

## Settlements and Land-Use Patterns in the Lepcha Reserve-Dzongu Zone in the Sikkim Himalaya, India

Veena Bhasin

*Department of Anthropology, University of Delhi, Delhi 110 007, India*

**KEYWORDS** Complex Ecosystem. Cultural Heritage. Scheduled Tribe. Reserved Area. Farming Systems

**ABSTRACT** With only 540,000 inhabitants, Sikkim is the least populated state in India. Sikkim is a multi-linguistic, multi-religious and multi-ethnic state. Historic events have played their part in creating such a mosaic. This paper was written in 1990 as a part of the study carried out under the Research project entitled "Impact of Human Activities on the ecosystem and vice-versa with reference to the Sikkim Himalayas" under MAB (Man and the Biosphere) Programme, UNESCO. The cultural heritage of Lepchas of Sikkim has been in the past and now a centre of attraction for several anthropological and ethno-medical studies

### INTRODUCTION

Till 1982, few Anthropological studies had been carried out in Sikkim after its integration in 1975 with India. The Lepcha were introduced to ethnology by early travelers and officials. In the middle of the nineteenth century Dr. Archibald Campbell, a medical superintendent was the first to publish a short list of Lepcha words about area through a series of articles (1840: 49, 74). Around this time Christian missionaries took up work among the Lepchas. They established schools, and translated some of the gospels into Lepcha. In 1876, Mainwaring published a grammar of Lepcha. A Lepcha dictionary was edited and published in 1898 by Albert Grünwedel after Mainwaring's death. Other important studies that appeared in the late nineteenth and throughout the twentieth century were those by White (1910), Stocks (1925, 1926), Biswas (1935), Gorar (1938), Morris (1938) and Hermanns (1954). The most important anthropological study of the Lepchas until today is the work of Halfdan Siiger (1955-1956). The Austrian Tibetologist René de Nebesky-Wojkowitz (1952b, 1952c, 1953c, 1954, 1956, and 1957) published extensively on the religion of the Lepchas.

This paper was written in 1990 as a part of the study carried out under the Research project entitled "Impact of Human Activities on the ecosystem and vice-versa with reference to the Sikkim Himalayas" under MAB (Man and the Biosphere) Programme, UNESCO (Bhasin et al. 1984). The cultural heritage of Lepchas of Sikkim has been in the past and even now a centre of attraction for several anthropological and ethno-medical studies (Arora 2006, 2007, 2008;

Bentley 2007; Bhasin 1989, 1990, 2007; Doma 2010; Foning 1972, 1979, 1980, 1987; Government of Sikkim 1982; Gowloong 1990, 1995, 2001; Jana and Chanhnan 2000; Jha and Jha 2004, 2005; Kohli 2010; Kerry 2007, 2008, 2009, 2010 a, b; Pradhan and Badola 2008; Roy 2001, 2005, 2007 b, 2007c).

The Lepchas of Dzongu are known for their retention of rich cultural heritage, and also because of the on-going cultural and economic changes brought in by the process of development. Sikkim is one of the ten Special Category States, which receives central assistance on preferential condition owing to their strategic location and special requirements. Since 1999, it is a member of North-East Council and as such its development has been accorded a high priority by the Government of India. Recently, Dzongu has been in news because of the Lepcha protest against the construction of hydroelectric project on Teesta River.

### Sikkim

With only 540,000 inhabitants, Sikkim is the least populated state in India. Sikkim is a multi-linguistic, multi-religious and multi-ethnic state. Historic events have played their part in creating such a mosaic. The Lepchas are considered the original inhabitants of Sikkim and Darjeeling Hills (Darjeeling hills were part of Sikkim and were annexed by British India in 1835). In the seventeenth century (1641), they came in contact with the Tibetan Bhutias, resulting in the Tibetisation of the Lepchas. British contact (1884-85) encouraged Nepali (a generic term that include many castes and tribes) immigration as

labour was required for construction of roads and extension of agriculture in the 19<sup>th</sup> and early 20<sup>th</sup> century. The ethnic scene of Sikkim changed rapidly with the multiplication of the number of Nepalese. According to the 1891 gazetteer of Sikkim, the Nepali constituted 56 percent, the Lepchas 19 percent and the Bhutias 16 percent of the population. More than hundred years later, the Nepalis have grown to 75 percent; the Lepchas have declined to 9 percent while the Bhutia population percentage remained more or less the same. The impact of this migration has been great and has social and cultural ramifications. Over time, in Sikkim, the relationship between the established Buddhist Sikkimese population and the Nepali Hindus has led to rivalry and confrontation culminating in the dethronement of the Buddhist monarch and the incorporation of Sikkim into the Republic of India. In June 1978, the Lepchas, Bhutias, Sherpas and Doptapas were notified as Scheduled Tribes. The Kami, Damai, Lohar, Majhi and Sarki have been classified as Scheduled Castes.

Except for North Sikkim, wherein certain groups of Lepchas and Bhutias are territorially bound, Bhutia, Lepcha, and Nepali groups belonging to specific religions, races and languages are found scattered in various parts of Sikkim. All these groups are characterised by specific ecological adaptations, as well as by type social organisation of the region. Most groups are culturally adapted to certain altitudes where they live which have been a barrier to an overall population mixture. North Sikkim is more tradition fervent than the rest of Sikkim.

The inhabitants of the north Sikkim have been leading a sheltered life because of geographical isolation as well as official restriction of settling of outsiders in Dzongu reserve and Lachung and Lachen. The rulers of Sikkim were conscious all through to protect the interests of the indigenous people and to see that they were not exploited by the outsiders. The first example of its kind is available from a notice published on 02.01.1897, where it was mentioned that no Bhutia and Lepcha are to be allowed to sell or sublet any of the land without express sanction of the council. A Lepcha reserve in Dzongu zone, which was a private estate of the queen, was created to preserve their social homogeneity since the 1960's when Sikkim was still a kingdom ruled by Chogyal Palden Thondup Namgyal. Even if no reserve like Lepchas was created for Bhutias

of Lachung and Lachen, they did have some degree of seclusion reinforced by political and ecological factors. The residents of these areas have been leading a secluded life and have continued to live and function in a traditional life style in accordance with their respective ethics and religious life style. In harsh and extreme climates and terrain, people always have had a symbiotic relationship with nature (For details see Bhasin 1989).

### DZONGU- THE RESERVED AREA

Dzongu, the special reserved area for the Lepchas, comprising 15,846 hectares is spread on a hilly terrain in a dense forest. It is roughly triangular in shape, bounded on the south-east by the river Teesta, on the north-east by the Talung river and on the third side by the mountains south of Kanchenjunga. It is the world's 3<sup>rd</sup> highest (and India's highest) peak. The Lepchas call Mt. Kanchenjunga (8,598 m) 'Kingsoom Zaongboo Choo' ('bright auspicious forehead peak'), and is the house of five treasures. It borders the Kanchenjunga Biosphere Reserve (KBR) at north. Kanchenjunga Biosphere Reserve (KBR) was known earlier as National Park since 1977 covering 1784 km<sup>2</sup>. It is now increased to 2619.92 km<sup>2</sup> and declared as biosphere reserve in 2000 (7 February) to conserve the unique biodiversity of the area. The Lepchas of Dzongu valley have traditional association with the reserve for their resources and religious affinity, and currently promoted eco-tourism by the state government.

Dzongu covers approximately 78 km<sup>2</sup> geographical areas extending between 27°28' – 27°38' N lat. and 88°23' – 88°38' E long (as judged from Google Earth) along the 700 m to 6000 m amsl altitude. Dzongu further extends from Sheep-Gyer in the east to Sakyong-Pentong village in the west and Kishong Cho Lake in north to Lum village in the south (Fig. 1). The area is characterised by diverse snowy mountainous landscape with steep and narrow valleys and gorges with well drained flanking slopes. Owing to dense forest cover, the area experiences showers almost throughout the year. The area represents three climatic zones viz. sub-tropical, temperate and alpine. Further, the area may be divided into two parts, viz. Upper Dzongu: the western side of which can be entered through a bridge at Sankalang over river Teesta and the

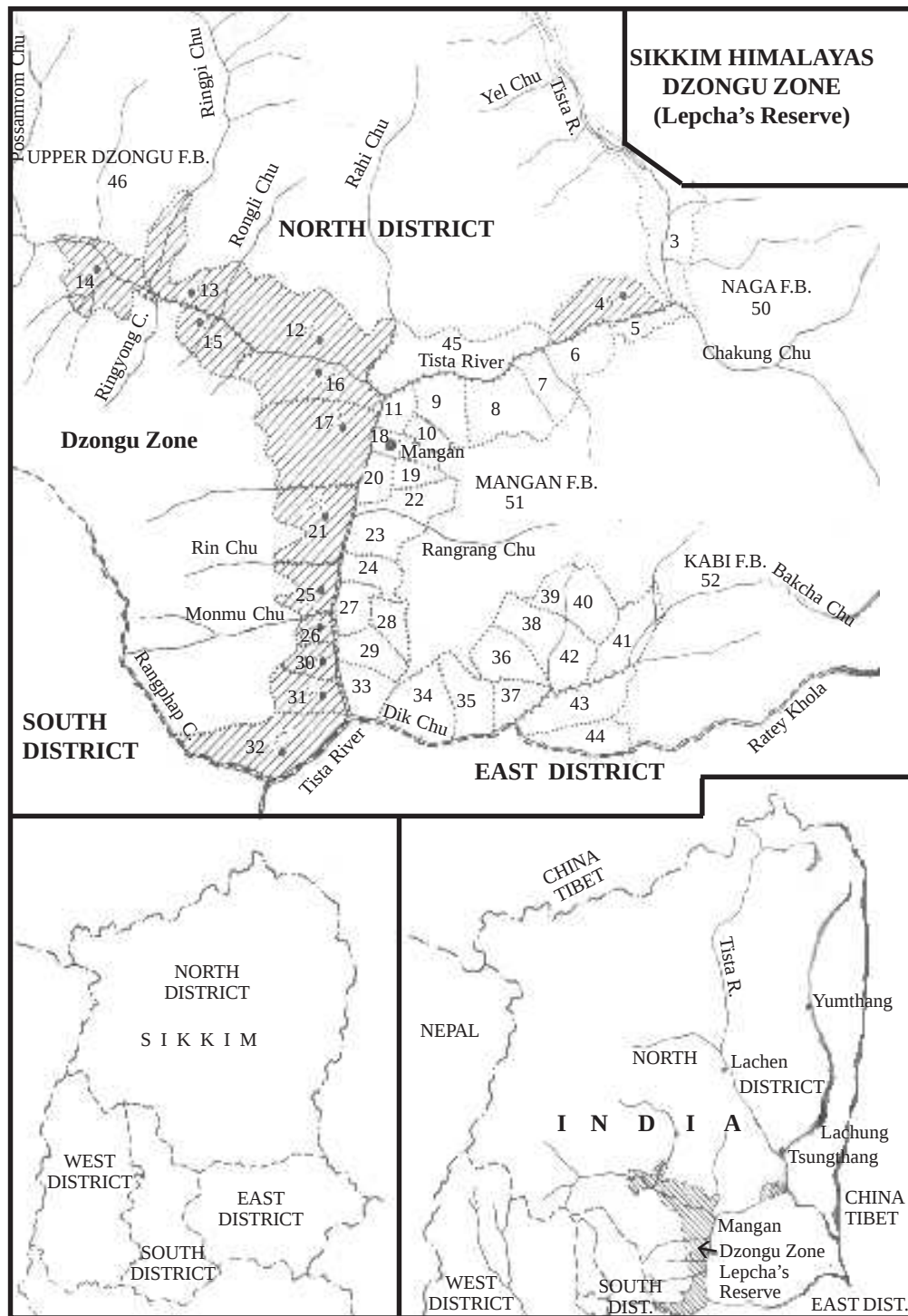


Fig. 1. Dzongu Zone (Lepcha's Reserve)

eastern side is connected by road at Theng via Toong prior to reaching Chungthang; and the Lower Dzongu: which can also be entered through a bridge at Sankalang in the eastern side and a bridge at Phodang near Dikchu bazaar (market) in the western side over the same river. As per 2004 official list of voters, it has a total population of approximately 4513 persons (*ca.* 10% of total Lepcha population of Sikkim), spread over 38 villages. The whole area is mountainous. Rivers are deep and the average altitude of the hills is about 4000 m. The hill slopes are steep and level pieces of land are rare. As the river valleys are low, hot, and steamy, the *busties* (village) cannot be placed by the rivers because of flash floods and un-healthy environment. The settlements and agricultural lands are located on a relatively narrow band above the two rivers between 1000 m. and 2300m above sea level. Beyond the cultivable land is the forest which extends to snow line. The geographical position of Dzongu zone has accentuated its isolation from the rest of Sikkim.

