

Agro-forestry: An alternative for Jhum Cultivation in Meghalaya

Lolita M. Shangpliang

Department of Sociology,

St. Mary's College, Shillong

Email : lmshangpliang@gmail.com

Abstract

Jhum cultivation is considered highly destructive to environment as it involves burning and clearing vast areas of forest so that cultivation can be done for a few years. It does not only destroy forest but has a chain of effects and after-effects leading to multifarious adverse conditions of soil and climate. People like to cling to this method because it is simple and cheapest method, and also their ancestors practiced it with a sense of socio-religious importance. Recognizing the adverse effects of jhum cultivation the State Government, through the Soil and Water Conservation Department, took up jhum control programme since 1974-75 under the State Plan, but it has not achieved encouraging results. Eminent scientists have recently advocated Agro-forestry as an alternative to jhum cultivation. This article attempts at giving some details about the proposed method of Agro-forestry)

Key words: Cropping, Dibbling, Erosion, Denudation, Depredation

Introduction

Jhum cultivation is one of the most ancient systems of farming believed to have originated in the Neolithic period around 7000 BC. It is called slash and burn method of cultivation. The system is regarded as the first step in transition from food gathering and hunting to crop husbandry. It is still practiced in Khasi Hills and in the hill areas of the North East states including certain pockets of India. Among the Khasis, this system of cultivation is known as “*Thang shyrti*” or “*Thang bun*”. (Shangpliang, 2010)

The operation of jhum cultivation is started by jungle cutting in the months of December to January. After the jungle is cut down and cleared the debris is left to dry in the open. From the month of February to March setting of fire to the dried debris is carried out. This operation is done with care so as to avoid forest fires from spreading across to other hills, not meant for ‘*jhuming*’.

Sowing and planting of crops is done by dibbling in an intimate mixture of varied crops. Upland paddy is the main crop grown in mixture with maize, millet, sorghum, tapioca, chillies, cotton, turmeric, pumpkin, etc. Cropping is done with minimum tillage: No animals or large implements are used for preparing land. The only implements used

are the chopping knife, sickle, dibbling stick, spade and hoe. After the harvest the land is abandoned for 3 to 5 years to rejuvenate itself and jhuming is shifted to another site and repeated the same process.

Jhum cultivation is considered destructive to the environment, as vast areas of forest is cleared and burnt down so that cultivation can be carried out at least for 3 to 5 consecutive years. It does not only destroy forest but also disturb the ecological balance and destroys the environment. It has a chain of effects and after-effects leading to multifarious adverse conditions of soil and climate. An assessment made by TREES-II in one of its International initiatives of shifting cultivation practices in North East India revealed that in many states due to reduction in the fallow period from 20-30 years in the past to as low as 3 years in recent times the situation has attracted the attention of planners and decision makers. The re-growth of forests was almost nil and existing forests were also decreasing, the threat to which the forests are being subjected to is of immediate concern. (Roy *et al.* 2002) The following adverse effects of jhum cultivation show how the system causes far-reaching disturbances in the conditions of the soil leading to changes in the climate, ecological imbalance and the environmental degradation, besides fertility loss and low productivity of crops.

Adverse effects of Jhum cultivation

- a) Denudation of forests : Ecological Imbalance
Elimination of source of water
- b) Soil Erosion : Stream silting : Floods
Loss of soil fertility: Pressure on land
Low productivity
- c) Low Technology : Labour Intensive
Reservoir : Derogatory Development
No subsidiary Income
- d) Social Effects : Social custom : Large family size

The first adverse effect of jhum cultivation is denudation of forests leading to two consequences, viz. ecological imbalance and elimination of the sources of water and ecological imbalance. In fact the forest eco-systems of North East India as a whole is under severe pressure taking a heavy toll on both biotic and abiotic sources, due to population explosion, encroachments on forest lands, loss of forest cover for other non-forest users, shifting cultivation practices and degradation caused by illicit felling, logging for fuelwood forest and fodder etc. (Toky.1981) A recent study conducted by the ISFR (India State of Forest report, 2017) shows a net decline of 116 sq.km in the state of Meghalaya due to rotational felling and developmental activities whereas a slight increase has been due to plantation activities (Table 1).

