantations through its 44 centres. The Tripura Rehabilitation Plantation Corporation (TRPC) was also set up in 1984 to oversee the settlement of *jhumias* on rubber plantations.

As a labour intensive plantation crop, rubber cultivation is similar to traditional *jhumming*, requiring *jhumia* families to work on co-operative basis, and provides paid employment opportunities to all members of a *jhumia* colony. Rubber production provides the highest net production income ratio as compared to other plantation crops. It also provides additional income through sale of by-products (e.g., seeds as a source of vegetable oil) and after the latex production ceases rubber trees can be used for timber and firewood. Features of rubber based TRPC schemes, such as meeting initial plantation creation costs, granting permission to practice *jhumming* within plantation plots for an initial two years with additional income support through wages for weeding the *jhum* crops, providing training in rubber plantation techniques, involving the *jhumias* in decision making

through their participation on the Beneficiaries Committee, granting ownership right over 1.5 hector of land and between 500-600 rubber trees, and providing community facilities inside the plantation centres, all ensured further economic and cultural protection to the *jhumias* and helped the gradual transformation of their economy from shifting to settled cultivation. Since 1984, the TRPC has successfully settled about 580 *jhumia* families on about 2608 hectares of rubber plantations and almost 90% of these families have completely given up *jhumming*. (Gupta, 2002)

Orange cultivation in the Jampui Hills in North Tripura as the main *jhum* crop for the Lushai and Reang tribes has been in operation for many years. The Law Research Institute (Eastern Region, Guwahati, Assam, India), conducted a thorough study between 1981 and 1984 on the economic conditions of *jhumia* families in this region, which revealed that the economic conditions of orange growing *jhumias* were much better than those not growing oranges and much better than their counterparts elsewhere in Tripura (Anon, 1990). Moreover, as a policy of the State government, the orange growers were eligible to acquire permanent rights over land. About 60% of the total orange growing families have completely given up *jhumming*.

All the mentioned schemes were implemented from different departments with different target groups and there was no coordination or linkage among the departments. All departments were interested just to fulfill their own target and as a result overall development of the *jhumias* hardly found and they have to continue their life in same condition year after year.

Regrouping of Tribal Villages : A New Initiative

Recently, from 2004 onward, one initiative has been taken by the Government of Tripura to rehabilitate the Tribals mainly *jhumias* through clustering of 2-3 villages near the main road side. Since the tribals situated in interior had already moved to different locations nearby roadside to escape their hardship being experienced by them, attempts have been made to provide some assistance to them through this approach. Major objective for regrouping of villages are- i) to deliver developmental facilities to the unreached Tribal people mainly the shifting cultivators, ii) to reduce the dependency on forestry and forest land through sustainable improvement of livelihood and iii) to tackle the insurgency problem.

For this purpose, Forest Department proposed for diversion of 36,125 ha. forest land for regrouping of tribal families in clusters at different places all over the State. The number of clusters identified in each district and families to be relocated and requirement of forest land is shown below.

Name of District	Number of clusters	Number of families to be relocated	Diversion of forest land (in ha)
North Tripura	9	2643	3310
Dhalai	24	13134	14539
West Tripura	31	8088	10110
South Tripura	35	6533	8166
Total	**99**	**30398**	**36125**

Under this initiative, Forest Department works as the nodal department and prepares micro-plans and the over all coordination remains with the respective District Magistrates. Other departments like Public Works, Rural Development, Tribal Welfare. Power and Animal Resource Development Departments have also associated for providing services to the regrouped villages. Forest Department has been taking up various kinds of activities i.e. plantation of bamboos, creation of nurseries, creation of check dams to control soil erosion, planting of medicinal plants and other forestry species etc. Other departments have also been implementing their department specific schemes for those regrouped villages.

