

Socioeconomic and Cultural Conditions of Ethnic Communities in Hkakaborazi National Park

U Aung Win
Lecturer
Department of Geography
University of Yangon

Introduction

Hkakaborazi region is recognised as one of the richest areas in the world in terms of biological resources. For this reason, a biological expedition was sent to this region to carry out a detailed survey on different aspects. The expedition team included four foresters, three zoologists, two botanists, two surveyors, one hiker, and one geographer. This paper resulted from a very adventurous and risky journey to the northernmost part of Myanmar.

Geographical Background of the Study Area

Location

Hkakaborazi National Park is situated in the northernmost part of Myanmar, which is a mountainous region of northern Kachin State (see map in Appendix 1 of 'An Introduction to Myanmar Native Orchids of The Hkakaborazi Area' by Saw Lwin, this volume). It lies between north latitudes 27° 35' and 28° 29', and between east longitudes 97° 18' and 98° 15'. Hkakaborazi National Park is included in the Naung Mung Township of Putao District, Kachin State. It is bounded by India in the west and by China in the north and east. The southern boundary is demarcated along the Nam Tamai River and Taron River.

Geology

The northern part of Kachin State includes the largest tectonic unit in Myanmar. This region is underlain by consolidated, partially low-grade metamorphic, Paleozoic, and Mesozoic sediments and its substratum consists of Pre-Cambrian crystalline rocks. Cretaceous sediments occur chiefly in the western part of this tectonic region, while Late Tertiary and Quaternary sequences surround its western marginal area and form the filling of intermontane basins.

Geomorphology

A mountainous region of Hkakaborazi National Park is situated in the northern part of Myanmar. It partially belongs to the Tibetan Plateau of China. In the extreme north-west regions, it is made up of ranges that flank the Himalayan mountain system, with very high altitudes and steep slopes. The north-eastern fringe of Myanmar consists of valleys and ridges trending from north to south owing to compression forces in between the high ridges. The mountain ranges that run along the Chinese and Indian borders have high altitudes of over 3,048masl. The highest peaks of Myanmar are all in this northernmost mountainous region and they are all covered by snow, as the snow line in the area is about 4,724m. The highest peak is the well-known Hkakaborazi (28° 18' N, 97° 25' E) (5,881m). Other notable high peaks in the area are Ta Hta Razi (28° 18' N, 97° 25' E) (5,203m), Sheankala Razi (28° 22' N, 97° 44' E) (5,463m), and Dindaw Razi (28° 22' N, 97° 44' E) (5,463m). All these mountain peaks are

“there are many tributaries of mountain streams that flow into the Seinghku Wang and Adung Wan. The most prominent have a dendritic pattern reflecting the geologic structure”

covered with perpetual snow and ice. So they are known as the ‘icy mountains’.

The mountains in Hkakaborazi National Park are composed of several branches rather than a single range. The average altitude of these ranges is about 3,048m and they have steep slopes and escarpments. Some escarpments have a dip of nearly 90°. Extensive fluvial plains are almost absent, with only narrow plains alongside the mountain streams. The mountains trend from north to south, and get gradually lower southwards. The slopes of the mountains are steeper in the north than in the south.

Hydrology

Hkakaborazi National Park has many rivers and streams, due to its abundant rainfall. The largest river system of this area is Nam Tamai River system; it is formed by the confluence of two mountain streams, Seinghku Wang and Adung Wan. There are many tributaries of mountain streams that flow into the Seinghku Wang and Adung Wan. The most prominent have a dendritic pattern reflecting the geologic structure. The Nam Tamai, having steep slopes and a narrow valley, flows swiftly. Mountain streams carry big boulders along the watercourse. They are all perennial streams since they are fed with melting snows in the summer. Numerous small glaciers are found along the slopes of the high icy mountains. The streams at the source of the Nam Tamai begin their drainage system in the mountains lying across the Sino-Myanmar border. They join together to form the Nam Tamai, which later joins up with the Taron River. The Taron and Nam Tamai join together to form the Maihka, which continues to flow southward.

“in general, it has a cool, temperate climate. Some of the higher mountains have permanent snow cover”

Climate

The climate of the extreme north of Myanmar is influenced by both latitude and altitude. Hkakaborazi National Park is mainly situated in the Naung Mung area, and has a northernmost location. Therefore, in general, it has a cool, temperate climate. Some of the higher mountains have permanent snow cover. The climate of the northernmost part of Myanmar is influenced by both monsoon winds and also by disturbances from westerlies.

Due to the lack of meteorological stations in the Naung Mung area the data from the nearest meteorological station at Putao were used for this study. It experiences the highest temperatures at summer solstices, when it receives maximum insolation (Table 15). The average annual temperature is above 25°C in June, July, and August. The highest mean daily maximum temperatures also occur during these months. In June, the daily highest maximum temperature recorded is 37.8°C. The lowest minimum daily temperature goes down to nearly freezing point in January (see Figure 10).

“it experiences the highest temperatures at summer solstices”

Mean daily relative humidity of Putao is always high (about 90%) especially in the morning (Table 16). In the evening, relative humidity tends

Table 15: Temperatures (° C) in Putao (1981-1990)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Mean	14.0	16.0	18.5	20.4	24.6	26.0	25.6	26.4	25.4	23.4	18.7	15.0
Mean daily maximum	20.8	22.3	24.1	25.0	29.8	29.4	28.4	30.1	28.8	28.3	25.6	21.4
Mean daily minimum	7.2	9.8	12.9	15.7	19.5	22.5	22.8	22.8	21.9	18.6	11.8	8.5
Highest maximum	26.3	28.3	32.6	33.1	37.0	37.8	36.0	36.0	36.0	33.2	33.2	27.5
Lowest minimum	0.6	2.0	7.0	10.2	13.0	19.0	19.0	17.6	17.6	11.0	4.7	3.0

Table 16: Mean Daily Relative Humidity (%) in Putao (1981-1990)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
0930h (MST)	97	92	88	87	80	91	96	93	92	87	91	96
1830h (MST)	85	83	81	82	77	86	88	86	89	86	85	87

to be high as well (more than 90%) (see Figure 11). Mean monthly precipitation is 3,873 mm with higher rainfall in the summer months (Table 17). The highest rainfall occurs in the months of June, July, and August. The summer monsoon winds penetrate the area following the topographic trend of the mountains and valleys and the mountainous terrain brings about more orographic rains within this area.

Naturally, there is no such rainfall in the summer months of April and May or in the winter months of November, December, and January. However, the extreme north of Myanmar receives rainfall all the year round. This can be explained by its location and the effect of the air circulation of westerlies of temperate climate. The number of average monthly rainy days accounts for 165.5 days with most rain occurring in the summer (see Figure 12).

