

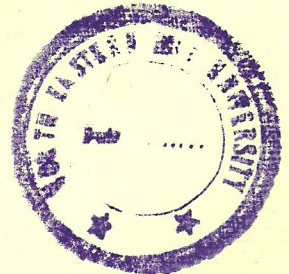
**STUDIES ON TRIBAL VILLAGE ECOSYSTEM  
FUNCTION IN NORTH—EASTERN HILL  
REGION OF INDIA**

**ABSTRACT**

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## ABSTRACT

In the present study the number of village ecosystems have been studied considering communities that belong to different socio-economic and socio-cultural background. Two cluster of villages have been considered, one from lower elevations of Meghalaya located at Lailad and another at the foot hills of Arunachal Pradesh at Balijan. While selecting these clusters a number of considerations went behind the selection : (i) the different communities involved have a common forest resources base, (ii) they belong to different socio-economic and socio-cultural backgrounds, (iii) they are either traditional tribal societies or they are immigrant ethnic population, each community being organised as a specific village unit. The objective here is not only to look at the ecological and economical efficiencies of the village ecosystem as a whole but also to look in detail each of the different sub-units within, such as agriculture, animal husbandry and domestic and forest sub-systems, and to look at the inter-linkages between the sub-systems. Such an analysis of the village ecosystem function is expected to be of value to designing developmental strategies for the different tribal societies based upon their on traditional value system.

# 1. ECOLOGICAL ANALYSIS OF A CLUSTER OF VILLAGES IN MEGHALAYA IN NORTH-EAST INDIA I. LAND USE

The cropping and yield patterns under different land use systems of three tribal and one non-tribal communities were evaluated at lower elevations of Meghalaya in north-east India. The economic efficiency of the slash and burn agriculture (jhum) done by the Garos was more efficient than that of the Khasis or the Mikirs, partly because of higher energy input for labour and partly because of the crop mixture where the emphasis is on seed and grain and tuber and rhizome crops, by the former. The output and net return from one cropping under valley cultivation as done by the Nepalis was higher than two croppings in a year done by the Garos. Further, yield from valley cultivation of the Nepalis was comparable to the yield from a 10-year jhum cycle of the Garos. Cash crops raised in the kitchen garden of the Mikirs provide higher returns than other agricultural systems. The energy efficiency of jhum was higher (output/input ratio of 14.6 to 42.1). Valley cultivation of the Nepalis had higher energy efficiency than that of others and the former was comparable to the energy efficiency of the kitchen garden of the Mikirs.

## 2. ECOLOGICAL ANALYSIS OF A CLUSTER OF VILLAGES IN MEGHALAYA IN NORTH-EAST INDIA II. ANIMAL HUSBANDRY

The present study is a comparison of the energy and economic efficiencies of different animal husbandry systems (poultry, duck, piggery, goat and cattle) of different village communities of diverse socio-cultural background at Lailad, at lower elevation of Meghalaya in north-eastern region of India. All tribal communities had swine husbandry as an animal husbandry system but not the immigrant Nepalis. The Nepalis and the Mikirs raised cow for milk production while others used them for meat. The output/input patterns varied considerably depending upon the labour and food energy inputs. Where animal husbandry is for meat production, the frequency of slaughter of the animal determined the energy and economic efficiencies. The animal husbandry systems in all the communities are based on recycling of resource from the agricultural system. However, there is scope for lighter recycling of resources and the use of better breeds of animals.

### 3. ECOLOGICAL ANALYSIS OF A CLUSTER OF VILLAGES IN MEGHALAYA IN NORTH-EAST INDIA III. VILLAGE ECOSYSTEM

A cluster of villages of the Garos, the Khasis, the Mikirs and the Nepalis at lower elevations of Meghalaya were analysed for their energy and economic efficiencies. Slash and burn agriculture (jhum) is the chief land use of only the tribals and not of the immigrant Nepalis. While differences were observed in the energy and economic efficiencies of jhum under different jhum cycles of different tribes, a 10-year cycle was found the cut-off point. With variation in valley cultivation of rice depending upon the cultivation practices of the different communities this land use could often be improved with more cropping per year. The kitchen garden of the Mikirs is an efficient cash cropping system and could be transferred to other communities. While the swine husbandry of the tribals are traditionally efficient both this and others such as poultry and cattle have varied economic and energy efficiencies largely depending upon the feed input and slaughtering time interval. Cattle farming of the Nepalis and the plain tribal Mikirs for milking has only limited value for other tribals. The tribals generally have a broad food resource base than the non-tribal Nepalis. Though forest resource base is strong, the fuelwood utilization could be based upon more efficient conversion for cooking energy and tighter resource-recycling within the village ecosystems.