Visit toward Efforts :

The project is in primitive stage and therefore a rapid assessment had been made in one of the representative regrouped villages so that we can get an idea about the potentiality of the project which is going to determine fate of thousands of *Jhumias* in the State. The study was conducted in Chakmaghat area of the West district of Tripura during the September-October, 2005. A SWOT (strengths, weaknesses, opportunities and threats) analysis of the project has been done based on group discussion, semi-structural interview with different stakeholders of the project like officials and field staffs of Forest department, Block Development Office, Tribal Welfare department, nearby Panchayat Raj Institution along with the *jhumias*.

Findings :

The total area proposed for the regrouping of the village in Chakmaghat was 483 hector near the Central Reserve Paramilitary Force Camp and just side of Assam- Agartala National Highway No.44. Already 318 families existed in that village and total 473 tribal families of Reang, Mog and Tripuri communities were expected to settle there from three villages namely Nonachara, Kakrachara and Haludia. During our study, it was found that various construction works from

different departments under the leadership of Block Development Office were in progress. As the family was started to settle different necessary construction like school building, roads, soil and moisture conservator structure, Bamboo plantation, check dam, drinking water point was going on rapidly. Near the villages or nearby villages other facilities like Panchayat office, Forest beat office, Anganwadri centre for the children, Animal Resource Development sub centre, Market shed, Junior basic school, security camp etc. was available.

I) Strength:

i. Single Umbrella Approach i.e: Convergence of the line department for rehabilitation of the *jhumias*.This is first time when all the line departments are working together for improving the life condition of the *jhumias*.

ii. With this initiative providing of infrastructure facilities to the *Jhumias* became possible.

II) Weaknesses :

i. No proper planning before starting: There was no scientific planning about the rehabilitation of the families. How many families may come and settle or what will be their livelihood options etc was not considered before starting of this rehabilitation approach.

ii. Less availability of land for land based activities. : Numbers of families are more than the availability of land and therefore most of the families have very small holdings (even less than 0.5 ha). As a result the families have no or less opportunity to start any land based activities for income generation. Whereas when they were in interior or hills as *Jhumias* they were solely depending on land for their livelihood.

iii.No proper allotment of the land: Hardly there is any proper allotment of land. The families who came earlier they have acquired more land and who have joined later they had received very less amount of land. This is also creating a socio-economic imbalance and social tension in the regrouped villages.

iv. Families are totally dependent on Government aid : As the families have come near the road side and have no or less land for any agro-based activities, they are just depending on Government aid for their survival. The families are engaged in different constructive works like road, school, creation of dam etc. under the wage employment programmes. But question is how many mandays can be created for those families in this way so that all the families can survive throughout the year. Again the families are reluctant to take any

initiatives for any kind of self-employment activities as they feel that they are the guest of the Government and Government should arrange for their earning.

v. Massive destruction of forest : Because of their roadside settlement, neither they have enough land nor any other skills and opportunities so that they can start any income generation activities. As a result almost all the families are engaged in destruction of forest and selling logs and firewood for their survival. One forest officer was nearly to cry while informing that it took nearly 40 years to develop the forest in that area but within the last one year they have just finished the entire forest. Again it was more suffering for them that neither they can stop them nor can tolerate the destruction of the forest such a fashion.

vi. No skill development for self-employment: Almost all the families were traditionally *Jhumias* and they don't have any other knowledge and skill for starting self employment but there was no such initiatives for skill development as alternative of *jhumming.*

vii.More emphasis on schemes with long gestation period: All the activities which was initiated for employment generation was either construction related or project with long gestation period. Therefore it become difficult for them to wait for tomorrow. This was also another and probably strongest reason for massive destruction of forest.

viii. Rehabilitation of part of the village: It was interesting to note that despite all the efforts quite a good number of families were till in their original villages. They were in dilemma to settle in this type of regrouping of the village. Now it becomes another headache for the administration. Authority is not sure whether the rest of the families will join in the rehabilitation village or these families also will return to their original villages.

ix. Half hearted participation of the Nodal department : As already mentioned massive destruction of forest is going on because of this approach, the forest department which is the nodal department for this project is not involving wholeheartedly and with their experiences they strongly believed that whatever may be effort ultimately the families will leave the place and go to their original places after destroying the forest areas.