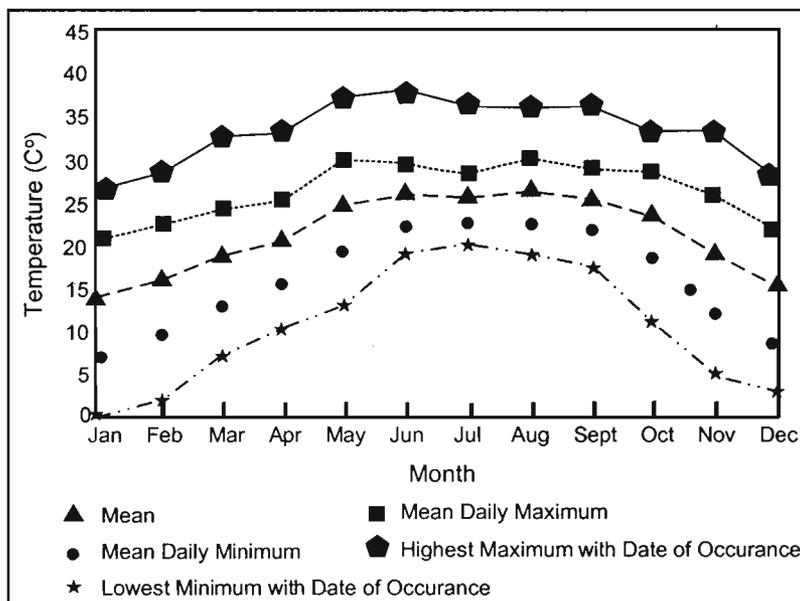


Figure 10: Temperature of Putao in Degrees Centigrade (1981-1990)

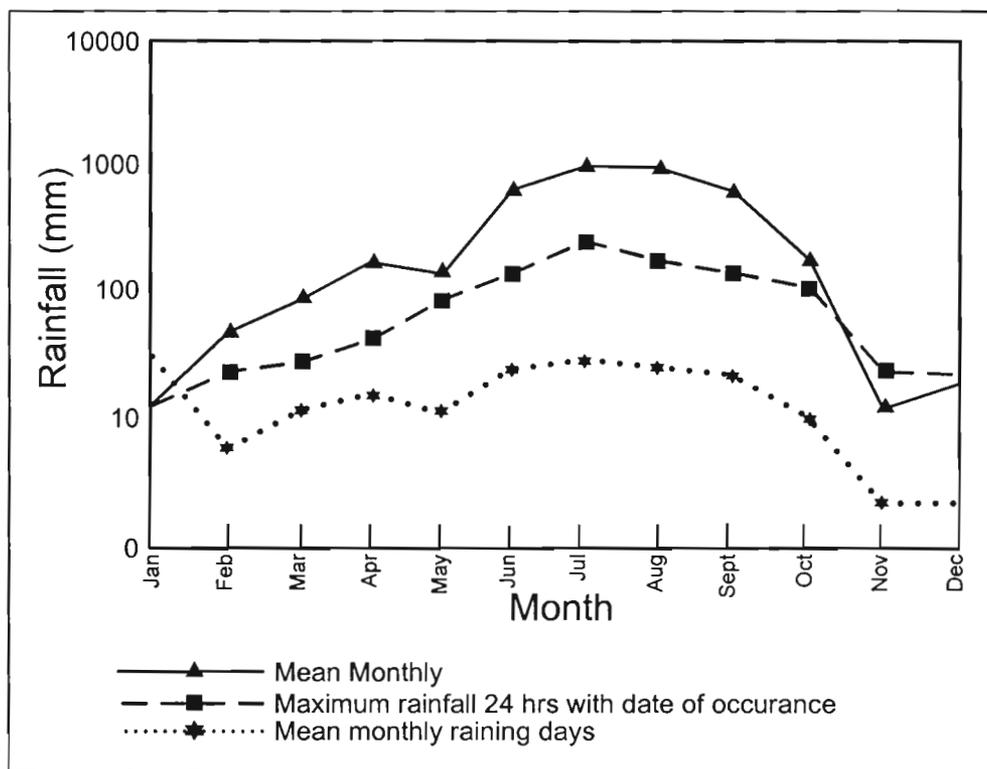


Figure 11: Rainfall in (mm) for the year (1981-1990) at Putao

Table 17: Rainfall (mm) in Putao (1981-1990)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Annual
Mean monthly rainfall	13	46	84	170	138	625	996	951	633	184	13	20	3873
Maximum rainfall within 24h	13	23	27	43	83	141	243	180	143	109	25	24	-
Mean monthly days with rain	2.7	5.8	11.5	15.7	11.6	24.5	29.1	26.2	23.1	10.7	2.3	2.3	165.5

Source: Hydrology and Meteorology Department

Pedology and Biogeography

“fertile fluvisols and gleysols are found in the river valley plains and are used as agricultural land”

There are lithosols on the steeper slopes of the high mountains and cambisols are found on the rest of the hilly tracts. Fertile fluvisols and gleysols are found in the river valley plains and are used as agricultural land.

With heavy rainfall, poor accessibility and low human occupancy, the region has a dense, natural vegetative cover. The southern part of Hkakaborazi National Park has temperate, semi-deciduous, broad-leaved rainforest owing to the cool, temperate, humid climate and an altitude

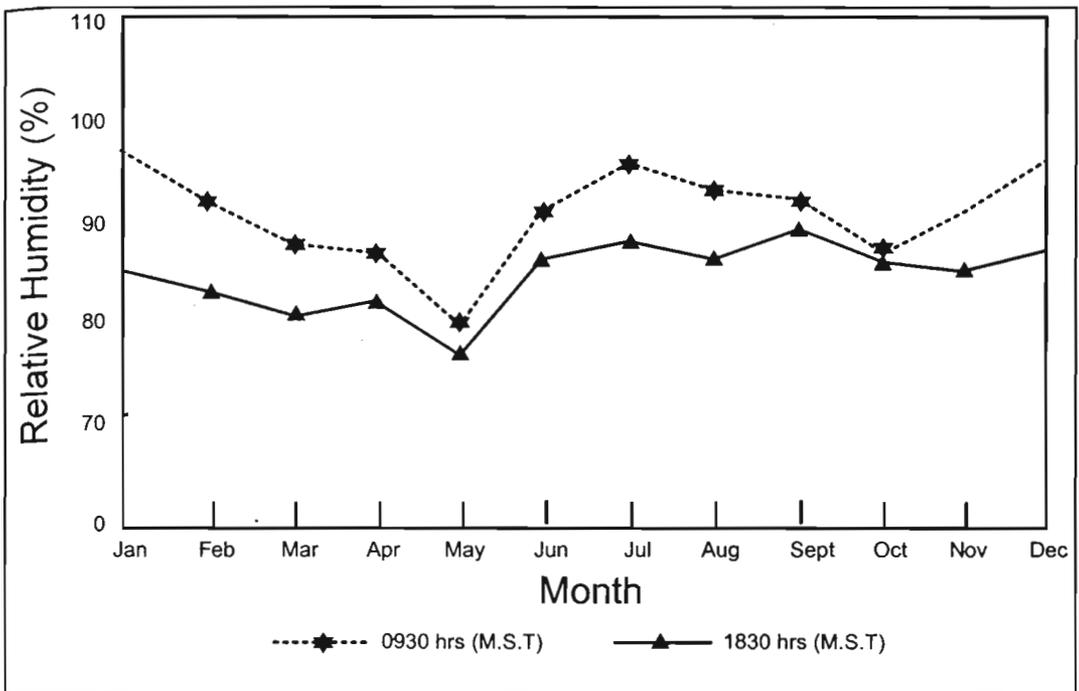


Figure 12: **Mean Daily Relative Humidity Percentage of Putao (1981-1990)**

between 1,829 and 2,743m. Evergreen, coniferous forests are dominant between 2,743 and 3,352m. At the very high summits, snow forests prevail. Alpine vegetation and scrub occur above 3,352m. In the river valleys and gently sloping areas, subtropical, evergreen, broad-leaved forests occur, and there is very thick undergrowth especially in the rainy season. Bamboo, ferns, climbers, epiphytes, magnolias, maples, cherries, and birch are common.

