

Environment and Community Action: A Case Study of Shifting Cultivation

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Abstract: *Shifting cultivation is the primary source of livelihood of the tribal communities in North East India. The academic attitude towards shifting cultivation system has always been that of ambivalence. While this has been treated as a system of food security, it is also held responsible for the large-scale land and environmental degradation in the region. Contrary to common perception about shifting cultivation as that of subsistence economy marked by stagnation, the present study finds that over the years the cropping pattern under shifting cultivation has undergone significant changes mostly in favour of market economy. This has come out largely as a response to ever growing population, declining productivity and reducing land availability. The case of Tangkhul Nagas, the predominant community in Ukhrul district of Manipur reveals that the tribal communities have their own understanding about the ecological problems arising out of the practice of shifting cultivation and have their own priorities for sustainable development without affecting their traditional fabric of life and culture. The paper ends up with the communities' preference of programmes and policies for sustainable development including the planning for land use and re-forestation. The local populace also has a very clear understanding of the problems they are likely to face in the process and the need for the help in the form of training and finances.*

1. Introduction

Presumed to have originated in the Neolithic period (Maithani et al., 1996) shifting cultivation (also known as Jhum cultivation) is still the most prevalent form of agriculture practiced by nearly two hundred tribal groups in the hill areas of North East India (Singh, S K, 1994). Geographically only about 25% of the total area of North East is under cultivation (IFAD, 1994) and shifting cultivation alone account for 25% of the total geographical area (North East Council, 1995). Due to geographical and security reasons the tribes always preferred to live in the hill tops in small groups surrounded by vast tracts of forest. Consequently Jhum had been the most rational and viable method of farming and deforestation the most immediate way to access to land for cultivation. With sufficiently long rotation cycle of 15-20 years allowing for natural recuperation of fertility of the soil, the practice has remained sufficiently scientific. Consequently, Jhum supplemented by hunting and gathering of wild nuts, fruits etc. was the main source of subsistence. Forest, in other words had been the key to the livelihood of the tribal communities in entire North Eastern region of India. With the growth of population and reduction in area available for Jhuming, the rotation cycle has gone down to around 5 years. As a result the fertility of soil and production from Jhum is constantly declining. The system is perceived to have been stagnant in terms of technology and operations as constant over the years. On the other hand we have evidences to show that despite the declining productivity and reducing Jhum cycle, the overall productivity (per hectare) in shifting cultivation is quite high, and in number of instances even higher compared to the plain and settled cultivation (Srivastava, 1999; Maithani, 1999). Today, the environmentalists interpret the Jhum system as hazardous for its impact in terms of progressive degradation of soil, environment and production base (Kushwaha and Hild, 1995). At the same time, leading to deforestation and degraded forests. The perils of deforestation are being felt now mainly in the form of high velocity wind and shortage of drinking water. Despite these negative influences and despite number of attempts made by the governments of North Eastern states as well as by Government of India and its different agencies, the system continues unabated for the inherent merits of food security, topographical viability and equity implications.

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2. Present Study

In view of the above the present paper addresses itself to following major issues-

- The extent of dependency of the tribal communities on different types of agriculture systems and the trends in area under cultivation.
- Perceived changes in shifting cultivation system from the point of technology and Environment, and
- Understanding the community responses to these changes and explore the proposed community action/ preferences for a sustainable future.

3. Methodology:

The study is primarily based on structured group interviews with different section of the society in the selected watersheds and draws the primary data from the community responses on the **dynamics of changes in the society over last ten to fifteen years**. From this point of view the present study is basically qualitative in nature and based on the community's perceptions of the changes in the land availability, environment as captured in terms of deforestation or degradation and community preferences for future actions.