### **Climate**

Owning to its proximity to Kanchenjunga, the Dzongu zone lies in the direct path of the summer monsoon and the climate of the valley is extremely wet, the annual rainfall being approximately 3500mm. Though it rains throughout the year, it receives high rainfall between June and September. As the slopes are steep, the ground dries up quickly. Humidity is high and the temperature varies according to the altitude. It snows above 2500 m. Weather is generally cool except during July and August. There is a marked difference between day and night temperatures. Mean temperature in winter is 19 and in summer 30°C. There is a difference in humidity and temperature in the portions of Dzongu facing Teesta and those that face the Talung River. The land on the Talung side of Dzongu is more precipitous and rocky and there is less cultivable land.

### **Geology**

Dzongu mountains are geologically young, precipitous and rocky. The valleys are steep and narrow, the streams and rivers are swift and become rushing torrents during rainy season. The Genesis is not so micaceous. Muscovite is rare or entirely absent. Scori and Horn are the chief

minerals. Intrusive granite rocks occur as dykes and sills. In some of them, Muscovite is well developed. The characteristic soil is brown clay, generally poor, shallow and acidic.

### **Sources of Water**

The water supply in Dzongu valley is ample, supplied by three mountain streams, the Monmuchu, Rati Chu and Tongli Chu. These are perennial streams fed by melting snow of the upper hill forests as well as by monsoon rains, and they flow into the Teesta River. There are also stagnant water bodies abundant with fish. There is great potential for minor and macro irrigation projects, but it has not been exploited because of hilly terrain and frequent landslides. Ground water resources cannot be exploited as most of the precipitation results in surface runoff and there is little percolation. Surface runoff was abundant but most streams flew through deep gorges, making it difficult to erect dams. The only source of irrigation was the spring water during the monsoon season. Irrigation was mostly confined to paddy, cardamom and vegetable fields. The water from springs collects in very small rivulets (*khosla*) and large streams (*khola*). However, at places where streams (*Jhora, Kholsa, and Khola*) had a high head, farmers had diverted the water to their paddy terraces. Once the water reached the bottom of the hill, it was not utilised for irrigation because the pumping back was impractical.

Excessive annual rainfall helps in vegetation growth. The hill sides are clothed with dense vegetation—forest as well as undergrowth. In the rainy season, the whole area becomes unhealthy and feverish. Consequently habitation occurred on hill top and mountain slopes.

### **Land-Use in Dzongu**

Various factors like steep slopes, rock crops and shallow soil restricted land use.

### **Land-use Statistics (1981-83)**

The figures in Table 1 show that 58.4 percent area was under forest. Area under cardamom cultivation can also be considered as forest, because cardamom cultivation was always under shady trees. Irrigated fields form only 2.3 percent, while rest 18.4 percent were dry fields.

**Table 1: Landuse in Dzongu**

| S. No. | Landuse           | Area<br>(in Hectares) | Percent |
|--------|-------------------|-----------------------|---------|
| 1      | Irrigated fields  | 360.8                 | 2.3     |
| 2      | Dry fields        | 2909.9                | 18.4    |
| 3      | Fallow (Banjo)    | 129.7                 | 0.8     |
| 4      | Cardamum          | 317.9                 | 20.1    |
| 5      | <i>Khas</i>       |                       |         |
|        | (1) Culturable    | 480.1                 | 3.0     |
|        | (2) Unculturable  | 8636.1                | 54.5    |
| 6      | <i>Gorucharan</i> |                       |         |
|        | (1) Culturable    | 144.8                 | 0.9     |
|        | (2) Unculturable  | 7.4                   | —       |

### Vegetation

The Dzongu area was endowed with luxuriant vegetation growth, including not only timber but also many varieties of bamboo, food plants, fire wood, fodder, minor forest produce, and medicinal plants. Forest occupied 9267.22 ha, out of which *gocharan* or *gorucharan* (Communally owned grazing land) forest was 152.30 ha and *khas* (Communal forest) forest 9116.92 ha including both cultivable and uncultivable (cultivable 480.11 ha) land. The government had absolute right to control and manage these lands, subjected to the rights of the Lepchas. The rights consisted of grazing, minor forest produce and in cases, timber for making houses and roadside plantations. In the *gocharan* areas, there was no grass but a good tree cover; the reverse was the case in *khas* lands or village land where people have the right to cut the trees. Here trees had been completely removed but some sort of grass cover remained.

Dzongu forest was wet, mixed, and of evergreen type consisting of mixed hard wood forests-Laurel Forest (1830-2130m), Buk Oak Forest (2130-2440m), High level Oak and Rhododendron Forest (2440-2740m). The commonest species in this zone were *Jaman* (*Eugenia operculata*, *remosissima* and *farmosa*), *panisaf*, *Angare*, *Chilaune*, *Bhalukanth*. And *Tarsing*. Undergrowth consisted of evergreen herbs and shrubs of *Rubiaceae* predominated. Climbers and numerous shrubs were common. Underwood consisted of *Symplocos theifolia*, *Arundinabium* spp., *Rubus* spp.; *Stronilanth vibrarum erubescens* was typical of wasteland in this zone. Natural growth of *Larch* and *Utis* is plentiful. Rhododendrons of various heights were abundant in the region, becoming gradually stunted with the altitude.

In the waste lands and forest cleared by fire, the following vegetation occurred—*Peptanthe sikkamensis*, *Rosa sevicea*, *Babberts petshtdzia*. There were extensive areas of bamboo on the main outer ridges and some were also grown in individually- owned groves in the settlement area. Bamboo is the poor man's timber, used as rafters, scaffolding, roofing walling, flooring, matting and basket-making. Tender bamboo shoots were eaten and when the bamboo clumps flowered in 20-40 years (after which they die), the seed was collected and eaten as grain. The fauna include goat, pigs, musk, deer, cheetal, bears, spotted leopards, lions, gorul, rabbit, wolf, and fox. A variety of birds were found including native wild and domesticated chickens. The streams abound in fish.

At the time of field work (1982-83), the Dzongu zone was not well connected to the district headquarters Mangan on the North Sikkim highway. Though a poorly maintained jeep road connected Dzongu area to Mangan but it was often subjected to landslides and there were no other means of transportation between Mangan and Dzongu. Road was valuable to officials only and was of little importance to the local inhabitant. Heavy summer rains caused landslides and the collapse of weak sections would close the road for many months each year. The Lepchas used to walk all the way to Mangan to buy essential commodities and to sell cardamom. The Dzongu zone had not benefitted from the development taking place in North Sikkim, where military settlements had led to the development of a road and communications infrastructure. The inhabitants of Dzongu practiced slash-and-burn agriculture (though restricted in areas of upper Dzongu) and grew dry rice, buckwheat, millet, and barley following a seven-year rotation cycle. They also practiced sedentary cultivation of wet rice, maize, wheat and vegetables. Cardamom as a cash crop was introduced at the beginning of this century. Though Dzongu was a reserve area, the isolation barriers had started breaking as Government-sponsored programmes had started in the area.

Although agriculture was the mainstay of the Lepchas, large tracts of the terrain were too steep to allow terrace cultivation of grain crops, so there the major produce was cardamom which could comfortably take root and flourish in sloped inclines. Agricultural land was found between 300 and 3000 m, but most laid below

1800m. Communal land in the vicinity of *busties* was usually untitled, denuded hill slope. The Lepchas had traditional rights in forests where they grazed their animals and collected (without cutting) firewood and fodder. The agricultural land of each family was divided into several fields at different altitudes. The *sing* (House Garden) was in front of house, the wet paddy fields laid below and temporary dry fields above. There was common land round the village where pasturing and gathering of minor forest products was permitted. The dry fields at the upper level were cultivated every seven years. The cardamom fields were under large trees. The burial or cremation grounds were situated some distance above. As family fields were scattered, temporary bamboo matted field-houses were also built as the Lepchas were expert in their construction from materials available in the vicinity (Bhasin 1989).

Dzongu ground is rocky and must be cleared before preparing a new field. It requires abundant supply of labour with an organisational structure. The small saplings must be cut and rocks dug out. Men as well as women participate in the initial clearing. Work teams (*lobo*) are invited and are paid in food and drink. These work teams consists of family units, neighbours, *ing-zong* (social friends) and this labour is reciprocated. Secondary growth forests are preferred as clearing of the primary forests requires much more man-power for a given area and demands a longer drying period between burning and clearing operations. Usually buck-wheat is cultivated after deforestation.

### Population and Settlement Pattern

Dzongu zone with an area of 15,846 ha was sparsely populated with a total population of 4332 (1981). Residents of this area were Lepchas and seasonal Nepali labourers. Lepchas are the original inhabitants of the state of Sikkim (Fig. 1). Bhutias from Tibet and Bhutan arrived later. Lepchas were nomadic hunters and food gatherers. They practised shifting cultivation with primitive technology. Bhutias were powerful in every respect and established a monarchical rule. They built *gompas* (monasteries) and converted the animistic, nature worshipping Lepchas to Lamaistic Buddhists. The Bhutias acquired the best land and cool hills, thus driving the Lepchas to seek new homes in lower, humid valleys. Dur-

ing British rule, Nepali immigration was encouraged as labour was needed for construction of roads and the extension of agriculture and therefore the ethnic scene of Sikkim changed rapidly. By 1981, the Nepalese had multiplied to comprise 51 per cent of the total population, reducing Lepchas and Bhutias to nineteen and sixteen per cent respectively. The Lepchas were lax about marriage rules, thus were losing their identity. The *Maharaja* (King) of Sikkim converted one of his private estates – Dzongu –into a Lepcha reserve, where only pure blooded Lepchas could live and own land. This was an inaccessible tract of land with a scanty population. The entire hill area was under forest and its people subsisted by collecting natural forest produce, such as roots, tubers, leaves, grass, fruits, and herbs. The food-gathering was supplemented with shifting cultivation, where large tracts of land were cleared by burning the forest and growing crops with simple implements. Each plot was used for one or two successive years, and then abandoned. The main aim of the Lepcha reserve was to preserve the social homogeneity. However this served only one purpose-the use of land for Lepchas exclusively-but otherwise their culture was being constantly modified by external factors. From the primitive stage of cultivation, Lepchas developed agriculture, replacing shifting cultivation by more efficient methods of terracing, ploughing and irrigating lands. Although in Dzongu, Lepchas were isolated, they visited neighboring markets, sold their products to local merchants, and bought clothes, utensils and other household items. Through contact with outsiders, the elements of change and innovations were imported and adopted. But the process of change was rather slow.

Tentatively the local people divide Dzongu into Upper and Lower Dzongu. The terms are misnomers as the difference is not one of altitude, for they are located on both banks of a tributary to Teesta which runs through the area. The area extending to Barfok (Location code No. 21) forms the boundary of Upper Dzongu and from Hee-gyathang (L.C.No. 25) starts Lower Dzongu (Fig. 2). Each revenue block was divided into a number of *busties* (villages), but sometimes only one or a couple of houses formed a *busti*. Most *busties* were scattered on hill slopes with houses far removed from each other by vast expanses of agricultural land. Only at a few places did one find four or five houses in a cluster.