Hkakaborazi and its environs are rich in biodiversity, and they are little-explored regions. The wild animals living in the national park include barking deer, monkey, bear, wild boar, sambhur, serrow, goral, otter, takin, musk deer, blue sheep, red panda, many bird species, and fish. The existence of some of these animals is under threat. Otter and musk deer are rare species and they are endangered in this area due to their high trade value.

Social Geography of the Study Area

General Characteristics of the Human Population

The biological expedition team observed 11 villages within the park along the route leading to Hkakaborazi. Altogether there are 138 residential houses with 160 households in these villages. The average density of the population in Naung Mung Township is 1.3/km² and it is one of the most sparsely populated areas in Myanmar. Along the trail, the density is even less than 1.3/km². In 1997, the total population was 838 people (439 males and 399 females) (Table 18). Among these villages Arundam Village is the most populous with a population of 160. Arundam is situated on the bank of Nam Tamai River. The least populous village is Ngalaingdam, which has only 15 residents. This village lies on the northern part of the expedition trail standing on the head-stream areas of Tashu Wan Creek. Most of these villages stand either in the river valleys or at the confluence of the streams.

“the chief reasons for the location of nucleated settlements on the riverain area could be easy access to drinking water, better communications, and availability of flat lands for cultivation”

There is no human occupancy or settlement on steep slopes, ridges of high altitudes, and in dense forest areas. It was observed from the field study that the pattern of human settlement is mainly influenced by topography. Some villages are also located on the alluvial fans between piedmonts and streams. It was observed that plains have to be given priority for human settlement rather than for farm land. In some instances human settlements are found together with cultivated lands, but the majority of villages are agglomerations of separate residential units. The chief reasons for the location of nucleated settlements on the riverain area could be easy access to drinking water, better communications, and availability of flat lands for cultivation. The compact settlements are usually found on the marginal strips of streams. The shape of the village, therefore, depends absolutely on the nature of those lands. Thus, the development of villages is controlled by the extent of level lands as well as by agricultural production.

Ethnic Groups

The majority of ethnic groups belong to Kachin races as the study area is situated in Kachin State. The majority of the population is Rawan. The minority groups comprise a few other Tibeto-Myanmar races (Dalong) and Taron (Table 18). They are all descendants from an early Tibeto-Burman race who migrated to Myanmar from Tibet. The indigenous Kachin races of Lisu and Rawan and Tibetans are found in the Sino-Myanmar border region. There is close communication across the border. The Tibetans settled in China first and unintentionally became settlers in Myanmar.

Table 18: Population and Educational Status of Hkakaborazi National Park

Village	No. of houses	No. of households	Ethnic group	Population		Religion	School	No of teachers	No of students	Building type	Condition of school buildings
				M	F						
Pangnandim	6	8	Rawan	18	14	Christian	Primary school	3	12	Grass and timber	Normal
Ngawa	16	24	Rawan	83	56	Christian	Primary school	2	18	Zinc sheets and timber	Normal
Gawai	18	18	Rawan	60	48	Christian	Primary school	3	38	Zinc sheets and timber	Normal
Tazundam	12	16	Rawan	46	50	Christian	Primary school	2	12	Zinc sheets and timber	Poor No desks
Guba	6	7	Tibetan	15	22	Buddhist	Primary school	1	10	Grass and timber	Normal Lack of stationery
Madain	15	12	Tibetan	35	43	Buddhist	Primary school	2	12	Grass and timber	Normal Lack of stationery
Tazuhtu	18	22	Rawan	68	88	Christian	Primary school	3	15	Grass and timber	Normal Lack of stationery
Ngalaingdam	3	3	Tibetan	5	10	Buddhist	None	-	-	-	-
Talarhtu	8	11	Rawan (70%)	35	25	Christian	Primary school	3	15	Grass and timber	Normal
Arundam (Crown)	25	30	Rawan (65%) Taron (35%)	71	89	Christian	Primary school	3	57	Grass and timber	Normal Lack of stationery
Tahundam	11	9	Tibetan	38	29	Buddhist	Primary school	2	6	Grass and timber	Normal Lack of stationery

Tibetans and Tarons were the last people to migrate to Myanmar. They settled in the northernmost part of Myanmar where the climate is generally cool. (Table 19). The majority of Taron groups are found in Karoung Village, which is also known as Arundan or Adonlong Village (Table 20). Tibeto-Myanmars are found in places near icy mountains very close to the border areas with China—in two villages, Tahawadam and Ngalaingdam. Tibeto-Myanmars are also found in the Guba and Madain villages situated close to the Indian border. All these races living in Hkakaborazi National Park are famous for being great hunters.

Ways of Living

Many of the above-mentioned ethnic races wear Myanmar clothes of longies and engies (underwear and shirt) like most Bamars. One exception is the Tibeto-Myanmars, the men wear trousers and the women long skirts. They also wear long, woollen coats at social and religious ceremonies. Rawan men wear traditional suits for social and religious ceremonies, with bamboo hats that have fangs of wild boars attached. Tarons wear long trousers with blankets wrapped around as their traditional costume. Their traditional way of life is not strictly forbidden and they are more liberal within their close society.

Houses with long-footed posts and split bamboo matting walls are commonly found in villages along the trail. These residential houses are constructed of timber and bamboo with thatched roofing. The floor is made of bamboo tied together. Houses built entirely with logs are found on the northern part of the trail where the climate is cool, in places such as in Tashuhtu, Arundam, Guba, Madain, and Tahawadam. The roofing of these houses is made of thin sheets of pine. In these rural houses, windows are almost absent (two main entrances, one at the front and the other at the rear). The fireplace is located within the house itself, there is no separate kitchen. Thus the houses are full of smoke. As the region receives relatively low insolation and direct sunlight, it has a cool climate so clothing and meat are dried by the heat of the fire.

Languages

Rawans and Tibeto-Myanmars have their own dialects and speech is dissimilar. But there are more Rawans, so most of the other races speak Rawan as a common language. Moreover, Rawans and Tibeto-Myanmars have native written languages, but Tarons do not. They have only a spoken native language. All races are able to understand and speak the Myanmar language except for Tibeto-Myanmars and some Tarons. Only 20 Tibeto-Myanmars are able to understand and speak the Myanmar language. The majority of Rawans can speak the Myanmar language fluently.