3.1 Selection of the Watersheds

In the absence of remote sensing data, selection of watersheds was done in consultation with the field agencies of agriculture, horticulture, forest and soil conservation departments of Manipur Government, having experience of implementing watershed management projects of Central/ state government. Following criteria was adopted for the selection of the watersheds-

1. In the selected watershed community size should range between 100- 200 households and the area of the micro- watershed should range between 400- 1000 hectares
2. Degree of land degradation- 40 to 60 percent of the land under watershed should be under open forest.
3. Intensity of Jhum cultivation- 40-60 percent of the total households should be engaged in Jhum cultivation.
4. Short Jhum Cycle- 4-6 years.
5. Pressure on land- inductively 40 to 60 percent of the cultivators should have one to two hectares of land including Jhum, terraced and settled cultivation.

3.2 Study Area

The present study covered five micro-watersheds covering 10 villages with a population of 1090 household. Four of these watersheds belong to the community of Tangkhul Naga and one belongs to Thadou Kuki tribe (Annexure 1). Significant differences were found in the socio-institutional arrangements of the two communities; but with regard to production system, the differences are almost negligible.

Of these 1090 families 954 families were Naga families and 136 kukis. 976 families were found to be engaged in agriculture and belong to the category of cultivators (including Jhoomia). Thus, 89.21 % of the total families covered is dependent on agriculture directly and are actively engaged in cultivation for their livelihood.

4.1 Dependence on Different Cultivation System

From the point of view of dependency of families on cultivation system, three types are taken into account-

1. Purely Jhoom dependent.
2. Jhoom cum settled, and

- Purely settled cultivation system. This type is studied mainly to understand the process of transformation of purely Jhoom dependent to purely settled cultivation.

Table 1:

Sl no.	Name of Watershed	Shifting-Cultivation	Shifting cum settled Cultivation	Settled Cultivation	Total number of households
1.	Wuira Lok	85(34.00)	143(57.20)	22(8.80)	250(100)
2.	Kanlui Lok	55(29.41)	87(46.43)	45(24.06)	187(100)
3.	Ramlikang	165(58.92)	50(17.86)	65(23.21)	280(100)
4.	Yokong Lok	113(84.96)	20(15.04)	-	133(100)
5.	Heitup Lok	99(78.57)	22(17.46)	5(3.97)	126(100)
6.	Total	517(52.97)	322(32.99)	137(14.04)	976(100)

Note: Figures in brackets show percent to respective total

4.2 Jhoom Cultivation

Fifty three percent total families are solely dependent on Jhum cultivation. The proportion of dependent families is minimum in kanlui Lok (29.41 %) followed by wuira Lok (34.00). Both the watersheds are located on Ukhrul- Jasami – Nagaland road and well connected with state and private transport system. “ Contact with outside world and demonstration effect of valley cultivation “ were two major factors behind the growth of terracing in the two watersheds.

4.3 Cropping Pattern in Jhum Cultivation

Despite the common perception of obsolete and near stagnant system, the jhoom system has undergone considerable changes over last 10-15 years of time in terms of the production structure and crop-mix. Two of the oldest Jhum products – millets and cotton are now rarely grown. Incidentally, only two watersheds where these commodities are still grown happen to be where Jhum dependency is maximum – yokong Lok and Heitup Lok.

The full range of Jhum products today can be described as below:

Foodgrains: Paddy, pulses, maize, millets, rice-bean, cowpea, French bean, green pea, and gram. Most of these products except for paddy, maize, millets and gram are new. Thus, it appears that within the food crops pulses have been affected positively and a number of new varieties have come up.

Vegetables: Over last 10 – 15 years of time, the Jhum cultivation has undergone “Vegetable – Revolution “. From mere pumpkin, now cabbage, cauliflower, mustard leaf, brinjal, tomato, ginger, chilly, arvi (in Heitup Lok only) and potato. It is a ‘vegetable revolution’ in the sense that in the face of growing shortage of foodgrains vegetable has become their major strength – for consumption as well as for sale. All these crops are sold in the market and income earned is used for covering up the paddy deficit.

Fruit and Plantation Crops : Papaya, banana, citrus fruits, orange, grapes, guava and tree bean. All these products also have entered market.

Cash Crops: Cotton, sugarcane and tobacco and main cash crops, which by definition are marketed. Coffee is also grown in most of the watersheds but on kitchen gardening basis and use is confined to domestic consumption only.

