
Chapter 2

Contributions of Ethnic Diversity to the Evolution of Diverse Coexisting Mountain Agroecosystems: A Study of the North East Indian Himalayan Region

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Introduction

As in China, in North East India (NE India) there are large numbers of tribal communities with different linguistic, social, economic, and cultural backgrounds living together in the same geographical region. These communities may be mixed with other communities or living very close to them. Thus, in addition to ecological heterogeneity, human diversity plays an important role in agrobiodiversity. The concept of biological conservation is closely interlinked with the sustainable development and food security of these diverse ethnic groups of mountain farmers. This study reviews the state of ethnic and agricultural diversity in North East India and highlights the inter-relationships among different ethnic communities of farmers. The 255,000 sq. km. area of the North East region of India, which comprises just 7.7 per cent of India's total area, is home to a majority of the indigenous people in the country (more than 100 cultures). The seven states in this region are ethnically and culturally very diverse and distinct from the rest of the country. All the tribal populations have mongoloid features and are of Tibeto-Mongoloid origin. The non-tribal populations have caucasoid features and are of Aryan origin. Some communities exhibit features of both groups.

The Traditional System of Land Use and Tenure in NE India

The tribal communities depend on forests for agriculture. Denial of access to this land simply means withdrawing the means of livelihood from the population. Slash and burn agriculture is practised annually on an area of 3,865 sq. km., and a total area of about 443,336 sq. km. is affected by the practice. The region

is rich with variants of slash and burn agriculture on slopes as well as variants in the settled terrace agriculture in the valleys. In traditional tribal society, all the land is owned by the village community or the chief of the tribe (Table 2.1). Normally the village council or the chief of the tribe distributes the available land

Table 2.1: Differences in Land Use and Tenure Systems in North East India	
State	Main features
Arunachal Pradesh	<ol style="list-style-type: none"> 1. The tribal community has customary rights over its <i>Jhum</i> land. 2. Both villages and communities have a right to cultivate land for 5 years. 3. The government only accepts individual ownership of homestead land or land under permanent or semi-permanent cultivation.
Assam Hills	<ol style="list-style-type: none"> 1. There is no private ownership of land except in the Mikir Hills. 2. The tribal community owns the entire land of the village collectively. 3. The resident families possess land according to their capacity for cultivation. 4. The farming families pay a flat tax for using land regardless of the size of the land holding.
Manipur	<ol style="list-style-type: none"> 1. The communal land tenure system operates where hill tribes dominate. 2. A chieftain system of land tenure, in which all land and natural resources are owned by the chief, operates in areas settled by the Kuki Naga tribes. 3. Farming tribes use land and pay a tax (<i>Changseu</i>) which varies from 75 to 125 kg of grain per <i>Jhum</i>. 4. In <i>Thangkhul</i> tribal areas, local village councils own and manage land and resources.
Meghalaya	<ol style="list-style-type: none"> 1. The land tenure system is very complicated and varied. 2. By customary law the wife of the <i>Nokma</i>^a is the sole heiress to the <i>Akhing</i>^b land. 3. The managerial rights are exercised by the <i>Chra</i>^c, and the <i>Nokma</i> cannot sell <i>Akhing</i> land without the consent of the <i>Chra</i>. 4. In areas settled by the Garo tribe, who follow a matrilineal system, the youngest daughter in the family inherits all the property. 5. In the Khasi Hills, land tenure is classified into four groups and follows a matrilineal system. 6. In the Jaintia Hills, land is classified broadly into three groups which are further divided into two to four types depending upon the altitude and value of the land.
Mizoram	<ol style="list-style-type: none"> 1. The traditional Chieftain-based land tenure system was abolished by the State in 1955. 2. At present land property rights are vested with the district councils. The village councils allocate land for shifting cultivation. Settled agriculture and plantation encourage private ownership.
Tripura	<ol style="list-style-type: none"> 1. Individual rights to land are recognised as a result of pressure from migrant populations. 2. The traditional practice of resource management is threatened.
<p>a The <i>Nokma</i> is the constituent head of the <i>Akhing</i> land.</p> <p>b A significant area of unclassified forests in the Garo Hills is called <i>Akhing</i> land and is owned by different lineage groups.</p> <p>c The <i>Chra</i> is the oldest male in the <i>Nokma</i>'s wife's lineage.</p>	

amongst the families for shifting cultivation on the basis of their capacity to farm. During the course of social development and government intervention, a number of different land tenure systems has emerged in the area (Table 2.1). This variation in the systems of tenure also affects the management of agrobiodiversity, and will influence future strategies for managing biodiversity at the community level in this region.