Religion and Beliefs

Formerly animists, the vast majority of Rawans and Tarons have converted to Christianity. There are different branches of Christianity, but the church of Christ is the dominant branch. Every Rawan village has a pastor and a church of its own. Tibeto-Myanmars are mostly Theravada Buddhists. In Tahawadam Village there is a Buddhist shrine and a Buddhist monastery. Tibetans, originally Hrinayana Buddhists, were later converted to Theravada after their migration into Myanmar.

Health and Hygiene

Current health-care programmes are unsatisfactory. There are no health-care centres in any of the 11 villages. Indigenous medical care, based on medicinal plants such as herbs, tubers and bulbs is practised throughout the region. In acute cases, patients are sent to the township headquarters hospital at Naung Mung. The most common diseases include malaria, influenza, pneumonia, and intestinal infectious diseases (Table 21).

Table 19: Population of Tahawndam Village (Tibetan)

Sr. No.		Name	Age	Sex	Household leader and relationship
1	1	U Gana	58	Male	Household leader
	2	Mg Htein Sein	25	Male	Son
	3	Mg Kunbatawgyi	15	Male	Son
	4	Mg Da Nga	12	Male	Son
	5	Mg Sri Kunta	8	Male	Son
	6	Ma Sarin Aung New	20	Female	Daughter
	7	Ma Khin Saw Dayma	10	Female	Daughter
2	1	U Pe Ma Young Htu	37	Male	Household leader
	2	Daw Sonekardayma	32	Female	Wife
	3	Ma Hsahtindayma	13	Female	Daughter
	4	Daw Ahkyaydayma	60	Female	Mother
	5	Mg Tawgyisarin	9	Male	Son
	6	Ma Rashichodae	7	Female	Daughter
	7	Mg Tet Lu	4	Male	Son
	8	Mg Khama Cho Phi	1	Male	Son
3	1	U Htaung Sha	59	Male	Household leader
	2	Daw Ahmo	43	Female	Wife
	3	Mg Pe Magonba	19	Male	Son
	4	Ma Pe Malarmo	15	Female	Daughter
	5	Mg Htet Shae	3	Male	Son
	6	Maung Zunphi	1	Male	Son
4	1	U Aung Chout	39	Male	Household leader
	2	Daw Lu Saung	32	Female	Wife
	3	Mg Sarin Tawgyi	7	Male	Son
	4	Mg Sarin Aung Htwa	3	Male	Son
	5	Ma HtashiYaungtaung	1	Female	Daughter
	6	Daw Kya Mo	68	Female	Mother
5	1	U Lwon Dam Min	33	Male	Household leader
	2	Daw Hsaung Dayma	36	Female	Wife
	3	Mg Sarin Chon Phi	9	Male	Son
	4	Ma Yin Sein Aungmo	5	Female	Daughter
	5	Mg Pe Ma Chon Phi	1	Male	Son
6	1	U Htin Htu	61	Male	Household leader
	2	Daw Ma Yin	61	Female	Wife
	3	U Yin Sein Chon Phi	33	Male	Son
	4	Mg Danyi	26	Male	Son
	5	Ma Sana Yaungtaung	20	Female	Daughter
	6	Ma Yin Chay Hsamo	25	Female	Daughter
	7	Ma Sarin Chode	16	Female	Daughter
	8	Ma Htashi Nsamo	8	Female	Daughter
	9	Mg Pe Ma Nabo	3	Male	Son
	10	Ma Hsana Aungmo	4	Female	Daughter
	11	Mg Htashi Tawgyi	1	Male	Son
7	1	U Htin Sein	30	Male	Household leader
	2	Daw Chan Chaw Thwema	27	Female	Wife
	3	Ma Hsana Thwema	11	Female	Daughter

Table 19 Cont.....

7	4	Ma Pe Moe	7	Female	Daughter
	5	Mg Sarain Kyaung Hsu	4	Male	Son
	6	Mg Hsana Naung Hsu	1	Male	Son
8	1	U Kyaung Hsu	37	Male	Household leader
	2	Daw Htay	38	Female	Wife
	3	Mg Chawayi Dawgyi	13	Male	Son
	4	Mg Htin Sein Naung Hsu	10	Male	Son
	5	Mg Saya Dawgyi	8	Male	Son
	6	Ma Sari Yaung Saung	5	Female	Daughter
	7	Ma Kyan Hsu Thwema	1	Female	Daughter
	8	U Namar Johnson	23	Male	Younger brother
9	1	Daw Sari Dawma	73	Female	Household leader
	2	Ma Ah Htu	40	Female	Daughter
	3	Mg Ah Bon	26	Male	Son
	4	Daw Sanjay Larmoe	28	Female	Daughter
	5	Ma Sitha	5	Female	Granddaughter
	6	Ma Hsana Larmoe	3	Female	Granddaughter
	7	Mg Karu	18	Male	Grandson
	8	Ma Lan Hsu	16	Female	Granddaughter
	9	Mg Kaw Yaw	14	Male	Grandson
	10	Mg Hsana Htashi	13	Male	Grandson

The staple diet is mainly composed of rice, maize, pulses, beans, sweet potatoes, yams, and potatoes. Rice is grown and consumed in villages where there is enough level land for cultivation, but production is not sufficient to meet consumption of the people in the area for the whole year. Maize is commonly used as a staple food, but production is still too low to meet demand and it has to be supplemented by root crops, yams, and bulbs, which grow wild in the jungle. There is no evidence of malnutrition, but gathering enough food for a day is a hard task.

Educational Status

Most villages have a State Primary School but the majority of them are in need of qualified teachers and some general school workers have to teach without any professional skills. The township educational officer at Naung Mung cannot effectively supervise the teaching activities due to poor communications. In all schools visited by the team, it was found that the teacher-pupil ratio is 1:10. Such a ratio could provide an effective education programme if facilities were good (Table 18).

Some primary school buildings are very old, tilted to one side, and nearing collapse; some of them are life threatening. There are not enough desks in the primary school in Karaung Village and no desks in the schools in Tazundam and Tahawadam Villages. In Talarhtu village, there is no State Primary School; a church is used instead. The primary schools of Tazundam, Tashuhtu, Karaung, and Tahwandam face shortages of stationery and textbooks, which imposes difficulties on teaching activities. All the Tibeto-Myanmars have the opportunity to receive elementary education but they have no opportunity to complete primary education. Nobody attains an educational status higher than the fourth standard, that is, primary school level.

