

Flagship programme on Jhum Improvement in Ri-Bhoi district of Meghalaya

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Jhum with short fallow cycle has been widely considered as an unsustainable land use practice that leads to severe land degradation. Productivity of the *Jhum* field decreases rapidly after one or two years of cultivation. Since, *Jhum* is closely linked with the culture, beliefs and lifestyle of the indigenous people of the NE hills, an attempt was made to improve the existing *Jhum* system in terms of productivity, restorative capacity and improve livelihood of the *Jhum* practitioners. It is hypothesized that pressure on *Jhum* cultivation would reduce if economic conditions of through the introduction of ancillary agricultural production activities. Flagship programme was initiated in a remote village, Sonidan (Ri-bhoi district) which is situated at 80 km away from Shillong. The village has 230 households with 1610 persons. Nearly 80 per cent of people depend on Agricultural activities for their livelihood. *Jhuming* is practiced by almost all the farmers of the village. Therefore, a holistic approach was adopted where soil and water conservation measures (bench terracing, contour bunding, hedgerow inter cropping, micro water harvesting structures), improved crops varieties, agronomic practices, crop rotation and cropping sequences, agroforestry, fruit and vegetable cultivation, improved housing and breed in piggery, backyard poultry, mushroom cultivation etc. were implemented on selected farmers field. The results of the various interventions are summarized below.

Intervention on field crops, vegetable and spices

In Meghalaya, most of the farmers cultivate ginger as a cash crop and colocasia, chilli, pumpkin etc. as subsidiary crops in the first year of *Jhum* cycle. In subsequent years, upland rice is cultivated as main crop for 2-3 years. The farmers practice was improved by introduction improved varieties and good agricultural practices (Fig. 1). After intervention, productivity increased



Fig 1. Cultivation of Ginger with MPTs in Jhum field

12.37 per cent (ginger) to 60.84 per cent (in Chilli).

It was observed that, the local rice varieties responded very well to line sowing and fertilizer application and the yield has increased by 43.83%. We selected specific glutinous cultivars which are proffered by farmers; the intervention was well accepted and adopted by the farmers.

Agroforestry and Fruit trees

Agroforestry and fruit tree plantations are one of the important interventions which do not require tilling of soil for quite a long period of time. Therefore, after the *Jhum* cultivation of the land for few years, multipurpose tree species like *Michelia oblonga*, *Chukrasia tabularis*, Khasi Mandarin, Peach, Assam lemon etc were planted (Fig 2). Some of the fruit trees were also planted in the home gardens. Among the trees *Chukrasia tabularis* had better survival percentage than the other tree species. Khasi mandarin had more mortality with a survival percent of 53.33 %. Within a period of three years, *Michelia oblonga* attained an average height of 3.35 m and *Chukrasia tabularis* attained an average height of 3.56 m. In terms of farmers' preference, *Michelia oblonga* is preferred for timber purpose whereas *Chukrasia tabularis* is preferred for fuel wood or selling in the market especially for plywood.



Fig 2. Agroforestry plantation on abandoned Jhum land

Income generation through production of quality planting materials in Nursery

Looking at the demand of quality khasi mandarin seedlings, local nursery was established in the village involving local farmers. The seeds were sown on nursery beds in open conditions in Jan 2015. However, the growth was too slow for which one *Jhum* farmer, Shri Drem Shadap, was provided with a poly-house of 15 m x 5 m x 3 m size to raise the seedlings (Fig 3). The first poly-house was constructed in 2015 with complete funding of Rs 56000 from ICAR Research Complex for NEH Region. About 4000 seedlings in medium sized polybags were then transferred to the polyhouse. The farmer sold about 3500 seedlings at an average selling price of Rs 25/seedling and earned a gross return of Rs 87500. With the income, the farmer established another polyhouse (Fig 4) for which he contributed 40% of the cost and the rest was contributed by the institute under the TSP programme. Out of the total expenditure of Rs 62100, the farmer contributed Rs 24840 for the nursery. Now the farmer has two polyhouses to grow the khasi mandarin seedlings. The farmer has about 4500 seedlings (in large polybags) ready to be sold in 2017 from which an estimated gross income of Rs 1.12 lakhs is expected. The same polyhouse can be utilized for raising seedlings of other tree species also if the demand so arises.



Fig 3. Khasi mandarin seedlings raised by farmer after support from Institute

Mushroom cultivation by *Jhumias*

Mushroom was introduced as an ancillary enterprise or micro-enterprise especially for the ladies who can devote spare time and state income generating activities at home. Initially, the farmers were trained at the institute (Fig 5 & Fig 6) and only four selected farmers were provided with all inputs including a temporary shed for mushroom cultivation. In 2016-17, about sixteen farmers came forward to cultivate mushroom and they constructed mushroom sheds on their own and a participatory production has started. About 12 to 32 bags of paddy straw/famers (3 kg capacity) were inoculated with spawn. The farmers could earn a gross income of Rs 2200 to 8100 within a period of two to three months at their home itself. This enterprise could generate employment for the ladies of the household at their doorstep.



Fig 5. Preparation of paddy straw by ladies for mushroom cultivation



Fig 6. Mushroom produced by the lady farmers in Sonidan village

Pig husbandry by Jhum farmers

Pig is a much sought after animal which are reared by the farmers for meat purpose. Farmers usually rear the local breeds of pigs which is fattened to about 40 to 50 kg in a year. Therefore, improved breed of pigs (Umsniang) were supplied during 2014 – 2016 to the farmers to improve productivity and generate additional family income without much investment (Fig 7). It was observed that the farmers who continued to expand the pig herd by not selling all the newborn piglets earned Rs 11,000 to 21,000 per annum in three years and still continuing with the rearing of piglets. Those, who did sold all the newly born piglets and did not expand their herd size earned Rs 6000 to 14000 per annum. However they have still retained the parent stock provided to them. Improved pig husbandry could reasonably improve the family income of the farmers.



Fig 7. Pig rearing and integration with jhum cultivation at Sonidan, Ri-Bhoi

Backyard poultry by Jhumias

As a means of supportive livelihood option, selected *Jhum* farmers were provided with 20 Kroiler birds of 2 weeks old for backyard poultry. After rearing for about 75 to 90 days, the grownup chickens were sold at an average rate of Rs 180 per kg of live weight. The average cost of medicine was Rs 150 for the whole period of rearing, cost of two weeks old chicks was Rs 75 per chick and cost of feed was variable which varied according the number of live birds and farmers' capacity to spend on feed. Cost of chicks, medicine and feed constitutes the total input/investment cost. It was observed that a farmer could earn Rs 1750 to 3550 within three months which is sufficient to support the education cost of two school going children for three months. The enterprise did not involve any additional man-days as the farm family would spend only an hour or so in a day to manage the flock.



Fig 8. Introduction of poultry at Sonidan, Ri-Bhoi for increasing farmers income

Conclusion

Introduction of improved varieties and good agriculture practices increased land productivity. Ancillary agricultural activities particularly horticulture, agroforestry, mushroom cultivation, piggery and backyard poultry increased farmers income and decreased dependency on jhum cultivation.

Acknowledgement

Authors are thankful to village headman, Sonidan village, Ri-Bhoi district, for extending his support in executing the programme. Financial support received from ICAR through various projects such as NICRA, TSP etc. is duly acknowledged. Authors are thankful to the Director ICAR RC for NEH Region for his guidance.