#### 4. ECOLOGICAL ANALYSIS OF A CLUSTER OF VILLAGES IN THE FOOT HILLS OF ARUNACHAL PRADESH IN NORTH-EAST INDIA I. LAND USE

The present study is a comparison of the economic yield and energy efficiency of slash and burn agriculture (jhum) under 5-, 10-, 20-, 30 and 60-year jhum cycles, valley cultivation with one or two croppings of rice and maize, and mustard cultivation on flatlands, as done by Nishis and Karbis in Arunachal Pradesh, in north-east India. Though economic output from jhum under a 60-year cycle was maximal and that under a 5-year cycle minimal, the net return was best under a 10-year cycle because of lesser inputs into it. Though the output from valley cultivation with one cropping as done by the Nishis is comparable to a 10-year jhum cycle in terms of economic returns, the yield is much higher where two croppings are involved as done by the Karbis. Mustard cultivation on flatlands or as kitchen garden gave lower returns. A 10-year jhum cycle was also optimal from an energy efficiency, with an output/input ratio of 36.1 compared to 20.4 only under a 60-year cycle. The energy efficiency under valley cultivation with 16.4 for the first cropping and declined to 5.2 only for the second cropping. The energy efficiency of mustard cultivation on flatlands was 14.2. The significance of these results for optimal land use in the region is discussed.

5. ECOLOGICAL ANALYSIS OF A CLUSTER OF VILLAGES IN THE FOOT HILLS OF ARUNACHAL PRADESH IN NORTH-EAST INDIA II.

ANIMAL HUSBANDRY

The present study is a comparison of the energy and economic efficiencies of different categories of animal husbandry systems, such as poultry, swine husbandry, goat, cattle and mithun of the Nishis, the Karbis, the Kacharis and the Chakmas at Baliyan, village cluster at the foot hills of Arunachal Pradesh in the north-eastern hill region of India. Swine husbandry is practised by all except the Karbis. Cattle reared by the Karbis and the Chakmas is for milk production whereas the other two obtained meat only. The energy and economic efficiencies of the mithun and the cattle raised for meat are reasonably high. Poultry and swine husbandry being largely based on detritus recycling are less dependent upon natural resources, unlike cattle farming that is sustainable only when the forest resource base is high. The Nishis with more elaborate animal husbandry in the village consume more food energy than others through this sub-system though on a per capita basis the export earning of the Chakmas was higher. There is scope for tighter recycling of resources within this sub-system such as through utilization of dung that is otherwise largely wasted. The results obtained through this study have implications in village ecosystem redevelopment.

6. ECOLOGICAL ANALYSIS OF A CLUSTER OF VILLAGES IN THE FOOT  
HILLS OF ARUNACHAL PRADESH IN NORTH-EAST INDIA III.  
VILLAGE ECOSYSTEM

A comparative study of energy and economic efficiencies of different sub-systems (agriculture, animal, forest and domestic) of the Nishis, the Karbis, the Kacharis and the Chakmas of Arunachal Pradesh in north-east India was made. Of these tribes, the Nishis alone had slash and burn agriculture (jhum) as the chief land use. The net economic return under jhum declined with cycle length but the economic and energy efficiencies was optimum under 10-yr cycle. The Karbis obtained maximum output per ha from valley compared to the other tribes because of more intensive cultivation. Energy efficiency of cattle maintained by different tribes and mithun of the Nishis was maximum compared to others. The monetary output/input ratio was also high for mithun. The animal husbandry sub-system of the Nishis was more efficient from energy and economic points of view compared to other communities. The forest sub-system, apart from being linked with agriculture also meets other needs such as fuelwood, food from wild, feed for animals and hut construction materials. The Kacharis export substantial quantities of fuelwood and import food items, since they have no agriculture in the village. The energy efficiency of the domestic sub-system was highest for the Nishis and least for the Karbis. The efficiency of the village ecosystem as a whole was also markedly higher for the Nishis with greater self-sufficiency based upon recycling of resources. The deficiencies in terms of village ecosystem function of these

tribes differ with obvious differences in redevelopmental strategies.

## 7. ETHNOBIOLOGY OF SOME TRIBAL SOCIETIES OF ARUNACHAL PRADESH IN NORTH-EAST INDIA

The ethnobiology of four tribes, namely, the Nishis, the Karbis, the Kacharis and the Chakmas in Arunachal Pradesh in north-east India was investigated. Of the 134 plant species 91 are of food value ; 56% of the food plants are leafy vegetables, others yield fruits, tubers, roots and seed. Nishis and Karbis depend more on wild resources than the other two tribes. A variety of animals collected from the wild are also used. Though the contribution of these plants to the total energy and protein needs of the tribals is limited, they are important particularly either when traditional food sources are in short supply or to meet the needs of relatively poorer sections of the society.

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