Table 20: Population of Karaung Village (Rawan & Taron)

Sr. No.	Name	Age	Sex	Race	Household leader & relationship
1	1 U Yonepali Min	80	Male	Rawan	Household leader
	2 Daw Hsone Dam Nan	75	Female	Taron & Rawan	Wife
	3 Mg Yonepali Hsin	28	Male	Taron & Rawan	Son
	4 Mg Yonepali Min	15	Male	Taron & Rawan	Son
	5 Ma Yonepali Nin Yam	25	Female	Taron & Rawan	Daughter
2	1 U Yonepali Phon	40	Male	Taron & Rawan	Household leader
	2 Daw Hsin Chan Chan	35	Female	Rawan	Wife
	3 Mg Yonepali Phon	13	Male	Rawan	Son
	4 Mg Yonepali Khin	11	Male	Rawan	Son
	5 Mg Yonepali Hsin	8	Male	Rawan	Son
	6 Mg Yonepali Min	6	Male	Rawan	Son
	7 Ma Yonepali Nan	4	Female	Rawan	Daughter
	8 Mg Yonepali Phi	2	Male	Rawan	Son
3	1 U Yonepali Derum	34	Male	Rawan & Taron	Household leader
	2 Daw Hsone Dum Nin	30	Female	Taron & Rawan	Wife
	3 Mg Yonepali Phon	12	Male	Rawan & Taron	Son
	4 Mg Yonepali De	8	Male	Rawan & Taron	Son
	5 Ma Yonepali Nan	5	Female	Taron & Rawan	Daughter
	6 Ma Yonepali Nin	2	Female	Taron & Rawan	Daughter
	7 Mg Yonepali Khin	1	Male	Rawan & Taron	Son
4	1 U Yonepali Joseph	30	Male	Rawan & Taron	Household leader
	2 Daw Tahson Nin Yam	26	Female	Rawan & Rawan	Wife
	3 Ma Yonepali Nan	2	Female	Rawan & Taron	Daughter
	4 Mg Yonepali Myo Rum	2 mnth	Male	Rawan & Taron	Son
5	1 U Chein Rein Hsin	65	Male	Rawan	Household leader
	2 Daw Hsondamnan	55	Female	Taron & Rawan	Wife
	3 U Chein Rein Phon	30	Male	Rawan & Taron	Son
	4 Mg Chein Rein Khin	26	Male	Rawan & Taron	Son
	5 Mg Chein Rein Hsin	23	Male	Rawan & Taron	Son
	6 Daw Hsondamnin	35	Female	Taron & Rawan	Daughter-in-law
	7 Ma Chein Rein Chan	5 mnth	Female	Rawan & Taron	Grand Daughter
6	1 U Hsonedamphon	35	Male	Taron & Rawan	Household leader
	2 Daw Htala Nanhtein	33	Female	Rawan & Taron	Wife
	3 Ma Hsonedamnan	12	Female	Rawan & Taron	Daughter
	4 Mg Hsonedamphon	10	Male	Rawan & Taron	Son
	5 Ma Hsonedamnin	3	Female	Rawan & Taron	Daughter
	6 MaHsonedamchan	1	Female	Rawan & Taron	Daughter
	7 Daw Htala Nanhsin	70	Female	Rawan & Taron	Grandmother
7	1 U Wan Sein Phon	60	Male	Rawan	Household leader
	2 Daw Chan Rein San	65	Female	Rawan	Wife
8	1 U Hsonedam Phee	85	Male	Rawan	Household leader
	2 Daw Htala Nan Chan	60	Female	Rawan	Wife
	3 Mg Hsonedam Khin	30	Male	Taron*	Son
	4 Mg Hsonedam Yon	24	Male	Rawan	Son
	5 Ma Hsonedam Chan	18	Female	Taron & Rawan	Daughter
	6 Mg Hsonedam Htinrun	12	Male	Taron & Rawan	Son
	7 Mg Hsonedam Khin	8	Male	Taron & Rawan	Son
	8 Ma Hsonedam Nan	6	Female	Taron & Rawan	Daughter

Table 20 Cont....

9	1	U Ahromdam Saymi	34	Male	Rawan	Household leader
	2	Daw Hsonedam Nam	30	Female	Taron & Rawan	Wife
	3	Ma Ahromdam Nam	12	Female	Rawan & Taron	Daughter
	4	Mg Ahromdam Phon	8	Male	Rawan & Taron	Son
	5	Ma Ahromdam Nin	6	Female	Rawan & Taron	Daughter
	6	Ma Ahromdam Chan	2	Female	Rawan & Taron	Daughter
10	1	Daw Yonpali Nan	36	Female	Taron & Rawan	Household leader
	2	Mg Lyondam Hsin	18	Male	Rawan	Son
	3	Ma Lyondam Nan	14	Female	Rawan	Daughter
	4	Ma Lyondam Nin	10	Female	Rawan	Daughter
	5	Mg Lyondam Phee	8	Male	Rawan	Son
11	1	U Yonepali Htwama	87	Male	Rawan	Household leader
	2	Daw Hsonedam Nan	78	Female	Taron*	Wife
	3	Mg Lyondam Deson	28	Male	Rawan & Taron	Grandson
12	1	U Hsinchan Khin	29	Male	Rawan	Household leader
	2	U Htala Nan Hsin	34	Male	Rawan	Uncle
	3	Mg Lyondam Phon	10	Male	Rawan	Nephew
	4	Daw Htala Nan	45	Female	Rawan	Mother
	5	Daw Tahsunam Nan	40	Female	Rawan	Aunt
	6	Ma Lyondam Nan	18	Female	Rawan	Niece
13	1	U Lyondam Phi	78	Male	Taron*	Household leader
	2	Ma Lyondam Doo	27	Female	Taron & Rawan	Daughter
	3	Ma Lyondam Zin	24	Female	Taron & Rawan	Daughter
	4	U Lyondam Hsin	35	Male	Taron & Rawan	Son
	5	Daw Tazan Nan	29	Female	Taron & Rawan	Daughter-in-law
	6	Mg Lyon Ang Phon	10	Male	Taron & Rawan	Grandson
	7	Ma Lyon Ang Htin	8	Male	Taron & Rawan	Grandson
	8	Ma Lyon Ang Nin	6	Female	Taron & Rawan	Granddaughter
	9	Ma Lyon Ang Chan	3	Female	Taron & Rawan	Granddaughter
14	1	U Hsondam Detan	29	Male	Taron & Rawan	Household leader
	2	Daw Lyondam Chan	34	Female	Rawan & Taron	Wife
	3	Ma Hsondam Nan	10	Female	Rawan & Taron	Daughter
	4	Ma Hsondam Nin	8	Female	Rawan & Taron	Daughter
	5	Mg Hsondam Htin	5	Male	Rawan & Taron	Son
	6	Ma Hsondam Chan	2	Female	Rawan & Taron	Son
15	1	U Lyondam Phee	30	Male	Taron & Rawan	Household leader
	2	Daw Hsin Chan Nin	26	Female	Rawan & Taron	Wife
	3	Mg Lyondam De	4	Male	Rawan & Taron	Son
	4	Ma Lyondam Nan	2	Female	Rawan & Taron	Daughter
16	1	U Lyondam Min	33	Male	Taron*	Household leader
	2	Daw Htala Nan Naing	30	Female	Rawan	Wife
	3	Ma Lyondam Nan	6	Female	Rawan & Taron	Daughter
	4	Ma Lyondam Nin	4	Female	Rawan & Taron	Daughter
	5	Ma Lyondam Chan	3	Female	Rawan & Taron	Daughter
	6	Mg Lyondam Phon	1	Male	Rawan & Taron	Son

Table 20 Cont.....