Although agriculture was the mainstay of the Lepchas, large tracts of the terrain were too steep to allow terrace cultivation of grain crops, so there the major produce was cardamom which could comfortably take root and flourish in sloped inclines. Agricultural land was found between 300 and 3000 m, but most laid below 1800m. Communal land in the vicinity of *busties* was usually untitled, denuded hill slope. The Lepchas had traditional rights in forests where they grazed their animals and collected (without cutting) firewood and fodder. The agricultural land of each family was divided into several fields at different altitudes. The *sing* (House Garden) was in front of house, the wet paddy fields laid below and temporary dry fields above. There was common land round the village where pasturing and gathering of minor forest products was permitted. The dry fields at the upper level were cultivated every seven years. The cardamom fields were under large trees. The burial or cremation grounds were situated some distance above. As family fields were scattered temporary bamboo matted field-houses were also built as the Lepchas were expert in their construction from materials available in the vicinity (Bhasin 1989).

Dzongu ground is rocky and must be cleared before preparing a new field. It requires abundant supply of labour with an organisational structure. The small saplings must be cut and rocks dug out. Men as well as women participate in the initial clearing. Work teams (*lobo*) are invited and are paid in food and drink. These work teams consists of family units, neighbours, *ing-zong* (social friends) and this labour is reciprocated. Secondary growth forests are preferred as clearing of the primary forests requires much more man-power for a given area and demands a longer drying period between burning and clearing operations. Usually buck-wheat is cultivated after deforestation.

### Lepchas of Dzongu

The Lepchas are considered the original inhabitants of the state. They call themselves “*Rong*” which means “ravine folk” or “*mutanchi*”, but are referred to by others as the Lepchas. The Lepchas have been greatly influenced by the forces from different directions. Lepchas belong to the Mongolian racial stock. The Lepchas refer to their language as ‘*Rong-arung*’ or

‘*Rongring*’ belonging to Tibeto-Kanauri group included in Tibeto-Burman group of languages. The Lepcha language has its own script supposed to be invented by the Lepcha scholar Thakung Men Salong during 17<sup>th</sup> century.

The traditional cloths of the Lepchas are woven in exquisite colour combinations. Men’s dress is called *thokro-dum* and the female’s dress is called *dumdyam* or *dumvum*. There is an obvious contradiction between *thokro-dum* and *dumvum*. One essential man’s wear making a complete *thokro-dum* is a white pyjama that reaches only up to the calf and resembles a karate player’s outfit. The short pyjama suggests that the Lepchas might have originated or lived long in a marshy land. However, the female attire negates this suggestion. *Dumvum* is an ankle length flowing dress suggesting dry land inhabitants. The male dress is almost always coarse, sturdy and durable fitting to the rigours of life in the open field and forest. The female dress is made of softer material and worn in the manner that is graceful.

Once the sole inhabitants of Sikkim hills, they managed their environment for making a living mainly by collection of roots, tubers, leaves, fruits, grasses, fishing, hunting and primitive shifting cultivation with simple technology. Lepchas were skilled in bamboo crafts and produced a wide variety of aesthetically beautiful baskets and other things of daily use. The Lepchas were expert in making a frame in the majority of constructions, such as houses and bridges. The Lepchas seem to have gained marvel over the technical use of Bamboo, ranging from articles of routine requirement to artifacts, water distribution network, musical instruments etc. Their knowledge of poisonous and non-poisonous plants, snakes and information on other flora and fauna was exceptional. But, with modernity making steady inroads into the Lepcha way of life, such age-old wisdom were increasingly cruising away into the sphere of myths and legends. They were animists and worshipped natural spirits of land, water and trees. The Lepchas were organised by one *Turve*, who was eventually given the title of *Panu* or king. With the death of the last *Panu*, the Lepcha kingship came to an end. Gradually, local chiefs were elected, who also performed the duties of religious priests. In the seventeenth century (1641), they came in contact with Tibetans (Bhutia), who came first as monks and traders, but were soon

able to dominate these shy and peace loving people who avoided aggression in any form. With no strong organisation and cultural tradition behind them, they were ill prepared for outside contact. A monarchy was established and soon these nature worshipping people were converted to Lamaistic form of Buddhism.

Lepcha society is divided into named *putso* (clan). Lepcha clans claim to have mythical connections with particular mountain peaks which they worship as their deity. Thus, the mountains Simvo, Siniolchu and Kanchenjunga find prominence in the Lepcha culture. They use patrilineal descent to determine inheritance and group membership. However, for strengthening social relations, alliances and networks of support depend on matrilineal kins. Although the household is the smallest unit, there is mutual-aid group-*lobo*, based on reciprocity, consisting of neighbours and/or kinsmen, mostly on residential and customary lines to help co-villagers in need. According to Morris (1938), the Lepchas lived in joint family system, in which while parents were working in fields and home, the children could lead a carefree life. However, the things were changing in the area in 1982 with the opening of schools. The Lepcha children were being sent to school which they resented as they were not used to disciplined life. They practice monogamy, polygyny and polyandry forms of marriage and patrilocal residence (For details see Bhasin 1989).

### The Study Area

The revenue blocks investigated for the study were Hee-gyathang and Gnon Samdong in Lower Dzongu. Altitude ranges from 1500 to 2500 m. Hee-gyathang was bordered on the north by Ringchu and on east by the Teesta River. It was separated from the Gnon-Samdong by Monmuchu. Gnon-Samdong had a block status as far as land use and survey departments were concerned under separate *Mandal* but they were administered at the Hee-gyathang *Panchayat* (block level administrative unit).

Hee-gyathang with a total area of 1922 ha and Gnon-Samdong with an area of 692 ha were inhabited by 756 and 174 Lepchas respectively in 1982<sup>2</sup>. Other residents of the area were unauthorised tenants on an *adhia* (share-croppers) basis. The Hee-gyathang revenue block was the biggest in the whole reserve with 220 household, out of which 108 were of labourers (other than

Lepchas). It has a small lake, considered to be sacred by the Lepchas.

Hee-gyathang block was composed of forty eight *busties*, out of which 16 were inhabited (Fig. 2). The household break up was as follows:- Heegyathang-18; Sudur-25; Breeng-18; Ravong and Manthoo-11; Sungbu-2; Thingkyung; Namprikdangng-2; Manthyong-10; Lyangdong-4; Singrik-2; Bling Bong-7; Tartong-3; Kavar-2; Payangdep-1 (Fig. 3). The Gaon Samdong revenue block had two *busties*, Gnon had 8 households and Samdong had 10 households (Fig. 4). For the sake of convenience we called these settlements *busties*, but in fact they had no geographical unity. The houses were either isolated in fields and forests, or clustered in small groups of three or four, but never adjoining. Lepchas called these settlements *kyong*. When three or four houses were grouped, they were usually given a name for revenue purposes. This grouping did not necessarily correspond to any emotional or kinship ties among those neighbours. The choice of house site and circumstance of inheritance were responsible for these grouping. Environmental constraints also hindered the habitation of some *busties*. Occasionally, houses which stood vacant at that time were previously occupied by transient Nepali labourers who stayed, wherever they found work. Namprikdang was the center for Dzongu constituency and all festivals, rituals, official and social gatherings etc. were held there. As a consequence of the changes in the land-use, the public ground and other areas of this place were getting destroyed by the rise in river especially during monsoon. The NHPC were requested time and again to take appropriate steps to protect the area but no action seems to have initiated so far

### Land-use in Hee-gyathang and Gnon Samdong Revenue Blocks

Hee-gyathang and Gnon-Samdong revenue blocks, the area under study, were divided into several *busties*, forests, cultivated and uncultivated land (Figs. 4 and 5).

In Hee-gyathang, out of 1922.93 ha only 48.42 ha and in Gnon Samdong 17.48 ha had irrigated fields (Table 2). A 3 km. long irrigation channel had been taken out from Monmuchu. It had benefited only a fringe of the population of low lying *busties* of Sudur, Manthyong and Tartong. One more channel was under construction in Hee-



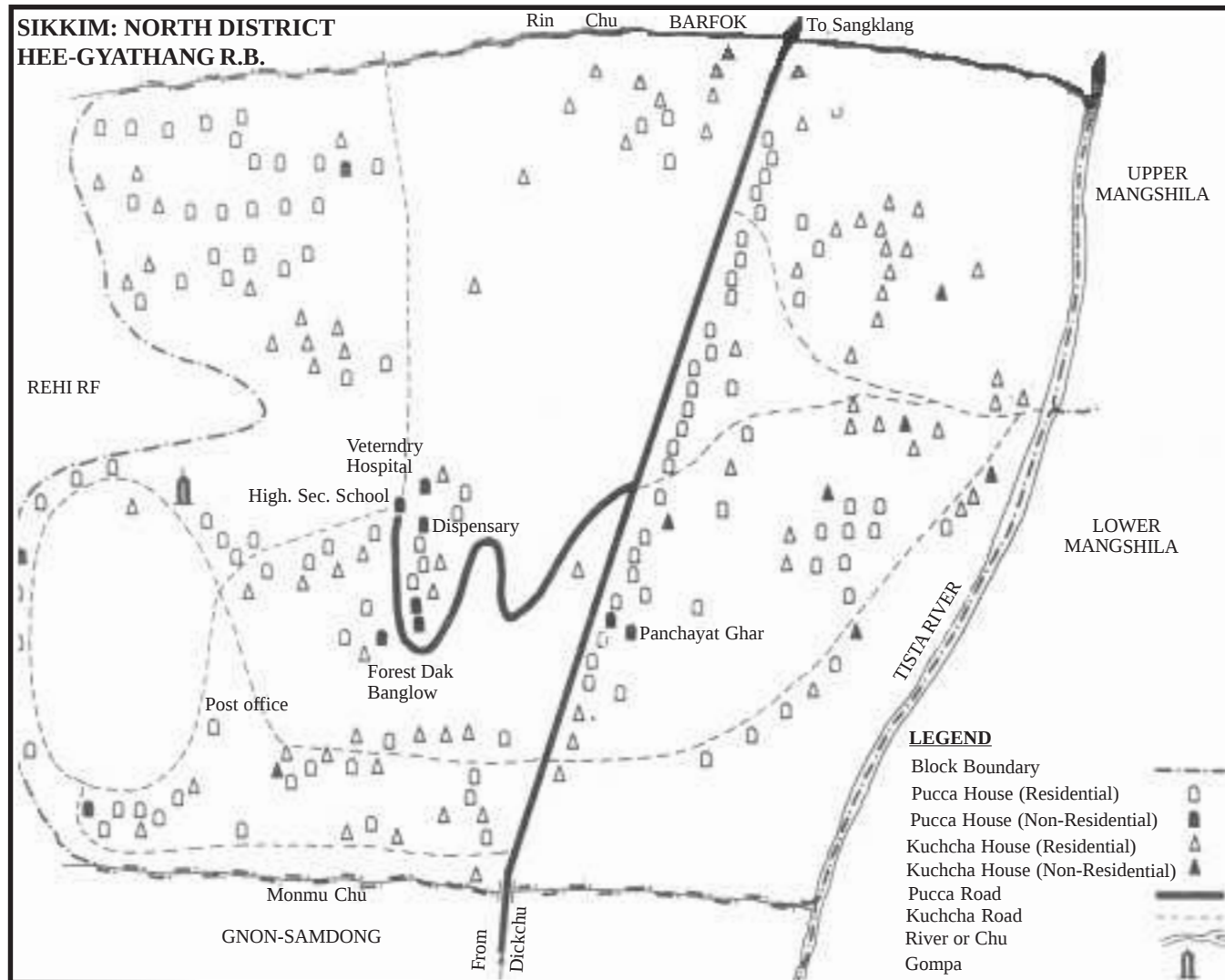


Fig. 3. Hee-Gyathang R.B.



