

# Sustainable alternatives to Shifting Cultivation in North East India

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## Abstract

In hilly regions of North East States shifting cultivation locally known as jhum continues to be dominant mode of food production and economic mainstay of many rural households. It is way of life which provides subsistence to the dependent community in form of food, fuel wood and fodder. Shifting cultivation leads to soil erosion, decline in soil fertility, forest degradation, biodiversity loss, loss of ecosystem services and air pollution. Transformation of shifting cultivation to settled agriculture is key to economic transformation of this region. The suitable technological and policy intervention need to be made which should respect land tenure, safeguard customary rights and traditional values. These interventions should address food security while maintaining crop diversity, help communities find alternate job opportunities, provide access to credit and market and reduction in poverty. Jhum rehabilitation schemes should focus on land management with livelihood generation, infrastructure development and socioeconomic development. Some of the viable practices like creation of home gardens, fallow forestry, Agroforestry, cash crop cultivation, timber tree plantation can help reduce shifting cultivation to a large extent.

**Keywords:** *Jhum, ecosystem services, livelihood, agroforestry*

## 1. Introduction

The history of shifting cultivation is as old as the history of agriculture itself. Most states of North East India are covered by dense forests. In the hilly tracts of Northeast India, jhuming is the dominant economic activity. According to the Wasteland Atlas of India published by the Department of Land Resources, Ministry of Rural Development, area under shifting cultivation accounts to 28% of the total geographical area (WAI, 2011). This includes 15% under current jhum and 13% under abandoned jhum category. The effects of shifting cultivation are devastating and far-reaching in degrading the environment and ecology of these regions. Nevertheless, it supplies farming families with food,

firewood, medicines and other domestic needs, though it produces low yields of crops and has almost no potential beyond subsistence farming (Crains and Geritty, 1999). The earlier 15–20 years cycle of shifting cultivation on a particular land has reduced to two or three years now. This has resulted in large-scale deforestation, soil and nutrient loss, and invasion by weeds and other species (Ramakrishna, 1992). The indigenous biodiversity has been affected to a large extent. As shifting agriculture is a significant contributor to deforestation, biodiversity loss, and greenhouse gas emissions, suitable policy intervention is required to improve livelihood and food production in hilly regions of North East India (Singh and Pradhan, 1993). Various programmes such as National Afforestation Programme, social forestry have been launched to plant trees on jhum lands. Bamboo plantations have been done under National Bamboo Mission. Department of Horticulture, Sericulture, Rural Development have promoted conversion of jhum lands to settled agriculture. Tea, Cashewnut, betelnut, rubber, coffee, turmeric, pineapple, passion fruits, floriculture, have been introduced in areas which are well connected with market.

## 2. Shifting Cultivation Scenario in North East India

According to State of Forest Report (SFR) 2017 total forest cover in NE states is 1,71,306 sq km which is 65.34% of its geographical area. SFR 2017 assessment reported net loss of forest cover to extent of 630 sq km in NE region. The main reason for this decrease is attributed to shifting cultivation and other biotic pressures prevalent in this region. The hilly areas are exposed to environmental degradation, massive soil erosion, disturbances of ecosystems, loss of biodiversity and climate change (Sonowal et al., 2005). The ideal solution for the hilly area problems would be settled agriculture with food crops grown on slopes and valley lands (Pandey and Sirothia, 2009). Task Force on Shifting Cultivation set up by the Government of India, in their report of 2003, estimated a cumulative area of 1.73 million hectares under the practice in NE India during the period 1987–97, based on a report of the Forest

Survey of India published in 1999. The Task Force also reported that an estimated 620,000 families are dependent on shifting cultivation.

Different agro-ecological terms have been used by some tribes of NE India. "Zabo" is a term used by Phek district of Nagaland (Maithani,2005). It is an indigenous system practiced for agriculture, forest, livestock, and fisheries with soil and water conservation base. "Apatani plateau system" is practised by Apatani tribe in Subansuri district of Arunachal Pradesh which is the rice bowl of Apatani population. "Panikheti" is a system of terrace cultivation practised by Angami and Chakhesang tribes of Nagaland where the source of water is channeled through bamboo or channels from top to the bottom in a zigzag manner to maintain all terraces (Maithani,2005). "Dhankheti" is a term used in Sikkim in the same manner as that of Panikheti above. "Bamboo drip irrigation system" is adopted by farmers of Jaintia Hills of Meghalaya where water is conveyed through split bamboos from water source to the crop field. "Alder base farming system" is practiced in Nagaland, and "Alder-large cardamom system" is followed in Sikkim "Bari system" or homestead garden is widely practiced in Assam, Meghalaya and Tripura where different crops, fruits and livestock are integrated near and around houses with simple water harvesting methods for multipurpose domestic use .