17	1	U Lyondam Derum	36	Male	Taron & Rawan	Household leader
	2	Daw Hsompali Chan	30	Female	Taron & Rawan	Wife
	3	Ma Lyondam Nan	12	Female	Rawan & Taron	Daughter
	4	Mg Lyondam Phon	9	Male	Rawan & Taron	Son
	5	Mg Lyondam Htin	6	Male	Rawan & Taron	Son
	6	Ma Lyondam Chan	3	Female	Rawan & Taron	Daughter
	7	Ma Lyondam Doo	1	Female	Rawan & Taron	Daughter
18	1	U Lyondam Hteinpa	89	Male	Taron & Rawan	Household leader
	2	Daw Htala Nan Chan	78	Female	Rawan	Wife
	3	Mg Lyondam Yon	30	Male	Rawan & Taron	Son
	4	Ma Lyondam Yon	29	Female	Rawan & Taron	Daughter
	5	U Lyondam Htin	38	Male	Rawan & Taron	Son
	6	Daw Yonepali Nin	29	Female	Taron & Rawan	Daughter-in-law
	7	Mg Lyondam Phon	18	Male	Rawan & Taron	Grandson
	8	Ma Lyondam Nan	15	Female	Rawan & Taron	Granddaughter
	9	Ma Lyondam Chan	10	Female	Rawan & Taron	Granddaughter
	10	Mg Lyondam Khin	17	Male	Rawan & Taron	Grandson
	11	Mg Lyondam Hsin	12	Male	Rawan & Taron	Grandson
	12	Ma Lyondam Doo	6	Female	Rawan & Taron	Granddaughter
	13	Ma Lyondam Zin	1	Female	Rawan & Taron	Granddaughter
	14	Mg Lyondam Phi	2	Male	Rawan & Taron	Grandson
19	1	U Lyondam Khin	45	Male	Taron & Rawan	Household leader
	2	Daw Htala Nam Nan	47	Female	Tawan	Wife
	3	Ma Hsondam Chan	30	Female	Taron & Rawan	Daughter
	4	Ma Hsondam Doo	28	Female	Taron & Rawan	Daughter
	5	Ma Hsondam Nan	10	Female	Taron & Rawan	Daughter
20	1	U Lyondam Dawi	45	Male	Taron*	Household leader
	2	Ma Lyondam Non	35	Female	Taron*	Sister
	3	Ma Lyongdam Chan	37	Female	Taron*	Sister
	4	Ma Lyondam Nan	39	Female	Taron*	Sister
	5	Ma Lyondam Nin	4	Female	Rawan & Taron	Niece
21	1	U Hta Hsu Nan Hsin	55	Male	Rawan	Household leader
	2	Daw Tazan Non	45	Female	Rawan	Wife
	3	Mg Hta Hsu Nan Pon	35	Male	Rawan	Son
	4	Mg Hta Hsu Nan Htin	28	Male	Rawan	Son
	5	Mg Hta Hsu Nan Khin	15	Male	Rawan	Son
	6	Ma Hta Hsu Nan Ban	24	Female	Rawan	Daughter
	7	Ma Hta Hsu Nan Nan	30	Female	Rawan	Daughter
	8	Ma Hta Hsu Nan Nin	27	Female	Rawan	Daughter
	9	Ma Nan	3	Female	Rawan	Granddaughter
	10	Ma Nan	2	Female	Rawan	Granddaughter
22	1	U Tazan Phon	50	Male	Rawan	Household leader
	2	Daw Ahronnam Nan	45	Female	Taron & Rawan	Wife
	3	Mg Dazan Di	30	Male	Rawan	Son
	4	Ma Dazan Chan	24	Female	Rawan	Daughter
	5	Ma Dazan Nan	17	Female	Rawan	Daughter
	6	Ma Dazan Nin	10	Female	Rawan	Daughter
	7	Ma Dazan Htan	8	Female	Rawan	Daughter

Table 20 Cont.....

22	8	U Dazan Phon	33	Male	Rawan	Son
	9	Daw Ahrodam Nam	30	Female	Rawan	Daughter-in-law
	10	Mg Tet Phon	2	Male	Rawan	Grandson
	11	U Dazan Khin	28	Male	Rawan	Son
	12	Daw Yonepali Non	30	Female	Taron & Rawan	Daughter-in-law
	13	Ma Dazan Nan	4	Female	Rawan	Granddaughter
	14	Ma Dazan Nin	2 mnth	Female	Rawan	Granddaughter
23	1	Daw Yonepali Nin Hson	40	Female	Rawan	Household leader
	2	Ma Ahrodam Nan	29	Female	Rawan	Daughter
	3	Ma Ahrodam Nin	25	Female	Rawan	Daughter
	4	Ma Nan	4	Female	Rawan	Granddaughter
	5	Ma Nin	1	Female	Rawan	Granddaughter
	6	Mg Ahrodam Khin	13	Male	Rawan	Grandson
	7	Mg Ahrodam Hsin	10	Male	Rawan	Grandson

Economic Geography of the Study Area

Primary Activities

There are four types of primary economic activities: cultivation, hunting, gathering of medicinal plants, and others (Table 22).

Cultivation

Two kinds of farming methods are practised in the National Park, shifting cultivation and wet cultivation.

Shifting cultivation: The most extensive occupation is hill-agriculture, which is a subsistence type of economic activity. Taungya (hill farming) is carried out on the gentle slopes of hills. Bamboo and tall trees are cleared by the slash-and-burn method, and crops are grown in the early monsoon period. Some taungya is even found on steep slopes with an angle of 45°. The chief crops of hill agriculture are glutinous rice, maize, beans and pulses, mustard, potatoes, yams, and millet. Only what is needed is grown. The rice yield per ha is usually less than 20 baskets (one basket is equivalent to 42 kg of unhusked paddy). This yield is not enough to support a farming family, so maize, beans, potatoes, yams, and wheat have to supplement the daily diet. There is a very small amount of terrace-like cultivation in a few areas.

Wet cultivation:

'Le' or wet cultivation is mainly for growing paddy. Ngawa and Tazundam villages, which have a small area of flat land, are the main rice-producing areas. Although paddy-growing lands are found as far north as Tazundam Village, in the north, the shortages of level land and the cool climate do not permit the successful growing of paddy. The yield is low due to lack of modern farming methods, sparse application of fertilisers, and destruction by wild animals. The average yield per ha is less than ten baskets, which is much less than annual family consumption.