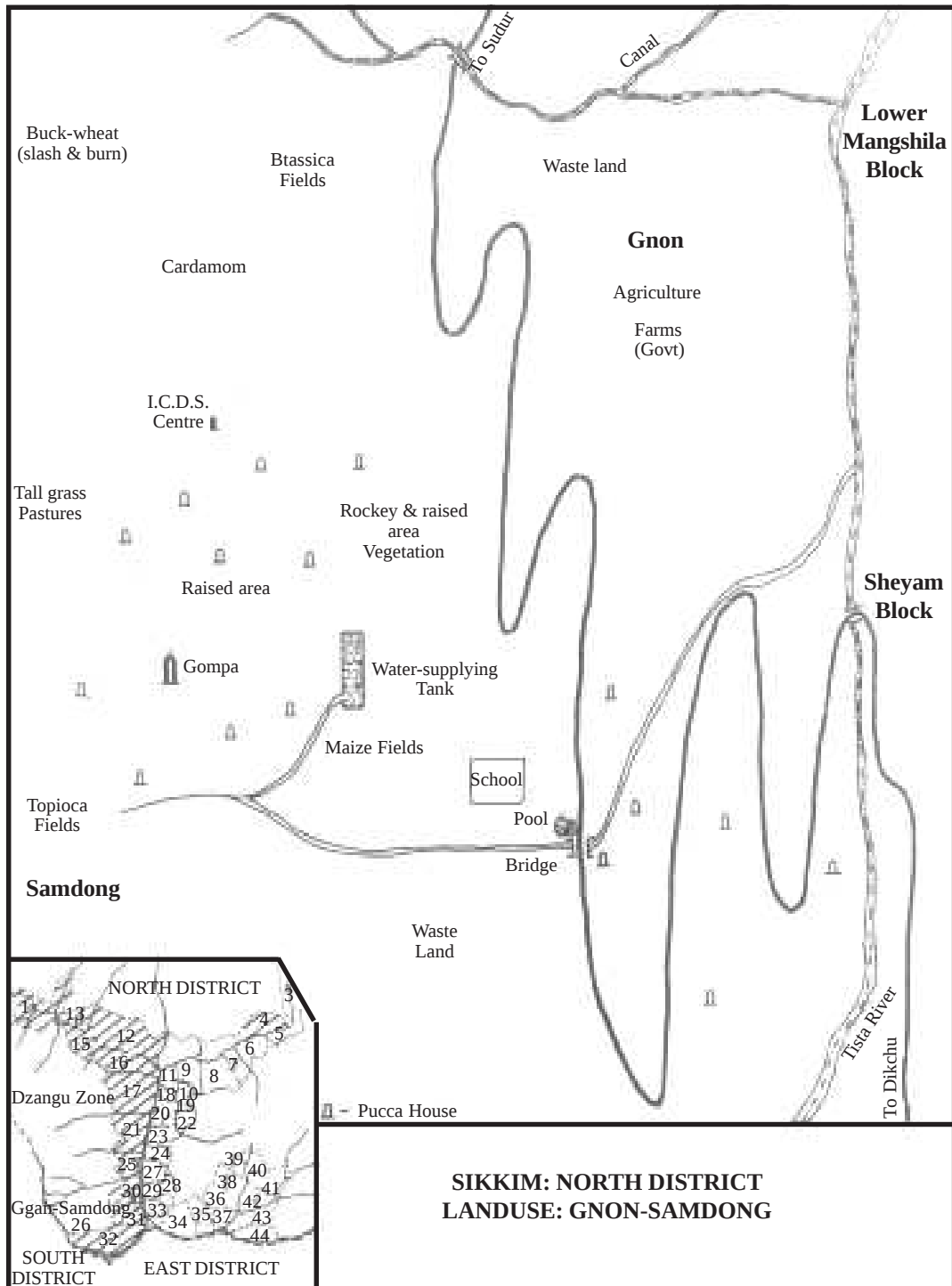


Fig. 5. Gnon Samdong: Landuse

gyathang. Small trails emanate in all directions from water sources to the fields and to neighbouring houses and *busties*. The trails were for the most part rough, and steep. In Heegyathang, fields at high-er altitude were rain fed and elsewhere water was brought from *jhoras* (water falls) or *kholas* (stream) for irrigation purpose by channels constructed by joining a number of bamboo poles. The Lepcha terraced the fields only for wet paddy cultivation. If the land was unterraced, irrigation posed the danger of landslide and soil erosion. Even if the land was terraced, sometimes excessive rain, hail-storm, and erosion damaged the landholdings. Not all the land was equally prone to these environmental hazards. Wet paddy fields were more vulnerable than temporary fields and so farmers usually made wet paddy fields at lower altitude, on hill sides of gentler incline. Terraces were horizontally cut and irrigation channels were properly maintained. Bamboo fences were constructed to help control contour strips. The unterraced maize and vegetable fields were situated above paddy terraces which acted as filters and buffers against erosion. Though the physical nature of the environmental hazards was evident, people associated hazards with supernatural causes and tried to appease spirits and gods.

**Table 2: Landuse in Hee-gyathang and Gnon-Samdong**

| Landuse              | Land (in Hectares) |              |
|----------------------|--------------------|--------------|
|                      | Hee-gyathang       | Gnon-Samdong |
| Total land           | 1922.93            | 692.17       |
| Cultivated area*     | 1275.19            | 260.68       |
| Uncultivated area ** | 9.96               | 4.77         |
| Area under Forest*** | 637.78             | 431.48       |

\* Cultivated area includes all dry fields, paddy terraces, cardamom fields, tapioca and orange trees.

\*\* Uncultivated area include waste land either because it is too steep or inaccessible or consists of rock outcrops.

\*\*\* Forest includes *Khas* and *Gorucharan*.

The Lepchas had adapted culturally to diverse natural landscape and had designed production activities suited to the region. They cultivated all kinds of crops for their livelihood. They produced cardamom as cash crop followed by orange and ginger. Wheat, maize, rice and varieties of dry rice were cultivated for daily use. Three major biogeographically different provinces of human land use could be identified in the area:

(1) The upper slopes of the hills (1800-3000m);

(2) The lower and temperate zone of minor valleys and (900-1800m);

(3) The valley floor, peripheral valley bottom (300-900m)

The fields of a family were at different places at varying altitudes. The temporary dry field (*Sukha bari* or *Sudyom*) were on upper slopes where wheat (*Fagopyrum esculentum*), millet (*paspalum scorbiculatum*) and dry rice were grown. The house garden (*aangen bari* or *sing*) at lower level had wheat, maize (*Zeymays*), soya bean and vegetable cultivation. The valley floor and peripheral valley was used for paddy cultivation. The cardamom (*Ammomum subulatum*) fields were always under shady trees. On the hill slopes *Tunggrukbuth* (*Manigot-esculentus*) cultivation was practised. The dry fields were used on rotation of seven years. In this study thirteen types of land use are recognized

(1) *Sing* or *aangen bari* (House Garden): It was the field in front of the house and fields immediately surrounding the *busti* area. The multi-cropping and inter-culture of crops were practiced. Two crops were grown annually, first a mixture of wheat and barley followed by maize and soya bean. A number of vegetables, fruits and root crops were also raised on the embankment of the house garden. Because of continuous care, irrigation by hand or bamboo pipes, and continuous manuring, the soil was fertile. Wheat and barley were grown in December and harvested in March-April. Maize was planted in September-October. Millet (*paspalum scorbiculatum*) was grown as mixed crop with maize. It was sown in June-July and harvested in October-November. Traditionally, millet was grown in temporary fields only (Agriculture Department). Local varieties in use were *muske*; *mangkaitra*; *pangdoor*. *Pangdoor* was cultivated by broadcasting and other varieties belonged to a transplantation type. *Mangkaitra* was a rain-fed crop and showed considerable drought resistance. It was ideal for making local beer, *chi*. Its coarse grain occasionally ground for *tsampa* (flour). It was grown for both grain and forage. Soya bean (*Avena stiva*) was also grown mixed with maize and harvested in September-October. Its cultivation had gained momentum after some high yielding varieties had been introduced in the area.

(2) *Sudyom* (Dry Fields): In the agricultural land where irrigation was not possible, barley (*Hordeum vulgare*); millet (*Paspalum scorbi-*

*culatum*); buckwheat (*fogopurim esculentum*) were cultivated. Dry rice was cultivated on the boundaries of the fields. Two crops of buckwheat were obtained in a year. The first crop was produced between January and May and the second was sown in June-July and harvested in December. Two types of buckwheat grown in Dzongu are (i) *kurhoo*, bitter in taste and (ii) *korhat* is the sweet variety. Barley was cultivated every alternate year with wheat. Dry rice was sown in April and harvested in November-December. The cropping time of dry rice was two months earlier than that of wet-rice. *Tokmaro*- a local rice variety that required seven months for ripening was also grown. *Tokmaro* rice appeared to be one of the relics of the primitive varieties of dry rice which differed in height, colour, and ripening time. All upland crops were sown in the pre-monsoon season. For shifting cultivation, land was cleared of vegetation by chopping during the winter time and left to dry. The adjustment of cropping calendar to onset of monsoon is necessary. The dried twigs and leaves were set afire before the start of rainy season and the fields were immediately sown so as to avoid growth of weeds. This type of agriculture, though known as monsoon agriculture was in fact pre-monsoon agriculture.

(3) *Cheekboo* or *pani-khet* (Irrigated Fields): were where water was available for irrigation on the side of a stream or valley floor, paddy cultivation was found. Water was taken from a river or stream and diverted into the field by means of bamboo pipes. Rice seeds planted in nurseries were allowed to grow till they were old enough to transplant. A portion of land above the paddy terrace was left unterraced for maize, millet and vegetable cultivation. Irrigation-cum-drainage channels ran across the terraces and served as field boundary. A few bamboo groves, orchard (orange) and fodder trees were grown at channel embankment. Paddy was generally raised as mono crop. However, the Lepchas were encouraged by the agriculture department to grow *mousem* or *kalodal* (*phaseolus vulgaris*) on the boundary of the paddy terrace.

Seven varieties of wet rice (*zomal*) are grown on water logged terraces up to 1500m without manure. These are small *otte*, *timburning*, *birum phool*, *tulsi*, *marsi*, *takamaru* and *thapachan*. Of these, two varieties were grown at higher altitude than other five. These were grown in rotation to give rest to the soil. 'Zo-Mal' or rice was

meant only for important occasions like wedding, house warming and celebrating the 'Nambun', Lepcha New Year.

(4) Cardamom or *elaichi khet* (*Ammomum subulatum*): Large cardamom was the cash crop of the region and was grown as pure crop under shady trees on hill slopes. Four varieties: *ramsey*, *sawaney*, *golsey* and *rannagit* were cultivated by sowing seedlings in nurseries or by separating rhizomes' from clumps of longer plants. It was planted in May – June and harvested between August and November. After separating from harvested penicles, the fruit was cured or dried in the kiln. The crop preferred plentiful and well distributed rainfall, generally over 200 mm per annum and an altitude range between 600 and 1800 m.

There were large tracts of forest which could be used for cardamom plantation but unavailability of finance for rhizomes plantation was restricting the feasibility. The virgin forests which could be utilised for the cardamom plantation, were instead burnt and used for seasonal crops. The cardamom was not only cash crop, but it also helped in soil conservation. Apart from extension of existing area, the large parts of existing unproductive plants (owing to age and disease) had to be rejuvenated. The government was planning to station a mobile plant protection unit in the area. There were no proper cardamom drying and storage facilities at that time. Government of India had established a Cardamom board. Ten scientifically based community driers and metal storage bins for dried seeds were to be established in the area at different locations. The Government proposed to set up cardamom co-operatives bodies for the carriage and marketing of cardamom. Initially two co-operatives had to be operated in Upper Dzongu and one in Lower Dzongu. The harvested produce would be transported to auction centre and from there to other parts of the country. It was all being done to eliminate the middle man profit. Four fair price shops had been started at Mangan, Dickchu, Kabi and Chungthang. Credit was available at these fair price shops, which was repaid in harvested cardamom. The village money-lenders charged high rates of interest. Various social forestry schemes had been initiated in the area under the state development plan. Nurseries were started on two acres of plot in Dzongu for demonstration and education, and free distribution of fruit plant like orange, guava, peach, plums, tree tomatoes, app-

les, thin shelled walnut. The department had acquired 4.4 acres of land at Hee-gyathang and Lingdong for the cultivation of grass-*Citronella* sp. The grass was to be grown for extraction of aromatic oil and to be used in Ayurvedic medicine.