Agro-Ecosystem Diversity

The diverse ethnic groups have different agro-ecosystems and farming systems which maintain a range of agrobiodiversity. The structure and organization of the agroecosystems vary depending upon climatic conditions, vegetation attributes, topographic conditions and landscape processes, the land tenure systems, and the intensity of external impacts. Thus, *Jhum*¹ agriculture, the most dominant land-use system, has a range of variations. Between eight and 35 crops are grown together and harvested sequentially from July to December. The composition of crop species varies considerably depending upon the environmental niche and the ethnic group managing the land. The crops managed by the Garos (a tribe in Meghalaya) are shown in Table 2.2 as an example. Usually both long-term (30 years) and short-

Table 2.2: Crop Diversity in the *Jhum* System Managed by the Garo tribe at Low Elevations in Meghalaya, and the Comparative Productivity of Different Crop species in Different *Jhum* Cycles

Crop Species	Tuber & rhizome crops		
	30-year <i>Jhum</i> cycle	10-year <i>Jhum</i> cycle	5-year <i>Jhum</i> cycle
Staple food crops			
<i>Oryza sativa</i>	1161	378	66
<i>Sesamum indicum</i>	446	541	25
<i>Zea mays</i>	700	397	30
<i>Setaria italica</i>	193	23	9
<i>Phaseolus mungo</i>	10	-	-
<i>Ricinus communis</i>	5	-	-
Vegetable/fruit crops			
<i>Hibiscus sabdariffa</i>	44	139	96
<i>Hibiscus esculentus</i>	-	50	-
<i>Capsicum frutescens</i>	-	1	-
<i>Lagenaria leucantha</i>	140	81	-
<i>Cucurbita maxima</i>	62	-	-
<i>Cucumis sativa</i>	16	-	-
<i>Momordica charantia</i>	-	5	-
<i>Musa sapientum</i>	-	105	488
Tuber & rhizome crops			
<i>Manihot esculenta</i>	339	1352	690
<i>Colocasia antiquorum</i>	260	294	180
<i>Zingiber officinalis</i>	10	-	-

Source: Toky & Ramakrishnan 1981

¹ Local term for shifting (slash and burn) agriculture in the Indian Himalayas

term (5-10 years) *Jhum* cycles are practised. Although both the grain yield and overall economic returns are higher from a long-term *Jhum* cycle, *Jhum* farmers in the Khasi Hills prefer the short-term cycle which gives higher yields of leafy vegetables, and tuber and rhizomatous crops, and, in particular, potatoes, sweet potatoes, *Colocasia antiquorum*, *Capsicum frutescens*, ginger, and cucurbits.

Unlike the *Jhum* system, which is confined to specific sloping land areas, valley agriculture is practised throughout the hills and mountains. It is a sedentary form of wet rice cultivation on flat or terraced lands where the nutrient washout from the hill slopes and forest humus keeps the soil fertile. In some areas three crops of paddy are grown and a range of varieties is maintained by the farming community to enable such adaptation.

Home gardens meet a variety of farmers' requirements and provide cash income to the farming households. Members of the *Mikir* tribe are migrants. They cultivate areca nut (*Areca catechu*), betel leaf (*Piper betel*), black pepper (*Piper nigrum*), and banana (*Musa* spp.) in plots of 0.5-1.5 ha per farming household. A legume tree (*Erythrina stricta*) is grown as support for climbing perennials such as betel leaf, pepper, yam, etc. Betel leaf and banana are harvested throughout the year to provide a continuous source of income. The economic returns from home gardens are very high in comparison to those from the *Jhum* system.