Table 1 : Forest cover of North Eastern States

| STATE | Geographical Area (sq.km) | VDF | MDF | % of | Total | Change |
|-------------------|---------------------------|--------|--------|-------|----------|--------|
| Arunachal Pradesh | 83,743 | 20,721 | 30,955 | 22.83 | 66,964 | -190 |
| Assam | 78,438 | 2,797 | 10,192 | 53.78 | 28,105 | 567 |
| Manipur | 22,327 | 908 | 6,510 | 57.24 | 17,346 | 263 |
| Meghalaya | 22,429 | 453 | 9,386 | 42.62 | 17,146 | -116 |
| Mizoram | 21,081 | 131 | 5,861 | 67.05 | 18,186 | -531 |
| Nagaland | 16,579 | 1,279 | 4,587 | 53.03 | 12,489 | -450 |
| Sikkim | 7,096 | 1,081 | 1,575 | 20.57 | 3,344 | -9 |
| Tripura | 10,486 | 656 | 5,246 | 23.61 | 7,726 | -164 |
| Grand Total | 2,62,179 | 28,026 | 74,312 | 40.26 | 1,71,306 | -630 |

Source : ISFR Report of 2017

The second adverse effect of jhum cultivation is that it causes soil erosion that affects fertility of the soil resulting in low productivity and pressure on land. According to a study conducted by the ICAR (Jha and Sarma, 2008) the average soil loss due to shifting cultivation in Meghalaya has been found to be 40.9 tonnes/ha. The highest sediment yield, however was, 76.9 tonnes/ha/year. The annual loss of soil was computed by taking into account an average soil loss of 40.0 tonnes/ha/yr. The report also indicated that annual soil loss due to shifting cultivation in the region was found to be about 15.5 million tones. A study conducted by Jha and Rathore (1981) revealed that erosion ratio of Orissa soil under shifting cultivation were 18.03 and 18.78 in the surface and 6.5 and 11.4 were in the sub-surface as compared to erosion ratio of soils under shifting cultivation of 10.7 and 10.8 in the surface and 3.7 and 11.7 in sub-surface soils. They also found that the erosion ratios were higher in the upper layer than in the lower layers. Another study conducted by Borthakur *et al.* (1978) revealed that the surface runoff under shifting cultivation was about 11.40 mm partial terracing reduced surface runoff further to 32.8 mm, indicating thereby that, physical barriers considerably reduces the surface run off.

It has been estimated that the average soil loss from the first year and second year of *jhumming* is 146.6 and 170.2 tonnes per hectare per year respectively. This clearly indicates that the second year of *jhumming* is comparatively more hazardous than the first year.

Thirdly, It causes rapid loss of soil nutrient. Together with the loss of valuable

fertile topsoil there is also corresponding loss of nutrients available in the soil. A study made on the affect of jhum on loss of soil nutrient conducted by Mishra and Ramakrishnan (1983) at high elevation of Meghalaya using 15, 10 and 5 years jhum cycle and terrace system showed that the soil nitrogen concentration under a five year cycle was significantly lower than under the 10 and 15 year cycles. The concentration of this nutrient declined sharply after the burn in the surface layers and was attributed to volatilization. The degree of volatilization is dependent on the intensity of the burn and, therefore, the nitrogen decline is lower in a five year cycle than in longer cycles. The variance in heat intensity during the time of jhum burning causes high or low decrease in the soil organic matter. Destruction of organic content is the highest when the intensity of heat above 150 degree Centigrade.

Present Status of Jhum Cultivation

The estimated *jhumia* population dependent on *jhum* is 13.87 percent of the total rural population of 18.53 lakhs of the state of Meghalaya in the year 2001 (Statistical Handbook Meghalaya, 2017). This clearly indicate that the population dependent on *jhum* had declined by 27.04 percent in a period of thirty years time that is from 40.91 percent out of the total rural population of 8.65 of the state in the year 1971. It has also been observed that the area under jhum cultivation in Meghalaya has been declining gradually .The following table shows the decadal change in the extent of shifting cultivation in Meghalaya from 2000 to 2010 (Table 2).