(5) *Tungruthbuk* or Tapioca (*Manihot esculentus*): Tapioca cultivation was on hill slopes. It was herbaceous, tall branched shrub with elongated tuberous roots. This tuber is rich in starch and can be commercially exploited to obtain starch, sago, and flour. The plant was cultivated during the month of March. Totally pulverized soil is sought. The older part of the stem was grown at a distance of about 150 cm from one plant to another. They germinated during June and August. At the time when the plant was about to produce tubers, to the basal part of the plant more soil was added from the surrounding area, so that the growing tubers did not come out of soil. The tubers were harvested or taken out during December and January. The vegetative parts were eaten by goats and some older parts were kept in store for next cultivation. There were two varieties – red and white, the latter being used for beer preparation and the former for *kaza* preparation.

(6) *Suntala* (Orange) (*Citrus reticulata*): Orange trees occupied 6.8 ha in the whole of Dzongu. They were scattered and never grown in orchard style. It was planted in small pits after clearing herbs and shrubs. Pruning was done periodically only in the side branches, the top of the plant was left unclipped. Legumes were intercropped with orange to build up soil fertility. During summer, vegetables such as cucumber, brinjal, and chillies and in winter radish, cauliflower and carrot were grown.

(7) *Banjo* or Fallowland: Non-cultivable land, sometimes used as pastures for cattle or kept as grassland.

(8) *Land which has been affected by landslides or other types of erosion*: it may have been an irrigated terrace, or dry fields or forest land before destruction.

(9) *Land, covered by large rocks and stones*: it could not be upgraded into agricultural land and was thus useless to the farmers.

(10) *Gocharan*: Land enriched with grasses and used for grazing cattle. It was communally owned grazing land.

(11) *Khasland*: Communal forest or jungle which fulfilled the local needs of the people and supplied them with most of their daily needs.

(12) *Reserve Forest*: The state government had full power to control and manage these forests.

(13) *Busti* (Settlement): The settlements were scattered widely on hill slopes. Traditional Lepcha houses were built on rock or on higher reaches to avoid floods and flash floods. The Lepchas built floor of the house up to a metre (2-3 feet) higher than the ground with some space, called *tanhanp* left below. This was done to protect the house from flood water. They never built their houses in slide prone areas.

### Cropping Pattern

The cropping pattern was fairly intensive as could be seen from the variety of crops grown in the area. Multicropping and interculture of crops was practiced. Wheat, maize and barley intercropped in house fields: a mixture of wheat and barley followed by maize. The temporary fields yielded main crops of dry rice, millet, and buckwheat after deforestation. Animals or large implements were not used by Lepchas in *sudyom* cultivation. Implements used were chopping knife sickle, *thingyel* (Dibbling stick), small hoe for weeding and *aunzo* (a special sickle) for harvesting. The only inputs were seeds and human labour. Ploughing was done on larger terraces with a pair of bullocks.

As the family had fields at different altitudes, the requirements of the family were met. Early ripening varieties of dry rice and millet were cultivated in the small valley fields and the main crop one field of dry rice and one of main crop millet was cultivated yearly. Nevertheless only one major crop was obtained each year from each plot. Two sowing of buckwheat were done annually, a large one in February for food and a smaller one in September for seed. This was the only case in which two crop of the same cereal grain were obtained in one year. Occasionally, if the maize produce in the home field was not sufficient, some maize was cultivated with early millets in the temporary fields. The main crop of barley (*kachar*) was cultivated at higher elevation to the *kokshi* (other variety). *Kokshi* was double cropped with either maize or buckwheat.

In the dry field in November – December, after millet or rice were gathered, the fields were sown with buckwheat which was harvested in June – July and the fields were left fallow for seven years. From October to December,

**Table 3: Sowing and harvesting periods for different crops**

| S. No. | Crop             | Sowing period |          | Harvesting period |          |
|--------|------------------|---------------|----------|-------------------|----------|
|        |                  | From          | To       | From              | To       |
| 1      | Maize            | February      | May      | September         | October  |
| 2      | Rice             | June          | July     | November          | December |
| 3      | Wheat and barley | November      | December | March             | April    |
| 4      | Buckwheat        | February      | March    | June              | July     |
| 5      | Millet           | June          | July     | December          | January  |
| 6      | Cardamum         | May           | June     | August            | November |
| 7      | Tapioca          | March         | —        | December          | January  |

Lepchas had free time. Weddings and feasts, postponed during the year, took place at that time. Repair work of all types was also finished. Canes and rafters of house roofs and stone walls sur-

rounding their fields were mended. New tools were made or old ones repaired (Tables 3, 4).

There was very little division of labour among the Lepchas. Most work was done in groups con-

**Table 4: Calender of economic activities**

| <i>Kur-nyit (Lepcha)</i><br><i>January-February (English)</i>                                                                                                                                                                                                                                                                                                                          | <i>Kur song</i><br><i>February - March</i>                                                                                                                                                                                                                                                                                                                                              | <i>Thon</i><br><i>March -April</i>                                                                                                                                                                                                                                   |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Preparation and manuring of buckwheat fields; fencing of gardens; collection firewood.                                                                                                                                                                                                                                                                                                 | Leveling, ploughing and sowing of dry rice fields; sowing of maize; weeding of cardamum.                                                                                                                                                                                                                                                                                                | Harvesting of wheat and barley preparation of house garden for vegetables sowing. Cutting of bamboo for fencing of paddy fields; rice terraces and irrigation canals are repaired; planting of <i>Tungruthbuk</i> (Tapioca stems)                                    |
| <i>Sam</i><br><i>April- May</i>                                                                                                                                                                                                                                                                                                                                                        | <i>Nam tsam</i><br><i>May- June</i>                                                                                                                                                                                                                                                                                                                                                     | <i>Blung</i><br><i>June- July</i>                                                                                                                                                                                                                                    |
| New fields are opened by cutting weeds, smaller plants, drying and burning of these; bigger plants are cut and carried home to be used as fuel; digging of fields, irrigation channels are made. In the old fields selected for paddy this year, bamboo fences are made to keep off domestic and wild animals. Some men go out hunting, trapping and fishing. Harvesting of buckwheat. | Fenced in fields are prepared for sowing by cutting off grass and soaking the fields with water through water channel. In the muddy fields, some rows and terraces are made in which rice seeds are sown to make nursery. Harvesting of barley and in the same field maize are sown. In June, Paddy plants grown in nursery are transplanted into fresh fields, sowing of millet seeds. | Transplantation of paddy continues; weeding of maize in dry fields. Heavy rains hinder outdoor work; Indoor jobs are carried out; wicker work articles are made                                                                                                      |
| <i>Num Kam</i><br><i>July-August</i>                                                                                                                                                                                                                                                                                                                                                   | <i>Pur vim</i><br><i>August-September</i>                                                                                                                                                                                                                                                                                                                                               | <i>Glu</i><br><i>September-October</i>                                                                                                                                                                                                                               |
| Millet is transplanted into dry fields under maize crop; first weeding of wet rice; covering of basal part of Tapioca stems with soil to ensure proper growth.                                                                                                                                                                                                                         | Weeding of millet fields; sheds for drying of cardamom are made.                                                                                                                                                                                                                                                                                                                        | Second weeding of wet rice, harvesting of millet and cardamom.                                                                                                                                                                                                       |
| <i>Ect</i><br><i>October-November</i>                                                                                                                                                                                                                                                                                                                                                  | <i>Pa</i><br><i>November-December</i>                                                                                                                                                                                                                                                                                                                                                   | <i>Max</i><br><i>December-January</i>                                                                                                                                                                                                                                |
| Harvesting of paddy; sowing of wheat and barley.                                                                                                                                                                                                                                                                                                                                       | Harvesting of pulse; storing of seeds in grainaries; stocking of paddy and gathering of Tapioca.                                                                                                                                                                                                                                                                                        | Gathering of fire –wood for rainy season; cleaning of the stubble of the maize millet and barley, preparation of fields for sowing. Mixing dung of oxen, goats and pig collected during the year with water and spreading it in fields. Tapioca gathering continues. |

taining both men and women. There were very few tasks which were not performed by either one. Even supposedly female tasks, such as cooking or looking after the children was being performed by men if there was need. There were no hard and fast rules about that. The only male activity never undertaken by women was ploughing. Agriculture activities performed by women were almost equal to those of men and their labour was interchangeable with those of men in communal work parties and was paid the same amount as an adult men.

### Labour Force Participation

The economically active population on the basis of their participation in one or another activity revealed that only persons above age ten were functioning. There was some variation in the participation rates between males and females in different age groups. In the age groups 10-14 more females, appeared to be working than males. Probably, this was because of female's lack of interest in education. In the next higher age group (15-19) the ratio of males and females working was virtually the same. In the age group 20-29 more females appear to be working than males but ratio of working women falls sharply in age-group 30 and above, it being only 79 percent against 90 percent for males.

Overall above 67 percent of both males and females over 10 years of age appear to be economically active. The total participation rates for males, females are 47.94 and 46.77 percent respectively. This rate is more or less the similar to North District (46.5%) as obtained in the Census 1981. However if we calculate the actual working hours and day in a full year the entire picture is different. The Lepchas' day starts between five and six in the morning. After taking their breakfast, they start for their fields which are at considerable distance. Women work in the house garden. On the way, Lepchas stop at various spots for gathering fungi etc. After working for four hours more, they take their afternoon recess, during which they take some snacks which they had brought from home. Then work for three-four hours more, they return home for the evening meal. When they are working at far-off fields, they spend their nights in the field house but then their extra time is spent in gathering and cooking food. When men are working in the fields, women work in house-garden, cook food,

and look after the children. In the evening, they visit each other or sit and chat and drink *Chi* (Local beer). This was their routine for working days which was often interrupted by ritual and festivities, the main chore of their social life. There were regular bi-monthly feasts in gumpa sponsored by two families in turn; and in most months there were one or more calindrical lamaist festivals like *boom-ker* or *cherim* ceremony; religious ceremonies regarding *Mun* and *Mayel* beings; ceremonies concerning birth, marriage and death. Lepchas performed curing and purification rites and maintained similar beliefs about the supernatural and man's responsibility to supernatural. These served as social occasions where large numbers of people come together for drinking and general gaiety. Besides these, there were number of visits: married women visited their native village with their children or in-laws; young men visit their *asekd* (fiancé) bride, accompanied by a friend or relation who helped in carrying the presents; *ing-zone* (special friends) or trading partners come on a visit or visited. All these visits were occasions for feasts, but not as big as the gumpa or other ritual feasts.

Lots of time of the Lepchas was spent in feasts and festivals in only eating and drinking. The drinking was the greatest social evil in Dzongu. All the Lepchas, men, women and children, drank in great quantities.

### DISCUSSION

The Lepchas were by tradition a forest people. The Lepchas resided almost exclusively within the forest and concentrated almost entirely upon its resources. Dzongu forests were rich and abundant and apart from supplying wood for fuel, timber for houses, fodder for animals they also provided food for Lepchas in emergencies. Gathering and hunting had been a way of life. Lepchas still indulge in these activities. However, hunting has become quite less. Most of the collection was done daily, but during the three months from June to August, when the food supply was sparse, the gathering developed into a large scale. On the way to their fields, the Lepchas stopped at various places, shrubs and rotten logs and inspected for various edible fungi etc. Besides bamboo shoots, number of other forest products like mushrooms, tubers, wild fruits and wild honey were used as food substitutes. The only real evidence for the economic situation of the Lepchas

comes from historical sources and travel accounts. The Lepchas used to practice slash and burn cultivation resulting in a total loss of vegetation cover. Out of a very rudimentary form of slash and burn cultivation, which at one time probably covered large areas, Lepchas have developed more intensive and productive agricultural system.