The home gardens of members of the *Khasi* tribe at Tynriang are between 1.5 and 2 ha and are more complex and diverse than those of the *Mikir*. New species are introduced into the system to diversify both the use of resources and sources of income. Bay leaf (*Cinnamomum obtusifolium*), betel nut, orange (*Citrus sinensis*), and Jack fruit (*Artocarpus heterophyllus*) tree seedlings are raised in nurseries. Four-year old seedlings are transplanted into the home garden plots in May before the onset of the monsoon. Betel leaf and black pepper vines are introduced two years later. Betel nut, citrus, and bay leaf start to produce fruit after six years (2 years after transplanting) and need replanting after a further seven to 15 years when yields start to decline. Banana, pineapple (*Ananas comosus*), and sweet potato (*Ipomoea batatas*) are cultivated before the tree plantations mature and start bearing fruit.

Traditionally, less labour intensive crops, such as broom grass (*Thysanolaena maxima*), bamboo (*Dendroclamus hamiltonii*), and thatch grass (*Imperata cylindrica*), were grown as cash crops. Harvesting of broom grass takes place once a year for seven years after which the area is replanted with fresh rhizomes to maintain yields. Coffee (*Coffea arabica*), tea (*Camellia sinensis*), and rubber have been introduced recently as cash crops through government intervention. Ginger (*Zingiber officinale*) and pineapple are two other traditional cash crops found in the system.

Agrobiodiversity in Ethnically Diverse Villages

Ethnic diversity contributes greatly to the agrobiodiversity in NE India. When considering the conservation of agrobiodiversity, it is important to understand the ethnic diversity and the environmental context of the sociocultural values of the traditional indigenous communities, as well as their economic development. Inaccessibility in the mountains over long periods has forced the evolution of diverse agro-ecosystems as a risk-avoidance practice, this has resulted in locally-specific agricultural opportunities and locally specific constraints. Most of these approaches are aimed at achieving food security on a local scale. Land and natural resources are considered as community property. Interestingly, the tendency has been one of encouraging optimum utilisation of agrobiodiversity within the local system of knowledge.

There are more than a hundred ethnic groups living in the North East Indian Himalayan region, including Tibetan refugees and Nepali immigrants. But the way in which these ethnic cultures manage agricultural biodiversity is poorly understood.

Between 79 and 94 per cent of the ethnic tribal farming communities in the east Indian Himalayas live in Arunachal, the Assam Hills, Meghalaya, Tripura, Manipur, Mizoram and Nagaland. Arunachal is the most remote and sparsely populated state but has as many as sixteen different ethnic communities and seven of the most endangered ones are given in Table 2.3. The other states each have between three and nine different ethnic communities. These ethnic farming groups have been identified as among the most deprived and least understood groups of people in India. It is estimated that the total population of the different tribal communities in NE India ranges from 108 to 543,615 (Table 2.4).

There are seven ethnic farming communities with populations of less than 2,500. Three of these (the *Aimol* in Manipur, *Ralte* in Mizoram, and *Khoira* in Manipur), have less than 500 individuals left and are recognised as endangered

Table 2.3: Tribal Communities of the North East Indian Himalayas with Populations of Less than 5,000 (endangered)

Ethnicity	Ethnicity
Arunachal Pradesh	Mizoram
Aka	Ralte
Bongro	
Khamti	Manipur
Mishing	Aimol
Sherdukpen	Chiru
Singpho	Clothe
Sulung	Khoira

Table 2.4: Diversity of Cultures and Their Proportion in the States of the North East Indian Himalayas