5.1 Trends in Area Under Cultivation

Following major points emerge from the interviews with the different sections of population in the watershed area-

- The ‘ net’ area under Jhum cultivation has increased continuously over last 10 – 15 years of time and community forest has been the main source of new land. Thus with the increase in area under Jhum, the

area under forests has declined.

2. Loss in the productivity of land and increase in population have been two major reasons for increase in area under Jhum.
3. Though net area under Jhum has increased, the size of the plot and land holding per family has declined. Currently the average size of plot varies from 0.50 hectare to 0.98 hectares. This average varies from watershed to watershed and also large variability is found in the smallest size of the plot and biggest size of the plot. The variability was found to be maximum in Heitup-Lok (Kuki community) where largest size of Jhum plot is (1.5 hectares) is six times of the smallest size (0.25 hectares).

5.2 Impact of Reduction in the size of holding

The reduction in the size of holding also means reduced availability of land for agriculture and over 10 – 15 years of time has led to –

a) Emergence of food crisis: One important impact of reducing size of holdings and declining productivity has been the emergence of food-crises. None of the watersheds were found to be self-sufficient with regard to paddy – the main food-crop. Their paddy production is sufficient for them for about 4-5 months of the year. For the rest of the period they have two sources to cover up the deficit – (I) government supplies under PDS through FPS and (ii)

The purchase from the market. During the deficit period almost every family buys 2-3 kgs of paddy per day from the market. As an emergent reply to sort out the food crisis.

b) Reduction in jhoom cycle: Another important impact of the reducing plot size and increase in population has been the reduction in the jhoom cycle to 4 – 5 years now from earlier 10-15 years average which in turn means-

c) Increase in cropping intensity: Above changes have led to change in cropping pattern. The same plot of land is now cultivated for three years before leaving fallow instead of just one year. Moreover the proportion of area under paddy to total area under cultivation seems to be declining. This is clear from the three yearly cultivation system of a plot. In this three yearly cultivation system paddy occupies only 33 % of total area under cultivation. Usually first year only paddy is grown, which also means a shift from the mixed cropping system to mono cropping system. In some cases during the first year pulses are grown, followed by paddy and maize in the second years and vegetables mixed with maize in the third year. Although apparently, the ‘net ‘ land available per family has reduced, but since the same plot of land is cultivated for three years, this increase in “ gross” availability of land must have off- set the ‘net ‘ reduction. The impact of this on the availability of land has to be studied separately and more carefully,

d) Diversification and Commercialization: The change in cropping pattern due to reduced availability of land and more intensive cultivation, has ultimately led to a highly diversified production structure within shifting cultivation which has commercial implications. Almost all the vegetables and plantation crops have entered market through their degree varies from place to place.

1. **More Permanent Use of Land:** Last, but probably most important impact of reduced availability of land is the emergence of ore permanent use of land in the sense that – (a) same plot is used for three years instead of one year; and (b) longer duration crops are now also grown especially horticultural crops.
2. Over the years under study the ownership structure and land relations have undergone a lot of changes, especially in three watersheds, Kanlui Lok, Wuira Lok and and Ramlikong, in favour of few , affecting the egalitarian structure of society.
3. Private ownership (Security of tenancy) has increased with terracing and other more permanent uses of land. Since, terracing involves investment in land and can be done only by those who are capable of doing so, the benefits of such privatization can not accrue to the common man. Moreover, due to

- higher productivity on terraced plots, the disparities within the society has grown in favour of few;
4. Over the years, with the growth in population, fragmentation of holdings has taken place leading to reduction in plot-size. This reduction in the size of holdings has further implications –
 - i. Due to reduction of plot size terracing became easier and privatization increased;
 - ii. The reduction in the plot size has rendered some of the holdings uneconomical. Selling of (private) land takes place under such circumstances. Thus, on the one hand, due to fragmentation the number of private landholders has gone up (amount of total land remaining the same), and at the same time selling of land has increased. Since, the number of sellers is larger than the number of buyers, a number of families who once enjoyed private ownership of land by inheritance, have now become landless (in terms of private holding). This process has led to concentration of the land resources.
 - iii. Reduction in plot size led to increased intensity of cultivation, reduction in Jhum cycle changes in cropping pattern, commercialization of Jhum, increase in wage labour and growth of alternative economic avocations.