Within the existing agricultural system in Dzongu, The Lepchas were practicing different farming systems - upland crop farming, rain fed rice farming, wet rice irrigated and dry farming harmonious with the existing environmental conditions. The agricultural system of the Lepchas was the historical product of the interaction between three different agricultural complexes: The original Lepchas complex, influenced by the Tibetan and Nepali complex which in turn was influenced by Indian complex. Though Dzongu had been Lepcha reserve since long, but cultural borrowings and cultural integration had been going on since the advent of Bhutias. The Lepchas of Dzongu accepted the changes resulting from different contacts. They were receptive to changes as these changes did not interfere in their ethics and cultural traditions.

### Strains of Lepchas Types Agriculture

Glimpses of Lepcha slash and burn agriculture is available in Chronicle (Gaz.:18). Campbell in 1840 also described the shifting nature of Lepchas along with their agricultural land (Campbell 1840: 387). They grew dry rice without irrigation (Hooker 1855, 1980:193). By the middle of the last century, wet rice cultivation was introduced in the area. Waddell described the Lepcha farm, "a small plot fenced in by thorny branches, for a few gourds, turnips and chilies and beyond this a few small crops of maize barley, millet for beer, and a little terraced land for irrigated rice. This scanty cultivation, if it may be dignified by such a term, is usually a mere scratching of the ground, and is done mostly by the women, while the men do the hunting" (Waddell 1900:95-96). The spread of practice of wet paddy cultivation was probably slow because it reached Dzongu rather late at the time of Morris and Gorer fieldwork in 1937 in Lingthem. (Morris 1938:127; Gorer 1938, 1967: 90). Waddell described the Lepchas as the aborigines of country, "they represent the state of

man when he subsisted by hunting, fishing and gathering wild fruits and digging roots; and now they are a vanishing race. Fast disappearing before the tide of emigrants from the more active and civilized tribes who have lately swept in great waves into their country" (Waddell 1900: 91-92). In 1982, the economy of the Lepcha reserve was already taking a turn. The Lepchas who were considered poor cultivators were already changing from *khoriya* (slash and burn agriculture) to settled agriculture and cardamom plantation. According to Gorer (1938) and Morris (1938), the animals were reared more for socio-cultural reasons than for economic ones as all their rituals and ceremonies were accompanied by the animal sacrifice. However, these socio-cultural practices were gradually disappearing and animals were being raised for their economic value.

Probably, Lepcha's shifting cultivation, in association with gathering of minor forest produce and hunting was sufficient for their survival. Shifting cultivation was still being practiced in its original form higher up in Random and Ravond *busti* by the Lepchas. In other parts of Dzongu, slash and burn was not being practiced in its typical form. Instead, it had taken the form of fallow field system in which plots were cultivated for two or three successive years, fallowed for seven or eight years and then recultivated. Tall grass covered the plots during the period when the fields were fallow. Time between abandonment and recultivation was too short for woody vegetation growth and it was easier to cut and burn. Besides shifting cultivation, Lepchas cultivated and gathered various tubers which were used as food, and grew upland rice (*Zomal<sup>3</sup>*); maize, millets and buckwheat on hill sides in dry fields. The elements of shifting cultivation, having tubers and upland rice farming buckwheat maize, combined with gathering hunting and fishing formed the Lepcha agricultural complex.

### Strain of Tibetan Agricultural Complex

With the advent of Tibetans, in the seventeen century (1641), a monarchy of Phuntsong Namgyal was established. This resulted in mass migration of Tibetan Bhutias to Sikkim and dominance of ruling class and subjugation of the Lepchas. New Tibetan ideas infiltrated into Lepchas culture. Wheat and barley associated with manuring were introduced as winter crops.

### **Wet Rice Farming or Indian Agricultural Complex**

In early nineteenth century they came in contact with Bhutanese and Nepalese. New ideas infiltrated the Sikkim state. Though, wet rice farming has a history of 4000 years in the Indo-Gangetic plains, it was introduced in the Dzongu rather late with the advent of migration of Nepali labour in this zone. This type of wet rice farming contrasts sharply with the upland rice farming. In wet rice cultivation, ploughing and thrashing by animals was practice, while in dry rice cultivation manuring, hoeing, seed sowing by dibbling and thrashing was carried out by hands. The Lepchas adopted the new technology of the wet rice farming and incorporated into their traditional system. They cultivated the dry fields at high altitudes and newly opened up wet rice terraces at lower altitudes.

In the beginning of the century, cardamom was introduced as a cash crop in the area and money entered the economy of the Lepchas. Lepchas accepted the rice and cardamom cultivation along with Nepalese rituals and taboos concerning cardamom cultivation. The Lepchas economy developed into partly subsistence and partly commercial. The Lepchas of Dzongu gathered forest produce, cultivated wheat, paddy, dry rice, millet, buckwheat, maize and barley as staples and cardamom as cash crop. The post independence era and integration of Sikkim into Indian union brought about further changes. Cultivation of tapioca (previously they only gathered various types of tubers); soya bean, vegetables and fruits had been introduced after opening up of the area to development programmers.

Lepcha's adaptive nature can be explained by insecurity of food and poor technology. Lepcha agriculture is still primitive; farming is a way of life rather than a business proposition. The shift from slash and burn cultivation to wet rice and cardamom cultivation was a rational economic decision that explained a preference for a system with better rewards. When in contact, Lepchas exhibited tendency to select those cultural traits which could easily merge with their cultural pattern. The greater freedom of choice had more degree of selectivity. This is true of the Lepcha case and helps to explain the apparent paradox that Lepchas have probably changed the least while changing the most. The nature of the contact situation made it possible for Lepchas to

accept certain innovation modify certain elements of their social, religious, economic and political structure in order to accommodate changes and retained their basic pattern of community structure and co-operative character. One thing which had not changed was their tradition of living only for the present and not worrying about the tomorrow.

The average operational holding<sup>4</sup> of the cultivating household was 9.34 ha, which was considerably higher than the state average of 2.56 ha as per 1976-77 agricultural censuses. This higher average was due to presence of a vast area of cardamom in Dzongu. The detailed records of holding pattern were not available because Dzongu was a private estate of king. The land holding of a household is divided into number of fields, some permanent and other temporary. Permanent fields were rice terraces, cardamom fields and house garden. The temporary fields were cultivated for successive two years and abandoned for seven- eight years; the nature of the terrain had resulted in small and scattered land holdings. The small landholdings were the result of the nature of the tract, steepness of the slope, fragmentation of land on break up of a joint family. Steepness of the slope and the rocky nature of soil do not permit terracing of large fields.

Because of the ecology of the area and lack of technological know-how, Lepcha were forced to practice shifting cultivation on small and scattered areas of soil suitable for tillage along with gathering. The fields cultivated were widely scattered and abandoned after few seasons. The resultant pattern of settlement was highly dispersed and mobile and it generally lacked a political and economic organisation. They abandoned both their fields and dwelling sites every three to four years ago. Lepcha in these regions discovered that fire was a useful ally in clearing land of wild vegetation and for years fire has supplemented hand cutting operations. Agricultural method was primitive and yields per acre per man were low. Maize and *zomal* rice grown by dry method were not sufficient for the entire year. Tubers, roots, fungi and leaves were collected to supplement meager grain production. With no surplus production, there was little need for trading centres. The role of animals in this type of agriculture was limited. Out of a very rudimentary form of shifting cultivation, Lepcha had developed more intensive subsistence agriculture. They had semi-

shifting type of cultivation wherein farm dwelling remain fixed but the farmers changed their fields throughout the environs, actually abandoning the fields, turning them back to wild vegetation after two years of cropping.

Agriculture work in Dozogu was very arduous. In every sphere, the consumption of labor had increased by the absence of labour and advanced tools. Men and women were busy throughout the year. The hill sides were extremely steep and rocky so that communication was still primitive. Almost all travel was done on foot. Practically everything was carried on human back. In the absence of irrigation facilities, in this form of cultivation, maximum reliance was placed upon environmental features like rain, soil and season. Human technological intervention to either control or improve the environment was minimal comprising planting, cultivation and harvesting. Though this type of agriculture improved the environment as a human habitat, man did not secure himself against environmental disasters. At this level of pre-industrial agriculture, people attempted to intervene with nature to secure more reliable productivity. That was achieved through leveling and terracing of land and related operations. The techno environmental factors determined the relative proportion of the crops. The Lepchas started cultivating wide variety of crops taking advantage of various soil types at different altitudes. This provided an insurance against devastation from crop-specific diseases and pests. Drought resistant and moisture tolerant species were grown. The variety of crops together with the practice of manuring, fallowing, crop rotation and crop mixture, all enhanced the productivity and reliability of food supply. Without machines these activities required the co-ordinate efforts of manual energy. These efforts brought change in the resultant economy of the Lepchas. The rate of the economic change was slow, but changes have occurred in the Lepcha economy.

The Lepcha fields had become an important feature of a complex ecosystem. Because the crops were planted at different time during the year, and their maturation was not uniform, fields with inter and multicropping and boundary cropping was a mixture of food stuffs for nine months of the year. A normal household cultivated eight to ten different food plants in different fields at any one time. The Lepcha farming was basically crop intensive. Out of rudimentary form of slash

and burn cultivation, which at one time probably covered all the Lepcha's land, Lepchas have developed more intensive, sophisticated and productive agricultural systems. The introduction of cash crop (cardamom), ginger and paddy in the area were very important. Besides few cultivated varieties, there were several sub-varieties or strains which were named in local dialects of Lepcha, Bhutia or Nepali. These varieties were Sawney, Ramsey, Bebo, Dzongu Golsey, Varlane, Golsey and Seremna. The most significant techno-environmental factor was the construction of irrigation channel in 1980-81 that has permitted cultivation of some crops that would otherwise have been difficult. New varieties of crops, tested and developed in government experimental farms were being introduced in the area. Crop mixture and crop rotations, improved seeds, fertilizers were being suggested by the agricultural departments. Almost all these innovations had an extraneous origin. The villager's decision to accept or reject these technological reforms depends on their rational economic considerations and availability of the resource.

There was no doubt that Lepchas could produce a surplus of food over the full production cycle with a little extra labour and improvement of technology. However, as it could be observed at that time, there was no indication that things would alter. In Hee-gyathang, 41.3% of the total cultivated land was under cardamom cultivation, because it required the making of terraces and water channels. Only 3.3% of the total was under paddy and other crops. The preparation of paddy terrace and cardamom field's required more time and hard work but the remuneration was bigger. The cardamom rhizomes were planted every ten years but once planted little labour was required to obtain a crop. It only required weeding. On dry fields Lepchas grew millet, barley, dry rice etc. which was used for making *chi*, the Lepcha's favorite drink. They spent a great deal of time in ritual ceremonies, dancing, feasting and drinking *chi*. At certain festivals, where other people spend three hours in ceremonies, the Lepchas of Dzongu spent three days. A good deal of this time could easily be devoted to cultivation.

The subsistence economy of the Lepchas, supplemented by gathering, hunting and fishing was one of abundance and reliability. The Lepchas said that as long as the forest was there, there could never be a shortage of food, let alone

any danger of starvation. There had been no qualitative and quantitative systematic analysis of the nature and extent of such dependence. Nutritive value of these plants and animals as such was not known but the Lepchas derived a significant portion of their nutritional needs like animal protein from animals. With low human population density and high plant and animal density, the Lepcha could afford a broad base of subsistence. With an increase in population and decrease in forest base, the Lepchas reduced the hunting and gathering activities and started domestication of plant and animals. At the time of Gorer and Morris's fieldwork in Lingthem in 1937, hunting, weaving, and carpentry were already in decline and it was no surprise that these three activities were being practiced by few Lepchas in 1982. Even the traditional barter trade was missing. The Lepchas had resorted to setting small shops and engaged in petty businesses.