### 3. Alternative attempts to shifting cultivation in Mizoram

Attempts have been made by the State government and Non-Governmental Organisations to replace shifting cultivation in Mizoram. Nevertheless, no major achievements has been seen so far. Some of the efforts made by the government and non-government organisations are briefly presented below.

- 3.1 **Terrace:** Terrace was introduced in small plots in Champhai area prior to the British regime in the 1890's.
- 3.2 **Land Use Planning (LUP):** This policy was introduced in 1980's but there was no successful result.
- 3.3 **New Land Use Policy (NLUP-I).** This New Land Use Policy was exercised during 1981 - 1991 with negligible success.
- 3.4 **Pit system:** Pit system was introduced by All Mizoram Farmers Union (AMFU) in 2004 - 2005. The earth was dug and grew crops with composed manure but this was abandoned because of high labour cost and unsustainable production.
- 3.5 **Tree-green hedge crop system:** This system was introduced by Prof. L.K. Jha in the year 1995-1996 in a small on-farm experiment but ended co-terminus with the project. Generally,

incorporation of trees in the farm was not appreciated by the farmers.

- 3.6 **Contour trenches and ICAR 3-tier method:** Contour trenches was introduced by the Agriculture Department in 2005-2006, but it was discontinued because contour trenches were easily filled with soil due to steep open jhum land within a monsoon. This indicates the quantity of soil loss due to jhuming.
- 3.7 **Sloping Agriculture Land Technology (SALT):** SALT was introduced in South Mizoram by Rev. Harold Watson of Mindanao Baptist Rural Life Centre Kinuskusan, Philippines in 2004. It is still practiced and retained by some farmers in Lunglei area. The farmers planted crops between the hedge-rows without using chemical fertilizers.
- 3.8 **Self Support Project :** This policy (also known as Mahni Intodelh Project-MIP) aims at self-sufficiency in the making of agricultural products during the Mizo National Front (MNF) ministry (2007-2009). The MIP project covers grape cultivation in eastern higher attitudes in Champhai-Hnahlan. To date, the project continues to be successful. Oil palm plantation under contract farming system with Godrej and Argo-Tech. Company is going on, while bamboo management remains questionable.
- 3.9 **New Land Use Policy (NLUP-II):** The State government renovated NLUP-I in the form of NLUP-II in the year 2010 onwards. As many as 120,000 families were targeted as beneficiaries with financial assistance @ Rs.100,000/- each family. NLUP-II is a flagship programme of the Congress Ministry from 2010 onwards. Some success stories have been recorded from broom grass cultivation and dairy milk production under agro-allied sectors.

### 4. Viable options to Shifting cultivation

- 4.1 Home Gardens serve as an effective, fairly easy to replicate and scale up approach to transformations is the promotion of home gardens (or extended home gardens). provides access to traditional food crops and contributes to nutritional security, but also allows for income generating opportunities. Combined with horticulture and animal husbandry, the promotion of home gardens has helped many households to increase income significantly and improve their economic status.
- 4.2 Fallow forestry by planting of native tree species for provisional and regulatory services has proved to be the underlying rationale for the widespread acceptance of this model by villagers across Nagaland. This is an excellent

model for replication and promotion of fallow forestry practice.

- 4.3 Traditional practices of cultivation of food crops Aji system of the Apatani, zabo system of Chakesang, bun system of the Khasi Hills, alder-based system of the Angami, and the tree-based rice cultivation of the Konyak are some of the best practices being followed by traditional communities.
- 4.4 Agroforestry, large scale plantation of fast growing timber and economically important tree species with intercropping of ginger, turmeric, black pepper, and lemon grass has proved to be ecologically viable, economically sustainable and socially acceptable.
- 4.5 Cash crop cultivation Broom grass cultivation in Meghalaya; rubber plantation in Tripura; tea cultivation in Tripura, Manipur, Meghalaya and Arunachal Pradesh; cashew nut plantation in the Garo Hills of Meghalaya; floriculture in Mizoram and passion fruit cultivation in Nagaland, Manipur and Mizoram are a few examples where cash crop cultivation has transformed shifting cultivation.
- 4.6 Timber tree plantations in villages where the land is sufficient and people have moved out for jobs or business (de-population), a large area of shifting cultivation land has been converted into timber tree plantations. This has happened in the states of Nagaland, Manipur, Mizoram and, on a small scale, in Meghalaya. This practice has helped in restoration of land and creation of wealth for the land owners