III) Opportunities :

i. **More families may settle :** If the project success with some corrective measurement more families can join and be settled in the regrouping villages.

ii. Can reduce the practice of jhumming and the dependency on forest: The

project have another opportunity to reduce the practice of jhumming and therefore can reduce the dependency on the forest if it can arrange the alternative income sources for the *jhumias.*

iii. Can reduce in incidence of insurgency: Taking the advantages of the remoteness,different insurgency groups take easy shelter in the interior villages after conducting any incidence. The poor *Jhumias* are almost forced to provide shelter. But with this regrouping of villages which are nearby roadside and also under the close watch of security forces, this practice will totally stop and ultimately the insurgency may be reduced to a great extent.

iv. Mainstreaming of Tribal people into developmental goal : Because of remoteness and due to the insurgency, it was very difficult to provide government facilities and services to a large number of poor tribal families. Now this is a chance to bring these people into mainstream of developmental efforts.

IV) Threats :

i. May create inter Tribe conflict and therefore social unrest: As tribal communities are coming from different villages and settling in a new area all communities are trying to avail different facilities like land, road as much as possible and as a result there is always an inter community tension which may create massive problem in future.

ii. The productivity of agriculture may decrease: As nearly 36,000 families suppose to be settled in the proposed regrouping villages, therefore no doubt that the production of agriculture will reduce a lot in the State as almost all the families are involved in *jhumias*. Need not to mention that it will hamper State's perspective plan to be self-sufficient in food within the year 2012.

Steps Ahead :

Therefore, for succession and sustaining of this highly ambitious and promising project following steps should be rethought:

1. There should be proper blend of short-term and long-term project for income generation.
2. As land is not available, home based industries like weaving etc. which they have their traditional knowledge and skill should be given priority.
3. Animal husbandry like piggery, poultry etc. can make lot of contribution towards increasing of family income.
4. Small shop, small hotel, rickshaw etc. road based activities should be given priority.

5. Joint Forest Management Committee under the concerned Forest Development Agency can be formed with representatives from all the households in the rehabilitated village. When the entire household will represent then destruction of forest by the villagers and outsiders can be controlled
6. Employment generation and empowerment through Self-Help Groups (SHGs) through out the country and performance of the SHGs in Tripura in improving the family income of the Self-Help Groups (SHGs) member was found very much encouraging (Upadhayay & Choudhury, 2006). This SHGs movement should be given important and extended in those regrouped villages,
7. Similar to National Rural Employment Guarantee Act,2005, 100 days wage employment must be assured for every family for any kind of construction and maintaining of road.
8. Capacity building through massive awareness generation and training for self employment is needed for sustainable income generation. In this regards local NGOs can play vital role.
9. At present, families coming from different villages they are representing different panchayat / Village Development Council. This is creating lot of administrative as well as social problems. Therefore entire area needs to be refrained under one PRI / VDC. This will help to strengthen social capital in the area.

Reference :

1. *Anonymous. (1987) : Survey report on the Jhumias of Tripura, Directorate of Welfare for schedule Tribes. Government of Tripura.*
2. *Anonymous. (1988): Evaluation of Jhumia Rehabilitation Schemes in Tripura, Department of Analytical and Applied Economics. Tripura University, Agartaia.*
3. *Anonymous(1995): Unpublished Report For Need Assessment Study For Tripura Agriculture Development Project, JPS Associates (P) Ltd., Consultants, New Delhi.*
4. *Gupta, A.K. (1992): Tribes and Wildlife,Conservation with Special Reference to Shifting Cultivation (Jhumming) in Tripura, North-East India, TUI, Tribal Research Institute, Agartaia.*
5. *Darlong, V.T.(2004) : To Jhuming or Not To Jhuming : Policy Perspectives on Shifting Cultivation, The Missing Link, Nagaland.*