6.1 Forest and Shifting Cultivation

Forest plays a major role in the domestic economy of every household. Fuel-wood and fodder are two main products of forest used by every household. Besides, timber cutting and selling (Kanlui Lok, wuira Lok, Yokong Lok and Ramlikong) is also prevalent. Heitup Lok is the only watershed where timber is not beng cut and sold (due to general deficiency). Honey , herbal medicines, bamboo, citrus and other fruits including amla are major forest products collected and used and occasionally sold also. In few instances fuel-wood is also sold (Heitup Lok).

Both male and female are engaged in collecting forest products in their fre time and so on an average they have to travel a distance of 2 – 4 km. for this.

6.2 Trends in Deforestation

The area under degraded forest is above 70 % in all the watersheds except for in Yokong Lok and Kanlui Lok. The sudy reveals deforestation to be a direct phenomenon of Jhuming i.e. smaller the Jhum cycle, larger is degradation and vice – verse, as can be observed from table 5.

Table 5: Jhum Cycle And Degradation

Watershed	Percent of watershed area under degraded forest	Length of Jhoom Cycle
Wuira Lok	72.20	4- 5 years
Kanlui Lok	49.03	3- 4 years
Raml	75.28	4-5 years
Yokong Lok	09.35	10-12 years
Heitup Lok	80.07	3-4 years

6.3 Effects of Deforestation: Perception and Response

Communities feel that deforestation has led to ecological imbalance. Problems like high velocity wind, water

scarcity and reduction in the supplies from the forest (basically fuelwood) have emerged due to reduction in forest. This realisation has led some of the villages to restore the forest. This has been found in three watersheds, Kanlui Lok, Ramlikong and Wuira Lok. The communities are adopting following measures:

- i. Ban on cutting of timber through resolutions passed by Village Authorities. The timber business at one time played a big role in raising the standard of living of people in Kanlui Lok. Now, with the depletion of forests, their level of living is again sliding back which they are trying to maintain by unauthorized means like collecting 'transport tax' etc. forcibly.
- ii. Privatization of land for forestry. This is most illustrative in Ramlikong, where after realizing the emergence of water scarcity, the Village Authority (local level people's institution which has the right to decide the land use and its allocation among the villagers) allotted some land to every household for growing trees. Thus each household is mandated to grow four to five trees around its house. This arrangement has resulted into restoring the water balance within six to seven years of time and resolving the water crisis (Phadang village).
- iii. Social plantation, especially by women societies (Marem village in Wuira Lok and Kharasom cc Village in Kanlui Lok).
- iv. Protecting the forests through vigilance by Youth Clubs (Kanlui Lok).

Despite the realization of the effects of deforestation, communities feel that cutting of forest can not be stopped unless alternative income generating activities are given.

7.1 Alternatives to Shifting Cultivation:

In the face of reducing size of land holding, declining productivity and degradation following alternatives to Jhuming have been suggested by the communities in different watersheds:

- i. Development of wet-terraced cultivation;
- ii. Soil conservation and horticultural plantation;
- iii. Livestock Development;
- iv. Development of small and cottage industries based on raw materials available locally like bamboo, cotton, etc.
- v. Food and fruit processing industries;
- vi. All these points should be considered and preceded by (a) Awareness building among the communities; and (b) Training for skill development among locally available manpower.

7.2 Community Action Plan

PRA exercises with the villagers reveal that land use planning has to be the beginning point for any programme combining Jhum control and development. Following main results of the PRA exercises regarding land use planning may be noted here-

- i. Mixed land use, keeping trees in the higher ridges, horticulture crops with half moon terraces in the middle portion and field crops in the lower terraces / contour bunds is ideal. However, this approach has its own limitations under the given land tenural conditions.
- ii. The terrace risers, which constitute 35-40 % of land area can be effectively utilized for raising perennial fodder grasses and legumes. These fodder crop along with other fodder crops raised with horticultural crops and trees as well as the crop residues can provided substantial feed for livestock in addition to helping conservation of soil.