Historical factors, no doubt have played their part in this type of happy-go-lucky attitude. The subsistence of the people was intimately bound with their system of land tenure. In theory, all land belonged to the king, not however in the sense of personal possession, but vested in him and administered for him by *kazis*. Large tracts of land were parceled to the *kazis* who administered them with the help of *mandals* (village headman). Revenues assessment was not on land but on personal possession, number of persons and cattle. This repressive rent land pattern decreased agricultural production and ultimately led to many fallow fields. People were robbed of incentive to work. Amassing property was fruitless as it was the property that was taxed and not land. This type of land ownership gave rise to a subsistence economy. People were producing only as much as they needed. There was a limit of the accumulation of wealth by the common man. The rules of landownership and revenue changed after assimilation with the Indian union, but its effect still remains. In 1982, the rights of the Lepcha landowners, in the land were held by them were heritable and transferable. The Lepchas paid land revenue and other local taxes to the Government following the prescribed land revenue rates. Among the Lepchas the class of landless tenants and landless labourers was small. Labour was needed at the time of cardamom harvesting or by the people who had more land and less family labour. Agricultural activities were

completed with the help of family members and reciprocal *lobo* (mutual help) affiliations. Since cardamom was a cash crop, labour had to be arranged from outside. The Limbu, Rai, Tamang and Sherpa labour was common in the area. Labour was procured from Mangan district headquarter. Passes from district headquarter were obtained by employers for the required number of labourers. There was a provision for the Lepchas to have a permanent labourer, who could go on annual leave and returned to his employer. The required renovation of a working permit had to be obtained by the employer. The period of validity was for three months to one year. A pass could be renewed only four times. A new pass had to be obtained after the expiry of the stipulated period. The rates for labour employment were fixed by panchayat, but the labourers sought land for rent. Legally other communities were not allowed to own land in Dzongu. According to the act in force, any transfer of land or any right or interest entry in anyway whatsoever (including transfer by sale, lease, mortgage, inheritance etc.) was prohibited in respect of landowners. Though Dzongu is a Lepcha reserve, only 56 percent of total households were of Lepchas, the rest belonged to temporary settlers of other communities. Lots of illegal leasing out of land had taken place in Dzongu yet no reliable information could be gathered on this count. These tenancies were always verbal and no records were maintained. These labourers lived either in field's dwellings or in temporary houses. These Nepali labourers were diligent and were able to save money which they usually loaned to their Lepcha employers who were spendthrift and always in need of money. The Lepchas spent lavishly on rituals and ceremonies. When these loans were not returned, labourers got hold of Lepchas fields. Though highly illegal, it was common in Dzongu. In case the Lepcha land owner could not return the loan at stipulated period, the labourer demanded cardamom crop as security and interest. The cardamom was introduced in area in order to improve the economic condition of the Lepchas. It could not be predicted at that time that entry of money into the area was going to have disastrous consequences on these simple illiterate people organised on egalitarian lines, which previously had no cash-economy. Until very recently, it was possible to extend agricultural land by simply claiming the land. The primary requisite was labour – it was a hard and

time consuming work to clear and open new land for cultivation. The availability of land prevented the pressure on land common in other parts of India. An expanding Lepcha agricultural family could usually, with effort, expend its holdings if desired. The Lepchas and their knowledge of steep slope conversion of agro-forestry and terraced productive zones (traditionally called *cheekboo/pani khet*), ridges of operational fields and management of very steep slopes as *sudyom* and *khoriya* was excellent but the agricultural tools and techniques, irrigation systems and local crops were all traditional. Thus ownership of land, however, was not sufficient in itself to ensure wealth. There must also be manpower to till the land. Here the land was plentiful and the labour was the limiting factor in production. The egalitarian society of the Lepchas of Dzongu might well be seen as the product of this situation. The most precious capital was not land, but labour which could not be passed from one generation to another. The Lepcha traditional system was no longer adequate and a more effective management was needed.

This effort was a critique of the theory according to which resources become scarce because of population pressure. Studies in developing societies indicated the process of over territorialization, the increase in the volume of labour force which puts an unanticipated pressure on land; the Lepchas situation was a contradiction to the above, where the problem was not of resources but of their meaningful exploitation and management. Scarcity of labour renders vast tracts of land unexploited and virgin. For this, what was needed was a well – organised labour system as resources were in plenty.

If labour was imported the resultant consequence of large scale migration on the socio-economic and political framework of the area would be tremendous. This could bring considerable demographic changes in this cardamom producing area, thus effecting ethnic composition of the Dzongu zone. Such demographic changes were economically significant in more than one way. Firstly, it led to continued imbalance between the fast growths of modern sector, that is, the cardamom plantation and the slower growth of traditional agricultural sector because of acute shortage of labour. The result would be that the cardamom producing region would turn deficit area in food grains. Secondly, though it was true that a part of savings by plantation

labourers was invested in agricultural development of the region when they acquired land on '*adhia*' basis, at the same time, a part of savings in the form of wages was remitted outside the region and state either through postal facilities or in person when the migrant labourers visited their native places.

In 1980's, though the cardamom crop was most important cash crop of the area but as already seen that large tracts of land in Dzongu remained vacant because of the shortage of labour. However, the Lepchas preferred living in relative isolation, primarily depending on subsistence agriculture and the cultivation of the native cardamom. Unfortunately, over the past few years cardamom crop in the upper Dzongu has drastically gone down because of disease resulting in the fall of the cardamom price. This has put lots of pressure on the Lepcha cultivators. Many of the younger Lepchas have migrated to urban areas including the capital Gangtok, leaving an increasingly elderly population in Dzongu. While searching for possibilities of alternative crops, government is giving attention to ginger and cane plantation. National Horticulture Board is providing awareness training on post harvest management and processing of ginger. State Council of Science and Technology has initiated a research on cane/*rattan* propagation and its value addition for livelihood sustainability. *Rattans* are climbing plants and are commercially important NTFPs (Non Timber Forest Produce) as a source of furniture, mats, kitchen equipment and tools. Its short roots are local delicacy. Apart from conventional uses, they have medicinal uses as well.

To stop the emigration of the local Lepcha youth, the idea of ecotourism was initiated in the Dzongu Reserve. The idea was to create avenues for self-employment within the area along with the ways to protect the Lepcha identity. To begin with Non Government Organisations (NGOs), local authorities and the representatives of Dzongu organised awareness and training programmes for the local Lepchas. They were trained to conduct and operate tourism locally, so the benefits can accrue to all levels of the community. As the area being restricted, permits have to be arranged by the tour operators. The absence of adequate infrastructure hinders viability of ecotourism. During my recent visit, it was difficult to arrange for transport. Few taxi-operators were ready to go there as they cannot go up

Dzongu. Travel from Mangan to Dzongu has to be on a Dzongu vehicle as other taxis are not allowed to enter Dzongu. This is a Private Protected Area (PPA) and the village committee runs the tourism operation and they offer multiple day packages. The Lepchas host visitors in their own private homes. This accommodation is owned and managed by the community.

The sustainable human settlements have to be economically stress-free, socially ostentatious and environmentally sound with full respect for cultural heritage. Yet the Lepchas of Dzongu are facing another crisis. As the Lepchas were reeling under the losses of cardamom crop and looking for alternatives, they had to face the disturbing ongoing hydro development plan: the damming of Teesta River and its tributaries to generate electricity for the rest of India. The Teesta Stage IV-Hydroelectric project is located in Mangan Subdivision of North District of Sikkim and will acquire 320.07 hectares for it. Out of this, 143.49 hectares will be Government and Forest land and 180.58 hectares private land. The project proposes to tap the waters of Tholung chu, one of the chief tributaries of the Teesta River in the Upper Dzongu in North Sikkim. The proposed dam site is located downstream of the confluence of Run chu with Teesta near Chandey village.

The major components of the project are located on the right bank (Dzongu area), while the other infrastructure (project head quarters, store, workshop and labour colony) will be constructed on the left bank to minimise the land requirements in Dzongu. The dam is to be located between Chandey and Hee-Gyathang villages, while the 'adit' (a horizontal passage from the Head Race Tunnel opening into river) work will be confined to Gnon-Samdong GPU (Gram Panchayat Unit). The power house will come near the Panan village, connected by a 9.8 km. head race tunnel along the right bank of the river. The labourers and officers quarters are in Tingchim-Mangshila.

A total number of 256 families comprising 232 landowners (*khatedars*) are likely to be affected due to various project activities. Out of 256 affected landowners, after land acquisition 67 would become landless, 32 would become marginal farmers, 40 would become small farmers. None of the family is using homestead land and house in the affected area. According to the EIA

(Environmental Impact Assessment) Report on Teesta IV, the project area is largely a degraded ecosystem due to high human pressure large scale logging and removal of fodder and timber species, clearing of ground cover for the cultivation of large cardamom and construction of roads etc.

Panan is one of the most controversial projects proposed for Dzongu. Within the core area of the proposed Panan hydroelectric project are a host of sacred sites: the *Kagey Lha-Tso* Lake, the *Drag Shingye* caves, and the *Jhe-Tsa-Tsu* and *Kong-Tsa-Tsu* hot springs, which are said to be endowed with healing properties. This area is not only sacred but is close to the Khangchendzonga National Park. The Lepchas trace their clan lineage to each of the 108 Himalayan peaks. The physical, topographical nature of so many of Sikkim's holiest places – and the concomitant identification of the Lepcha and Bhutia with those sites – the potential impact of the current development proposals on Dzongu's religious identity and sanctity is causing great anxiety and concern. These traditional nature worshippers are concerned about the biodiversity of the area. Tunnelling and blasting and the associated 'adits' at five places along the tunnel length have already caused serious problems. Complaints of cracks in the houses, drying up of perennial water sources and landslides have been reported by the people living above the tunnelling area (for example, village Amrada, Lower Khamdong Primary School). The biogas plants established by Khadi and Village Industries Commission (KVIC) in lower Samdong village have become dysfunctional due to cracks. The village is also facing water shortage. Some of the perennial streams have become seasonal and dry up in summer months. Crops and trees are also beginning to get affected by the activity. The Lepchas believe that gas used in chilling and blasting may have brought down the productivity of cardamom crops by 50%. Dust pollution and noise of crushers is causing health problems to the Lepchas and effecting the flowering and productivity of fruit trees.

As a result of tunnelling, large quantities of muck have been dumped directly into the river, constricting its flow and increasing threat to downstream area. Recently, the bridge across the river connecting the Lepcha village of Lum and Dickchu and Singtam collapsed because

of the muck on the left bank. The absence of bridge denied access to Primary Health Centre in Dickchu to ill and old. After the construction of the dam, the running water system of river Teesta will become stagnant water system producing change in the ecology and biodiversity of the river. The Lepcha would lose the most fertile and productive land along the river.

Along with the hydro electric project, large number of outsiders-planners, officers and labour will come to Dzongu, the Lepcha Reserve. In 1957, this area was set aside for ethnic Lepchas who now make up just eight percent of the state's total population. This far-flung area set up as reservation for the ethnic Lepchas was a protected and restricted area of Sikkim since the Chogyal era. Large number of outsiders will have an irreversible impact on the Lepcha community. Apart from the loss of their land, the influx of the labour may have an adverse effect on the Lepcha culture.

They are experiencing harmful effects of development as these are associated with soil, air and water pollution, destruction of natural resources and irreversible loss of biodiversity. The Lepchas have been protesting against the desecration of their sacred landscape since 1997 (Arora 2005, 2006). In 2005, this Lepcha's opposition took the form of a movement and other organisations and Non-Government Organisations (NGOs) joined hands in 2006 to oppose land acquisition and construction activities in Dzongu. In recent months, Dzongu's Buddhist community and Lamas have started protesting against the construction of the power projects fearing religious sacrilege. In mid-June, monks from the gompas of north Sikkim founded the Sangha of Dzongu, against the commencing of the Teesta projects. The hunger strikers in Gangtok have the full backing of the Sangha.

Choudhary (2007) expressed her concern about the implementation of Teesta project while writing her report for Ministry of Environment and Forests, Government of India. She added that the Lepchas youth have high level of awareness about their rights as an indigenous people including right of self-determination, protection from ethnocide and right to control, use and oppose the alienation of their natural resources. She even recommended that Teesta projects should not be implemented by ignoring either these local sentiments or the vocal opposition of the indigenous communities affected by them (134-135).

## NOTES

<sup>1</sup>Gram Panchayat Code of Hee-Gyathang- 254753

<sup>2</sup>It has a population of about 1336 persons living in around 239 households (2011).