### 5. Problems identified and the research-gaps

Perceived problems identified in relation to shifting cultivation includes shortened fallow period; soil loss, loss of forest cover, decline of soil fertility; scarcity of water and irrigation facility; lack of farm machinery and facility; lack of appropriate technology suitable to the local environment; lack of farm loans and rural bank loans; lack of agro-processing plants; lack of HYV crops; lack of supply of good and timely planting materials; lack of transport facility; lack of minimum support price and crop insurance scheme; lack of assured market and market links; unstable income; problem of weeds, pests and diseases; and peculiar topographical configurations unlike neighbouring states of North East India. There is a missing link between the projects and the monitoring-evaluation processes under both government and non-government-run projects became lacunae of the research gaps (Dhiman, 2005).

### 6. Appropriate technology and lessons learned from the past attempts

- 6.1 Clear-cut policy on agriculture system and strong political support is required.
- 6.2 Sustainable land management and appropriate technology adoptable to the local conditions underlining traditional practices need to be ensured.
- 6.3 A holistic community based approach with cropping based on land use capability and location specific needs to meet the requirement of the people.
- 6.4 Enhancement of soil and water conservation through rain water harvesting and/or irrigation facility where possible.
- 6.5 A special incentives for farmers involved in cluster farming providing tractors, tillers, weeders, quality seeds (HYV) and pump-sets free of costs, or at a remunerative subsidized rates.
- 6.6 Participatory seed development program and capacity building program with interface between farmers and scientific fraternity to ensure sustainable agro-ecosystems, quality seeds and planting materials as well as exploration of marketability outside the state.
- 6.7 Agriculture linked- roads for agro-horticultural products through production centres for clustered or compact villages.
- 6.8 Credit facility for farmers in Rural and National Banks.
- 6.8 Involvement of farmers' participation from the micro-planning stage to end product.

Various concepts and practices have been highlighted on agroforestry systems to substitute slash and burn method of cultivation over the past decades. The environmentally degraded and unsustainable practice of age-old shifting cultivation in to an improved/settled farming system at all levels is need of the hour. Three excerpts on agroforestry models have been quoted which most likely addressed thought provoking in more or less the same way.

“SALT-like or any other appropriate agro-forestry system is to be devised taking the indigenous knowledge and local participation into proper account for modernization of shifting cultivation for a sustainable ecosystem with a promise for self-reliance to the highlanders of the concerned region”. Agroforestry being site-specific, should be focused on rural communities in various ecological conditions under real farming situations and managed by farmers in the farmers' lands with both short and long-term goals (Grogan et al, 2012) . “A whole range of agroforestry system models based upon traditional value systems at the level of crop organization, and at the level of introduction of tree species as part of agroforestry models where socially

valued ecologically significant keystone species are brought in offers a range of opportunities to work with local communities for sustainable agroforestry models". From the statements cited above coupled with the experience of an old-age practice of shifting cultivation in hilly areas of northeast India, a sustainable land use management and agriculture models have been devised for improved environmental service, that is, improved farm yield through improved soil fertility, as an alternative to shifting agriculture in hilly areas of Eastern Himalaya in general, and Mizoram, in particular.

## 7. Conclusions

Clearing of jungles is the prerequisite of shifting. The felling of trees and clearing of bushes, however, accelerate soil erosion and accentuate variability of rainfall which may lead either to droughts or floods. The overall impact is the decline in soil fertility. The ecosystems lose their resilience characteristics. The population dependent on shifting cultivation faces the shortage of food, fuel wood and fodder. Consequently, the nutritional standard goes down. Assessing the fact that jhuming system cannot be stopped altogether, it is necessary to make the process more productive so that it may sustain the growing pressure of Jhumias population at a reasonably good standard of nutrition. The main approach to overcome the evil of shifting cultivation should be to change the jhuming lands into sedentary farms. Apart from terracing, other soil conservation measures like bunding, trenching, gully plugging, etc., can be adopted according to the need of the area. Equally important is the development of protective covers, like forests or fruit trees, suitable cash crops, grasses and leguminous crops especially on steep slopes. In short, land use planning and practices should be based according to land capability and suitability. Moreover, where population densities are low and forest areas vast, slash and burn practices are sustainable and harmo-

nious with the environment. The long term objective should be to develop alternatives to shifting cultivation that are ecologically sound, economically feasible, and culturally acceptable.

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