Hunting

The second most important economic activity is hunting, which in this case is the indiscriminate killing of wild animals for food. There are two reasons for hunting: to get meat for the family's

Table 21: Health Conditions in Hkakaborazi National Park

Village	Food	Health centre	Major diseases	Drinking water	Toilet system	Remarks
Pangnandim	Millet, maize, yam	Nil	Malaria, diarrhoea, worm infection, pneumonia	Stream	Pit type and bush type	Very rare physical cleaning and washing Live together with domestic dogs and chickens
Ngawa	Rice, maize, potatoes	Nil	Malaria, diarrhoea, worm infection, pneumonia	Stream	Pit type and bush type	Very rare physical cleaning and washing Live together with domestic dogs and chickens
Gawai	Rice, maize, potatoes, pith of minbaw palm	Nil	Malaria, diarrhoea, worm infection, pneumonia	Stream	Pit type and bush type	Very rare physical cleaning and washing Live together with domestic dogs and chickens
Tazundam	Millet, maize, pith of minbaw palm	Nil	Malaria, diarrhoea, worm infection, pneumonia	Stream	Pit type and bush type	Very rare physical cleaning and washing Live together with domestic dogs and chickens
Guba	Wheat, millet, maize, milk, cheese, potatoes	Nil	Malaria, diarrhoea, worm infection, pneumonia	Stream	Pit type and bush type	Very rare physical cleaning and washing Live together with domestic dogs and chickens
Madain	Wheat, millet, maize, milk, cheese, potatoes	Nil	Malaria, diarrhoea, worm infection, pneumonia	Stream	Pit type and bush type	Very rare physical cleaning and washing Live together with domestic dogs and chickens
Tazuhtu	Millet, maize, yam, potatoes, pith of minbaw, palm	Nil	Malaria, diarrhoea, worm infection, pneumonia	Stream	Pit type and bush type	Very rare physical cleaning and washing Live together with domestic dogs and chickens
Ngalaindam	Millet, maize, yam, potatoes, pith of minbaw, palm	Nil	Malaria, diarrhoea, worm infection, pneumonia	Stream	Pit type and bush type	Very rare physical cleaning and washing Live together with domestic dogs and chickens
Arundam (Crown)	Millet, maize, yam, potatoes	Nil	Malaria, diarrhoea, worm infection, pneumonia	Stream	Pit type and bush type	Very rare physical cleaning and washing Live together with domestic dogs and chickens
Talarhtu	Millet, maize, yam, potatoes	Nil	Malaria, diarrhoea, worm infection, pneumonia	Stream	Pit type and bush type	Very rare physical cleaning and washing Live together with domestic dogs and chickens
Tahundam	Wheat, maize, millet, milk, cheese, potatoes	Nil	Malaria, diarrhoea, worm infection, pneumonia	Stream	Pit type and bush type	Normal physical cleaning and washing Live together with domestic dogs and chickens

Table 22: Economic Conditions of Hkakabo Razi National Park

Village	Main profession	Crops	Other professions	Wild animals	Transportation	Road condition	Nearest town	Remarks
Pangnandim	Shifting cultivation	Millet, maize, sweet potatoes	Hunting, collecting machit oo, gusha, and other medicinal plants	Barking deer (black), wild boar, monkey, bear, Serow	On foot	Footpath	Naung Mung (48 km)	Primitive farming methods, subsistence agriculture, small-scale domestic breeding
Ngawa	Wet cultivation, shifting cultivation	Rice, maize, mustard, yam, potatoes	Hunting, collecting machit oo, gusha, and other medicinal plants	Barking deer (black), wild boar, monkey, serow	On foot	Footpath	Naung Mung (72 km)	Primitive farming methods, subsistence agriculture, small-scale domestic breeding
Gawai	Shifting cultivation	Rice, maize, yam, millet	Hunting, collecting machit oo, gusha, and other medicinal plants	Barking deer (black), bear, monkey, wild boar, serow, red goral	On foot	Footpath	Naung Mung (104 km)	Primitive farming methods, subsistence agriculture, small-scale domestic breeding
Tazundam	Shifting cultivation	Millet, maize, yam, potatoes, beans	Hunting, collecting machit oo, gusha, and other medicinal plants	Barking deer (black), serow, red goral, wild boar, bear, monkey	On foot	Footpath	Naung Mung (120 km)	Primitive farming methods, subsistence agriculture, small-scale domestic breeding
Guba	Shifting cultivation	Wheat, maize, millet, potatoes, yam, beans, mustard		Musk deer, serow, red goral, takin, barking deer (black), bear, monkey	On foot	Footpath	Naung Mung (128 km)	Primitive farming methods, subsistence agriculture, small-scale domestic breeding, breeding of hybrid cattle
Madain	Shifting cultivation	Wheat, maize, millet, potatoes, yam, beans, mustard	Hunting, collecting machit oo, gusha, and other medicinal plants	Musk deer, serow, red Goral, takin, barking deer (black), bear, monkey	On foot	Footpath	Naung Mung (133 km)	
Tazuhtu	Shifting cultivation	Wheat, maize, millet, potatoes, yam, beans, mustard	Hunting, collecting machit oo, gusha, and other medicinal plants	Barking deer (black), monkey, serow, red goral, bear	On foot	Footpath	Naung Mung (137 km)	
Ngalaíndam	Shifting cultivation	Wheat, maize, millet, potatoes, yam, beans, mustard	Hunting, collecting machit oo, gusha, and other medicinal plants	Barking deer (black), monkey, serow, red goral, bear	On foot	Footpath	Naung Mung (143 km)	
Talarhtu	Shifting cultivation	Wheat, maize, millet, potatoes, yam, beans, mustard	Hunting, collecting machit oo, gusha, and other medicinal plants	Barking deer (black), monkey, serow, red goral, bear	On foot	Footpath	Naung Mung (145 km)	
Arundam (Crown)	Shifting cultivation	Wheat, maize, millet, potatoes, yam, beans, mustard	Hunting, collecting machit oo, gusha, and other medicinal plants	Barking deer (black), monkey, serow, red goral, bear	On foot	Footpath	Naung Mung (151 km)	
Tahundam	Shifting cultivation	Wheat, maize, beans, millet, yam, mustard	Hunting, collecting machit oo, gusha, and other medicinal plants	Barking deer (black), monkey, serow, red goral, bear	On foot	Footpath	Naung Mung (160 km)	

“the use of jaw traps is the most destructive device for local fauna because none of the animals, old or young, can escape”

needs and to gather horns, leather, fur, and other parts of animals to be sold for some income. All mature men hunt, using various devices such as crossbows and poison-tipped arrows, snares, traps, strings and spears, hunting dogs, jaw traps, and locally-made guns. The use of jaw traps is the most destructive device for local fauna because none of the animals, old or young, can escape (Table 22).

Hunting is carried out both near and away from the villages. Hunting around the village area is done in combination with taungya farming. Hunting away from the village takes place in the snow-capped mountains. The hunting season begins in June, July, or August when the snow has melted and grasses begin to sprout from the ground. The animals hunted commonly include monkey, bear, barking deer, wild boar, sambhur, serow, goral, takin, musk deer, and blue sheep. Monkey, bear, and wild boar usually destroy the taungya crops. Monkeys, barking deer, wild boars, gorals, and serows are more numerous than other animals. The skin of the otter is a valuable commodity; thus the demand for its skin threatens to cause the extinction of these animals by over-hunting.

Horns, leather, and other animal products from hunting are sold to Rawans and Lisus who live on the other side of border, in China. Rawans in Myanmar also visit fellow Rawans on the Chinese side to sell these animal products. There are no immigration checkpoints to hinder such cross-border migrations.

“monkeys, barking deer, wild boars, gorals, and serows are more numerous than other animals. The skin of the otter is a valuable commodity”

Traders from Putao also purchase these animal products, but less frequently than those from China. The products are sent to markets of east Asian countries via Naung Mung, Putao, Myitkyina, Mandalay, and Tachileik or to China via Panandin and Makhongan Villages. In return, textiles, salt, and some basic domestic requirements are purchased or exchanged through a ‘barter system’. The price of horn and leather is less than 10,000 kyats per piece (1997), but a kind of powder from musk deer costs more than 10,000 kyats per tical (one tical is equivalent to 16g).