<sup>3</sup>Zomal- Rice cultivation in dry fields after deforestation.

<sup>4</sup>Operational holdings included house-site, steep slopes, land slide, rock, marshy place, jungle with cardamom, jungle without cardamom, area occupied by trees and bamboo other than jungle grass land, planted grass and thatches, orchards cultivable but not cultivated for more than 5 years, not cultivated for more than one year but less than 5 years, current fallow, actual area cultivated, monocrop area including irrigated and unirrigated.

## REFERENCES

- Arora Vibha 2006. The forest of symbols embodied in the Tholung sacred landscape of North Sikkim, India. *Conservation and Society*, 4(1): 55-83.
- Arora Vibha 2007. Unheard voices of protest in Sikkim. *Economic and Political Weekly*, 42: 3451-3455.
- Arora Vibha 2008. Gandhigiri in Sikkim. *Economic and Political Weekly*, 43: 27-28.
- Bentley Jenny 2007. Change and cultural revival in a mountain community of Sikkim. *Bulletin of Tibetology*, 43(1-2): 59-79.
- Bentley Jenny 2008. Lásó mung sung: Lepcha oral tradition as a reflection of culture. *Bulletin of Tibetology*, 44(1-2): 99-137.
- Bhasin V 1989. *Ecology, Culture and Change: Tribals of Sikkim Himalayas*. New Delhi: Inter India Publications.
- Bhasin V 1990. Settlements and land use patterns in the Lepcha Reserve Dzongu Zone in the Sikkim Himalayas, India. *J Hum Ecol*, 1(3): 227-248.
- Bhasin V 1997. The human settlements and health status in Sikkim. In: KC Mahanta (Ed.): *People of the Himalayas*. Delhi: Kamla-Raj Enterprises, pp. 153-187.
- Bhasin V 2007. Medical Anthropology: Healing practices in contemporary Sikkim. *Anthropologist*. Special Volume, No. 3: 59-94.
- Biswas P C 1935. The Lepchas of Sikkim. *Indian Culture*, 1: 483-486.
- Campbell Archibald 1840. Note on the Lepchas of Sikkim, with a vocabulary of their language. *Journal of the Asiatic Society of Bengal*, IX: 379-393.
- Campbell Archibald 1869. On the Lepchas. *Journal of the Ethnological Society of London* (New Series), 1(2): 143-157.
- Choudhury M. *Carrying Capacity of Teesta Basin in Sikkim: Socio-Cultural Environment*. Vol. X. Ministry of Environment and Forests, Government of India.
- Doma Yishey 2010. *Legends of the Lepchas. Folk Tales from Sikkim*. Westland Ltd.
- Environmental Impact Assessment and Management Plan for Teesta Stage IV. H. E. Project Sikkim.
- Foning Arthur R 1972. The children of Kanchenjunga. *Bulletin of the Cultural Research Institute*, 9(1-2): 1-63.
- Foning Arthur R 1979. A short account of the Lepcha language and literature. *Bulletin of the Cultural Research Institute*, 13(3-4): 20-30.

- Foning Arthur R 1980. Some customary laws of our Lepcha Tribe. *Bulletin of the Cultural Research Institute*, 14(1-2): 17-21.
- Foning Arthur R 1980. *Lepcha, My Vanishing Tribe*. New Delhi: Sterling Publications Ltd.
- Gorer Geoffrey 1938. *Himalayan Village: An Account of the Lepchas of Sikkim*. London: M. Joseph Ltd.
- Government of Sikkim, Bureau of Economics and Statistics. Planning and Development Department 1992. *Lepchas of Dzongu: A Socio-economic Survey*. Dec 1981- Jan 1982. Gangtok, Government of Sikkim, 31 pages.
- Gowloog Rip Roshina 1990. Religion and Ethnicity among the Lepchas. *Himalayan Miscellany*, 4( Mar): 34-39.
- Gowloog Rip Roshina 1995. *Lingthem Revisited: Social Changes in a Lepcha Village of North Sikkim*. New Delhi: Har Anand Publications.
- Gowloog Rip Roshina 2001. Social organisation and change among the Lepchas of Sikkim. In: S Sengupta (Ed.): *Tribes of the Eastern Himalayas*. New Delhi: Mittal Publications.
- Hermanns Father Matthias 1954. *The Indo-Tibetans*. Bombay: Fernandes.
- Hooker JD 1855. *Himalayan Journals or Notes of a Naturalist in Bengal, the Sikkim and Nepal Himalayas*. Revised and condensed I and II. London: Ward. Lock and Co. Today and Tomorrow's. New Delhi, Reprint (1980).
- Jana S K, Chauhan AS 2000. Ethnobiological studies on Lepchas of Dzongu, North Sikkim, India. *Annals of Forestry*, 8(1):131-144.
- Jha Ajeya, Jha S, Suhag V 2004. Ethnomedicinal plants of Lepchas of Dzongu area in Sikkim. *Crop Research*, 28(1, 2-3): 138-141.
- Jha Ajeya, Chauhan A S 2005. Traditional Bamboo Based Technology: A Study of Lepchas of Sikkim. *Proceedings of the 2<sup>nd</sup> International Congress of Chemistry and Environment (ICCE-2005) held at Indore from 24 – 26 December 2005*, 250-251.
- Kohli Kanchi 2010. Damming and damning the Teesta. *India Together*. Electronic Publication.
- Little Kerry 2007. Lepcha hunters' narratives of their hidden landscapes. *Bulletin of Tibetology*, 43(1-2): 81-97.
- Little Kerry 2008. Lepcha narratives of their threatened sacred landscapes. *Transforming Cultures* (eJournal), 3: 1.
- Little Kerry 2009. Deep ecology, dams, and Dzonguland. The Trumpeter. *Journal of Ecosophy*, 25:1.
- Little Kerry 2010a. Democracy reigns supreme in Sikkim? A long march and a short visit strains democracy for Lepcha marches in Sikkim. *Australian Humanities Review (Ecological Humanities)* 48, Electronic Publication.
- Little Kerry 2010b. From the villages to the cities: the battlegrounds for Lepcha protests. *Transforming Cultures* (eJournal), 5: 1.
- Mainwaring George Byres 1876. *A Grammar of the Rong (Lepcha) Language as it Exists in the Dorjeling and Sikim Hills*. Calcutta.
- Mainwaring Goerge Byres 1898. *Dictionary of the Lepcha Language*. Revised and Completed by Albert Grünwedel, Berlin.
- Morris John 1938. *Living with Lepchas. A Book about the Sikkim Himalayas*. London: Heinemann .
- Nebesky-Wojkowitz, René von 1952b. Ancient funeral ceremonies of the Lepchas. *Eastern Anthropologist* 5(1): 27-39.
- Nebesky-Wojkowitz René von 1952c. Tibetan drum divinations, Ngamo. *Ethnos*, XVII: 149-157.
- Nebesky-Wojkowitz René von 1953. Hunting and fishing among the Lepchas. *Ethnos*, XVIII: 21-30 .
- Nebesky-Wojkowitz René von 1953d. The religion of the Lepchas. *The Aryan Path*. Bombay. 24.
- Nebesky-Wojkowitz René von 1954. A report on ethnographical research in the Sikkim Himalayas 1950-1953. *Wiener Völkerkundliche Mitteilungen*, 2(1): 33-38.
- Nebesky-Wojkowitz René von 1956. *Wo Berge Götter sind*. Stuttgart: Deutsche Verlags-Anstalt. [English translation: Where the Gods are mountains. Three years among the People of the Himalayas. London: Wiedenfeld and Nicholson, translated by M. Bullock].
- Nebesky-Wojkowitz René von 1956. *Oracles and Demons of Tibet. The Cult and Iconography of the Tibetan Protective Deities*. The Hague: Mouton.
- Nebesky-Wojkowitz René von, Gorer Geoffrey 1951. The use of thread-crosses in Lepcha Lamaist ceremonies. *Eastern Anthropologist*, 4(2): 67-87.
- Pradhan Bharat K , Badola Hemant K 2008 . Ethnomedicinal plant use by Lepcha tribe of Dzongu valley, bordering Khangchendzonga Biosphere Reserve, in North Sikkim, India. *Journal of Ethnobiology and Ethnomedicine*, 4: 22.
- Roy Dulal Chandr 2000. About the Lepcha religion. *Aachuley. A Quarterly Lepcha Bilingual News Magazine*, 4(2): 11-15.
- Roy Dulal Chandr 2001. Dynamics of Lepcha language: A theoretical discourse. *Aachuley. A Quarterly Lepcha Bilingual News Magazine*, 5(3): 14-16.
- Roy Dulal Chandr 2005. *Dynamics of Social Formation among the Lepchas*. New Delhi: Akansha Publishing House.
- Roy Dulal Chandr 2007b. Women among the Lepchas: A socio-economic study. *Aachuley. A Quarterly Lepcha Bilingual News Magazine*, 11(2): 17-28.
- Roy Dulal Chandr 2007c. Dzongu: The present day Mayel Lyang of the Lepchas. *Aachuley. A Quarterly Lepcha Bilingual News Magazine*, 11(3): 49-52.
- Siiger Halfdan 1955. A Cult for the God of Mount Kanchenjunga among the Lepcha of Northern Sikkim. A Himalayan Megalithic Shrine and its Ceremonies. *Actes du IV<sup>e</sup> Congrès International des Sciences Anthropologiques et Ethnologiques 1952*, II: I Ethnologica, Vienna, 185-189.
- Siiger Halfdan 1956. Ethnological Field Research in Chitral, Sikkim, and Assam. Preliminary Report. From the Third Danish Expedition to Central Asia. *Historisk-filosofiske Meddelelser udg. af Det kongelige Danske Videnskabernes Selskab*, 36: 2.
- Siiger Halfdan 1967a. The Lepchas. Culture and Religion of a Himalayan People. Part I. Results of Anthropological Field Work in Sikkim, Kalimpong, and Git. *Publications of the National Museum. Ethnographical Series* , XI: 1.
- Siiger Halfdan 1967b. Fate in the Religion of the Lepchas. In: Helmer Ringgren. Scripta Instituti Donneriani Aboensis II (Eds.): *Fatalistic Beliefs in Religion, Folklore and Literature. Papers read at the Symposium on Fatalistic Beliefs held at Åbo on the 7th-9th of September, 1964*. Stockholm: Almqvist and Wiksell, 150-157.
- Siiger Halfdan 1967c with Jørgen Rischel. The Lepchas: Culture and Religion of a Himalayan People. Part II.

- Lepcha Ritual Texts and Commentary by Halfdan Siiger. Phonetic Transcriptions of Lepcha Ritual Texts with Introduction by Jørgen Rischel. *Publications of the National Museum. Ethnological Series*, XI: II.
- Siiger Halfdan 1971. Himalayan Mountain Cult. *Proceedings of the VIII International Congress of Anthropological and Ethnological Sciences 1968*, Vol. II, Tokyo, 277-279.
- Siiger Halfdan 1972. A Himalayan Goddess of Procreation. From the Lepchas of Sikkim. *Ex Orbe Religionum, Studia Geo Widengren, Pars altera*, Leiden, pp. 236-245.
- Siiger Halfdan 1975. The Gods of the Lepchas of Sikkim. *Proceedings of the XII International Congress of the International Association for the History of Religions 1970. Studies in the History of Religions*. (Supplements to Numen) XXXI, Leiden, pp. 298-304.
- Stocks C de Beauvoir 1925. Folklore and customs of the lap-chas of Sikkim. *Journal and Proceedings of the Asiatic Society of Bengal (New Series)* 21: 325-505.
- Waddell, Lawrence Augustine 1895. *The Buddhism of Tibet or Lamaism*. London: W.H. Allen.
- Waddell Lawrence Augustine 1899. The Lepchas or Rong and their songs. *Internationales Archiv für Ethnographie*, 12: 41-57.
- White J Claude. Arts and Crafts of Tibet and the Eastern Himalayas. *Journal of the Royal Society of Arts*, LVIII: 584-594.