Table 2 : Decadal change in the extent of shifting cultivation in Meghalaya(2000-2010)

| State | Shifting Cultivation Area (2000) | Shifting Cultivation Area (2010) | Change (Km) | % of Decadal Change |
|-----------|--|--|----------------|------------------------|
| Meghalaya | 2086.77 | 448.99 | -1637.78 | -78.48 |

Source : Indian Council of Forestry Research and Education and published under Statistical Year Book -2014 by MoSPI

At present with rapid increase in human population, there is corresponding heavy pressure on land. The *jhum* cycle has reduced drastically over the last few decades to an average of below ten years and in extreme cases such as that in Garo hills to as short as 3 to 5 years. In due course of time this cycle may even be brought down further. The soil is deprived of its normal period for recuperation and unable to replenish its lost fertility and the immediate consequence is the significant reduction in the productivity.

Factors contributing to the persistency of *Jhum* cultivation in Meghalaya

Cultural and Religious factor

The people still practice *Jhum* cultivation as part of their tradition, their ancestors had practiced it from centuries, when there was no scientific knowledge of agriculture. Some tribes like the Aos of Nagaland have Maotsu which is an important festival celebrated after the *Jhum* fields are sown. There are some who connect this festival to the fertility of the earth and expect a rich plant growth. Wangala, a harvest festival of the Garos is celebrated with pomp and gaiety to appease the Gods. It is observed that *Jhum* is not only an economic activity but also inseparable from certain elements of spiritual ethos of the community as well.

Simple and cheapest method

The method involves minimal land preparation, insignificant capital investment, no manures or fertilizer requirement and manual labour involving only family members.

Absence of land ownership

In Meghalaya the land belongs to the community and in the absence of a secure tenure, the *jhumias* are unwilling to invest in land development activities. This lack of ownership makes the *jhumia* unable to have access to bank facilities. However, with increasing communication of life and with certain community land being released for sale, there is also every likelihood of the danger of usurpation of land by the affluent of society and consequential marginalisation of poor farmers of *jhumias* in rural areas.

Mixed cropping

The *jhumias* are self sufficient in a way because they consume the crops from their own *jhum* fields, like rice, millet, maize, fruits and vegetables so that their requirement for their daily consumption is fully met. Also, the presence of different crops in the same plot is conducive to pest management due to genetic diversity and the sequential harvesting of crops is an effective way of managing many species over both space and time and contributes to agro-ecosystem stability, besides showing better orientation of nutrient use efficiency.

Lack of improved technology awareness

In a State where ethnicity is prominent and there is general aversion to bring labour from outside, the continuance of shifting cultivation practice would largely depend on the kind of developmental activity that is being offered. The lack of creating awareness and non-introduction of improved technology that are location specific and need based would only strengthen the farmers resolve to resist change and persist with *jhum*.

Lack of Financial Support

Besides the bottlenecks of development highlighted above, one of the biggest constraints in livelihood matters relating to *jhum* control, poverty alienation, conservation oriented and other income generating programmes is the lack of extension of credit facilities. Traditional land tenure is blessed as constraining security for the credit. However, this appears to be only an excuse for non-performance and reluctance for credit extension. Therefore, with this in mind, the *jhumias* have no alternative but to continue with his age-old practice of *jhum*.

Lack of co-ordinated multi-disciplinary approach

The *jhum* control programmes are being implemented by different developmental agencies in relative isolation without proper co-ordination through multi-disciplinary approach. This lack of institutional consultations leads to mainly personality-based consultation with each trying to out do or overdo others resulting in alienation of traditional systems and knowledge from the decision making and governing process, leading to marginalisation and non-participation by the *jhumias* in the developmental works.

***Jhum* Control Programmes (Government Schemes)**

Recognising the major problems on *jhum* cultivation in the State, the Government through the Soil and Water Conservation Department took up the scheme of *jhum* control in 1974-75 under the State Plan. This scheme was undertaken to provide effective supporting base for permanent settlement of the *jhummia* families in order to wean them away from *jhumming*. The scheme is a package programme and consists of the following components:

1. To provide permanent cultivation land (Bench Terraces) with assured irrigation facilities.
2. Follow up programmes by way of supply of inputs like seeds and plants, manure and fertilisers including cultivation cost for three years at a gradual sliding scale.
3. To provide cash/horticultural crop plantations and afforestation.
4. To provide drinking water supply for village settlement.
5. To provide link/approach roads to work areas.