Culture	State	Population (1991 Census)	
Adi	Arunachal Pradesh	99,372	
Aka	"	2,347	Threatened
Apatani	"	12,888	
Bongro	"	1,085	
Hill Miri	"	8,174	
Khamti	"	4,078	
Miji	"	3,549	
Mishing	"	3,359	
Monpa	"	28,209	
Nishi	"	80,325	
Nocte	"	23,165	
Sherdukpen	"	1,639	Threatened
Singpho	"	1,567	Threatened
Sulung	"	4,250	
Tagin	"	20,377	
Wancho	"	28,650	
Garos	Meghalaya	411,532	
Hajongs	"	23,987	
Jaintias	"	82,493	
Khasis	"	384,006	
Boro-Kacharis	Assam	543,615	
Chutiyas	"	9,103	
Dimasas	"	37,900	
Karbis	"	17,360	
Lalungs	"	10,650	
Mechs	"	12,919	
Mishings	"	180,684	
Aimols	Manipur	108	Nearly extinct
Anals	"	6,592	
Chirus	"	3,590	
Chothes	"	1,117	Threatened
Hamars	"	38,207	
Kabuis	"	17,360	
Khoiras	"	406	Nearly extinct
Marams	"	19,968	
Tangkhus	"	58,167	
Mizos	Mizoram	270,312	
Pawi-Lakher	"	21,427	
Ralte	"	170	Nearly extinct
Chackmas	Tripura	68,711	
Jamatias	"	22,446	
Maghs	"	12,378	
Riangs	"	74,931	
Tripuris	"	268,948	
Mariangs	"	9,710	

Table 2.4: Diversity of Cultures and Their Proportion in the States of the North East Indian Himalayas (Cont'd)

Culture	State	Population (1991 Census)	
<i>Angami</i>	Nagaland	43,569	
<i>Ao</i>	"	62,275	
<i>Chang</i>	"	15,816	
<i>Konyak</i>	"	72,338	
<i>Lohta</i>	"	36,949	
<i>Phom</i>	"	18,017	
<i>Rengma</i>	"	8,578	
<i>Sema</i>	"	65,227	

ethnic groups (tribes) (Table 2.3). The diverse ethnic groups have various farming systems with a mix of agricultural crops. They each have unique features in their systems for agriculture, agrobiodiversity, sustainable land use, and land tenure ownership. If these groups vanish their indigenous knowledge and the agrobiodiversity they maintain will be lost with them.

The types of agrobiodiversity practised by the migrants from the mainstream communities of India are very different from those of the indigenous tribes. For example, the local communities in Meghalaya, such as the *Garo* and *Khasi*, practise *Jhum* (slash and burn) agriculture in communities and maintain a mixture of at least 10 to 13 different crops, whereas migrants, such as the *Mikir* and *Nepali*, concentrate on valley agriculture and do not carry out shifting cultivation. The migrants use animals for ploughing and manure and generate income through the sale of dairy products. Agricultural labour is a family, not a community, concern and only four to seven different crop species are cultivated.

In the *Jhum* system, farmers burn *Tapio* plant to produce a salt which is consumed by local tribal farming communities as a substitute for common salt. This practice is still important in those mountain areas where accessibility is a big problem. It is one example of the unique knowledge evolved by these ethnic farmers as a result of their isolation.

The main issue is how to maintain the benefits of management of agricultural biodiversity by ethnic farming groups. Ethnic diversity has to be understood in greater depth to discover why some of the ethnic groups maintain one specific type of biodiversity, whereas others in the same location value different resources. It would be useful to record the indigenous knowledge of marginalised ethnic groups on the management of agrobiodiversity, especially that of tribes which are endangered. At present these groups are affected by the direct and indirect impacts of modernisation such as transportation, communication, education, government policy, and, last but not least, an increasing population which has put increased pressure on natural resources. The exploitation of natural resources - especially

forest and farmland - has increased in an unbalanced way. Establishment of protected areas and biosphere reserves in forests under government control has reduced the available area for shifting agriculture and led to a shortening of the cultivation cycle. Promotion of cash crop cultivation, such as rubber, coffee, and tea, among these tribal farmers has encouraged the development of individual rights to land and inequity. Promotion of settled terraced farming with full financial support from the government has led to severe soil erosion in a high rainfall area on the one hand and to social disruption on the other. The supply of raw material from the forests to industries at subsidised prices, but denial of access to local ethnic communities to the same government forests, has led to a feeling of alienation in local communities, and this is expressed in the socio-political problems prevalent in this region.

Thus, biodiversity in the region is threatened largely because of external rather than internal factors, a view the mainstream conservation and development agencies find hard to share. There is certainly a need to improve the economic condition of these diverse ethnic (tribal) farming communities and to integrate them with the outside world and development. But this goal could be better achieved by capitalising on the rich agrobiodiversity and traditional knowledge which the communities have, rather than forcing replacements and substitution of cropping systems and radical reforms in land use.

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