- iii. Crop planning in the watershed should adapt to proper sequencing of crops as water/ moisture availability is more in lower portions than in the upper slopes. Hence rice cultivation should be avoided in the upper slopes.
- iv. Cultivation of perennial plantation crops such as rubber, tea, coffee, black pepper, cashew, fruits, etc. depending on agro-climate and market conditions. In such an approach food security issue need to be tackled through appropriate measures.
- v. Farming systems approach based on land capability classification would help in optimum utilization of the soil and water resources for sustainable yields and benefits to the farmers.
- vi. Frequent demonstrations of new technologies of land use and crop production in both irrigated and Unirrigated conditions within the watershed.
- vii. Regeneration of degraded Jhum lands through planting of appropriate trees shrub and plant species. Plantation of horticulture crops and broom grass can also prove helpful.
- viii. Improvement approach where longer Jhum cycle is prevalent.
- ix. Massive education and awareness programmes specially focussed on village heads, clan leaders, and other local elected or traditional leaders with a view to influencing local opinion about Jhuming.

Success of these measures will however depend on:

- i. Direct involvement of the farmers in decision making and execution.
- ii. A secured land tenure.
- iii. Use of appropriate mix of technologies including soil conservation, water harvesting, topo-sequencing etc.
- iv. Organizational innovations for securing inter – department coordination.

8. Concluding Observations

Shifting cultivation has been and continues to be the major farming system of the tribal communities in the five selected micro- watersheds of the Ukhrul district of Manipur. Although during last 15-20 years time, there has been a decline in the number of families dependent solely on the Jhum system, this decline has only been in relative sense. In absolute sense the total number of families dependent on Jhum cultivation today are more than 15 years ago mainly due to population growth.

The population growth during last two decades has resulted into lower availability of land, reducing plot size per household and reducing Jhum cycle. This has also led to productivity decline, soil erosion and deforestation as most of the new Jhum lands are developed by cutting the forest. The tribal communities have shown remarkable adjustment with these negative trends associated with the Jhum system. As a result, over the years the system of shifting cultivation has undergone significant changes, especially as far as cropping pattern is concerned. At present, there seems to be trend of using old Jhum plots for growing cash crops catering to the markets. This has come out largely as a response to ever growing population, declining productivity and reducing land availability.

Although significant differences are found in the productivity per plot between Jhum and terraced cultivation, productivity being invariably higher in the terraced cultivation, Jhuming has continued over the years mainly because of three of its advantages- food security, equity in land distribution and use of land otherwise not suitable to any other form of cultivation.

The major factors behind their sustenance were bigger size of the plots, private ownership and farmers capacity to invest. Yet, due to larger range of crops, also meaning greater food security and some income also (as vegetables are now being grown for the markets also) the Jhum system has sustained over the years.

The process of change from shifting to terraced cultivation has not been very smooth and has affected the land relations having significant bearings on the accessibility of land to the poor and causing managerial problems for the local village level institutions like village Authorities.

Over the years there have been two changes in this traditional system – with the growth of terracing, land under 'private' ownership (Security of tenancy) has increased; and with the emergence of Village Authority, the Chief's discretionary powers have reduced.

In the face of the emerging system, development of terraces with assured irrigation facilities are the top priorities of the communities. This has to be followed by a proper land use planning. The fulfillment of both these priorities is likely to involve some gestation period. In the interim, therefore, supportive livestock schemes, small scale food and fruit processing units, cottage industries based on local raw materials and government food security programmes, especially in the form of wage employment programmes should be undertaken on short to medium term basis.

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Annexure: List of Watersheds and Villages Covered

Name of Watershed	Villages Covered
Heitup Lok	Jalembung, Shangkai, Lamai Chimpau
Kanuli Lok	Kharasom CC, Kharasom Lacho and New Kharasom
Ramlikong	Phadang
Wuira Lok	Kalhang, Kuirei, Marem
Yokong Lok	Mawai