Land development in the form of bench terraces with assured irrigation facilities have proved most effective means in attracting the *jhumias* to settled agriculture. Cash/Horticulture crop plantations undertaken under this scheme is also making an appreciable impact in the process of weaning away the *jhumias* from their age-old practice of *jhumming* and it could be seen in the field that most of the abandoned *jhum* areas have been converted into permanent cash/horticulture plantations such as areca nut, cashew, citrus, etc.

However, the poor extension services, lack of dedicated workers to save rural

Agro-forestry: An alternative for Jhum Cultivation in Meghalaya

areas and the failure to ensure effective marketing linkages along with communication and transport network meant that the *jhumias* continue to miss the opportunities and remain isolated and backward. Besides the above, there are other factors that contribute to the overall stagnation and slow progress in eradication of jhum in Meghalaya. These are:

1. Lack of ownership right over the land.
2. Lack of inputs, improved technology and result oriented approach in interior areas.
3. Lack of integrated, co-ordinated and sustainable approach based in research and development, which will give a good impact to change the mindset of the *jhumias*.
4. Lack of proper co-ordinated efforts and effective linkages between research agencies and developmental agencies.
5. Lack of need based technology and flexibility of the scheme, particularly schemes from the Government of India.
6. Among poorer sections of the society, the long gestation period of plantation crops became a hindrance.
7. Lack of pre-implementation capacity building and farmers participation in the programme.
8. There is no continuity of Research in the *jhum* fields.

Agro-forestry as an alternative to Jhum

Agro-forestry is a composite, diversified and sustainable production system. It is a practice that has a long tradition in the North East where trees are integrated in the crop and livestock production system according to agroclimatic and other prevailing conditions. In Meghalaya, a study conducted by the ICAR in 1987 revealed that the Khasi Mandarin (*Citrus reticulata*) was introduced in agri-horticulture system with a plant diversity of 800 plants/ha and 400 plants/ha (Bhatt et al., 2000). The fruit yield was noticed after 6 years of plantation with no change or variation in plant height or canopy variation, and its production level was also quite high which shows that the Khasi mandarin could be a potential source of agro-forestry in Meghalaya. The Khasi Hills are rich in wild edible herbs and plants which form an important constituent of their daily diet where about 143 species of herbs and plants beginning with the prefix 'ja' have been documented. These NTFP products have served as a primary source of revenue to the villages especially women who sell them in the local markets. (Khongsit.1999)

Such an idea of developing alternative models in land to suit local farmer's needs for agriculture has long been advocated by scientists and scholars. According to them any alternative model can only be adopted by local people if it suits to the local environmental condition and meet the needs and constraint of farmers. Besides this, the model should be

similar to traditional practices with minor alterations. They recommended introduction of three components, i.e. agronomy, forestry and animal husbandry which will help minimizing the soil erosion, conservation of moisture, increase in infiltration rate, decrease in evaporation from soil and balance nutrient status and finally help in land remaining productive on a sustained basis. Their main contention is that “we generally try to transfer technology in the farmers field without considering biophysical and psychosocial economic problems of the farmers. The farmers never accept imposed technology under any circumstance”. (Jha and Tiwari, 2013) They are of the opinion that instead of spending time in on-station trial the extension workers should work along with farmers to examine requirements of the farmers and biophysical causes. They should conduct on-farm trial in the farmers field itself with collaboration of farmers on model basis in 5 or 10 villages in first phase. The whole process of agro-forestry being multi-disciplinary in nature it requires a team work of agriculture, forest, soil-conservation, social science and animal husbandry departments. Thus, the Agro-forestry as an alternative to jhum cultivation, is worth giving a fair trial by the departments concerned.

Conclusion

Jhum cultivation does not only disturb the ecological balance and destroy the environment but also causes a chain of affects and after affects leading to multifarious adverse conditions of soil and climate. However the efforts so far made by the various departments of the Government of Meghalaya to wean over the jhumias from jhum cultivation seem to be encouraging enough. The NERCORMP project supported by the International Fund for Agricultural Development has done commendable work in West Garo Hills of Meghalaya by assisting the jhumias in rationalization and optimization of jhum practices through community-based participatory planning, implementation, monitoring and social auditing of their jhum procedures. The project also provided additional inputs in the form of livestock, mainly pigs, and home-garden developments .A recovering fund was also established for Women’s Self Help Groups and village level National Resource management Groups (NERCORMP,2008). It is also hoped that the Government joins hands with primary departments like Horticulture and Soil and Water Conservation Departments to work towards economic upliftment of the jhumias through market focussed and subsidy based programmes. In its bid to follow the current emphasis on ‘weaning away’ hill farmers from this so called ‘primitive’ style of conservation ,government policies should in turn shift to ‘supportive ‘policies.

Notes

1. ‘*Ja*’ is a Khasi term which means ‘rice’-a staple food of many tribes including the Khasi. It has been documented that there are about 143 species of edible herbs and plants in and around Khasi-Jaintia Hills that begin with the prefix ‘*ja*’ which goes to prove that there was a time in History when the people sustained themselves by

Agro-forestry: An alternative for Jhum Cultivation in Meghalaya

consuming these herbs whenever there was a scarcity of food or a famine.

2. NTFP – Non Timber Forest Products are an important source of daily diet of local villagers and form an important source of livelihood to the rural folk who sell these products in the local markets. Some common NTFP products of Meghalaya are bamboo-shoot, mushroom, broomstick, honey, yam, edible herbs and plants etc.

References

- Bhatt. B.P., Tomar, B.P., Singh, R. and Misra, L.K. 2000. *Agroforestry : A potential source of socio-Economic upliftment of Rural Areas of NEH Region*, ICAR Research Complex for North Eastern Region, Umiam, Meghalaya. pp.155-165
- Borthakur, D.N., Akasthi, R.P and Ghose, S.P. 1978. *Alternative system of farming for increasing productivity in jhum lands*. Proceedings of seminar on Shifting Cultivation in North East India, NEICSSR, Shillong
- Darlong, V.T. 2002. An overview of forest policies and Legislations vis-à-vis Forest Resource management in North East India. In: B. Dutta Ray and Alam K. (Ed). *Forest Resources in North East India*, New Delhi. Omsons Publications.
- ICFR Report. 2017. *Report of Net decrease of forest cover in hill districts of North east*.
- Jha, M. and Rathore, R. 1981. Erodibility of soil in shifting cultivation areas of Tripura and Orissa. *Indian Forester*, 1075(5): 310-313
- Jha, L.K. and Tiwari, R.P. 2013. Agroforestry: A stable alternative of Jhum cultivation for North East India. In: J.V Hluna (ed), *History and Ethnicity Identity Formation in North East India*. Concept Publishing Company Limited, New Delhi
- Jha, L.K. and SenSarma, P.K. 2008. *Agroforestry-Indian Perspective*. APH Publishing Corporation. New Delhi.
- Khongsit, S.1999. *Kiba ngi khot ja*, Shillong: Mrs. Sucila Khongngain, San Mer.
- Ministry of Statistics and Programme Implementation.2014, *ICFR Statistical Year Book*. New Delhi
- Mishra, B.K and Ramakrishnan, P.S. 1983. Slash and burn agriculture at higher elevations in North Eastern India in Sediment, Water and Nutrient losses. *Agriculture, Ecosystems and Environment*, 9:67-82.
- Roy, P.S. *et al.* 2002. TREES II- Tropical Forest Assessment in India and Northern Myanmar. Paper presented at ‘*International workshop on Tropical Cover Assessment and Conservation Issues in South East Asia*,’ 12-14 Feb.2002, IIRS, Dehradun, India.

Shangpliang, Rekha M. 2010. *Forest in the life of the Khasi*. Concept Publisher Pvt. Ltd. New Delhi.

Toky, O.P. and Ramakrishnan, P.S. 1981. Soil Nutrient status of hill agro-ecosystems and recovery pattern after slash and burn agriculture (jhum) in North Eastern India. *Plant and Soil*, 60(1): 41-64.