The gathering of medicinal plants

Some income is generated from the gathering of medicinal plants. Their collection begins soon after the taungya harvest, at the time of snowmelt, during the months of July, August, and September. These indigenous medicinal products are also very useful in the health care of the local people. The main medicinal plants include majit oo, hkantauk root, gusha oo, and shipadi root. Majit oo and gusha oo are obtained from beneath the snow cover of icy mountain slopes and they are highly priced commodities, worth 2000 kyats per viss (1 viss is equivalent to 1.6 kg). Hkantauk roots are gathered in Gawai Village and nearby downstream areas.

“a kind of powder from musk deer costs more than 10,000 kyats per tical (one tical is equivalent to 16g)”

Other Primary Economic Activities

Fishing in icy waters from the melting snow is also practised occasionally. Domestic breeding of poultry and pigs is done on a family basis in every

house for domestic consumption. Beekeeping is also practised in hollow trees in Tazundam Village and in other upstream villages. Honey is gathered for bartering and domestic use.

Secondary Economic activities

Traditional handicrafts include the production of baskets or containers from bamboo and cane available locally, and these activities can be observed along the route to Hkakaborazi. In Tahawadam Village woollen clothing for domestic use is produced using handlooms.

Tertiary Economic activities

Tertiary economic activities comprise seasonal occupations such as road maintenance and guiding and portering for visitors.

Transportation and Communication

Roads and other means of communication are essential for the movement of commodities and goods as well as for promoting all-round regional development by movement of people, new ideologies and modern technologies. However, in the northernmost remote area, such innovations are almost completely lacking.

The footpath leading to Hkakaborazi is one of the most difficult trails ever to be found. The metalled road between Putao and Machanbaw is 22.5 km long and it is an all-season road. The 98 km long gravelled road connecting Machanbaw and Naung Mung was built with readily available rocks from nearby streambeds and is motorable but the surface of the road is very rough. From Naung Mung to Tahawadam Village (156 km), footpaths are constructed along the steep escarpments. But the footpaths are very slippery, and can be dangerous for travellers. Sometimes communication is cut off by landslides and mudslides that occur in the wet season. Transportation of goods by mule is possible up to 13 km from Naung Mung, to Gawle Village. But further away from Gawle, goods are transported by human porters (Table 22).

There are 22 suspension bridges, some of which have been built by the local people. These suspension bridges are small and narrow so that only a single person can go across at a time. Local bridges are not strong enough, since they are constructed with local cane and bamboo. The Ministry of Construction maintains some sections of the footpaths and some are maintained by local people. The swift-flowing, boulder-carrying streams are not used at all for transportation, but they could be used for sports if ecotourism were to thrive here; some of them have 'gushing white waters' with noisy, rushing currents.

Problems of the Study Area

Physical problems

Hkakaborazi National Park is located in the northernmost part of a mountainous region and has rugged terrain; the remote location of this park results in poor accessibility. It also limits agriculture to shifting cultivation (taungya farming) which results in deforestation and land degradation.

Environmental damage caused by deforestation includes soil erosion, landslides, and the destruction of wildlife habitats (causing a reduction in biodiversity). As soil erosion increases at the sources of the streams, excessive deposition downstream can block the waterways. There is an increasing danger of landslides in the area especially on the steeper slopes in the northern village areas. Firm evidence of such landslides was observed on the way from Gawine Village to Tahawadam in the north. The lack of vegetation cover caused by burning of the forest loosens

“deforestation will also lead to the destruction of taungya farming plots”

the soil and increases the tendency for swift surface flow. The consequently weak structure of the surface layers leads them to slide down slopes, especially during the rainy season.

The danger of landslides is especially deadly on the slopes with more than a 45° tilt. A landslide that occurred in 1994 caused three deaths and the destruction of three houses at Tahawadam Village. In July 1995 a landslide near Ngawa Village caused the death of four people. There may be similar instances that are not recorded. Deforestation will also lead to the destruction of taungya farming plots and a reduction in hunting, which are the main occupations for the indigenous races. As a result, they will face hunger and starvation and eventually absolute poverty.

Social Problems

The villages included in the field study are situated in the most remote areas of the least-developed regions of Myanmar Naing-Ngan and so they face all sorts of problems. The first requirement for survival is to have sufficient agricultural land. Being a mountainous region, there is little level land that can be tilled easily. The shortage of medicine and insufficient medical care are also a problem. Searching for food for survival is always a top priority, and so education is neglected in the face of poverty. Men prefer to hunt while women and children work tirelessly at taungya farming.

“the shortage of medicine and insufficient medical care are also a problem. Searching for food for survival is always a top priority”

Intermarriages among close relatives within the Taron race have resulted in genetic degradation, producing mentally retarded or physically handicapped people. However, marriages between Rawans and Tarons have created new and healthier generations. At the time of writing, there are only eight typical Taron people. The Tibeto-Myanmars are quite possibly the last to migrate into Myanmar so they are less likely to mix with other races. There are only two households who are a mixture of Tibeto-Myanmar and Rawan. Currently Tibeto-Myanmars form a small minority group with intermarriages among close relatives. If this continues, they, like Tarons, will also face genetic degradation.

As the region has a cold climate and lacks health education, personal hygiene is poor. Most people are dirty and untidy and in most villages farm animals and pets are kept within the family house. Firewood is used to keep the house warm, there is not enough warm clothing to protect from cold weather. As it is a hilly area, salt is a necessity, and it is very expensive. It is bought from Naung Mung market and some Tibeto-Myanmars have to go up to China to purchase the necessary salt.

The hills and mountains along both sides of Adongwan Valley are almost naked from taungya practices. Firewood collection and logging for houses in the area between Tashubtu and Tahawadam villages have increased.

“there is not enough warm clothing to protect from cold weather”

Economic Problems

The two main occupations of taungya (or shifting agriculture) and hunting cause deforestation, soil erosion, and the extinction of existing wildlife and

ecosystems. Due to the coincidence of the hunting season and breeding season many wild species now have low populations.

Some of the native people in the area would be willing to migrate into Naung Murg and Putao towns because of their difficulties, but they cannot afford the travelling expenses or the charges for a new place to live that would be required.

Taungya farming is carried out for two successive years on a plot. The plot is then abandoned and the farming shifts to another plot. In this type of agriculture there are more inputs than outputs, and it can lead to harmful deforestation and soil erosion. It is an old farming method and seed quality is poor. Also, the more food is produced the more forests are destroyed. However it is the only means of livelihood for a hill family.

Feasible solutions to the existing problems

Based on the findings of our socioeconomic study, feasible solutions to the existing problems will now be presented.

Naung Mung Township in the northernmost part of Myanmar, which is also the hilliest area, needs all-round development. The people living there have yet to be provided with the basic requirements of food, clothing, and shelter. Government officials and non-government organisations (NGOs) should be made available to help meet social needs and to supply financial aid.

Deforestation and land degradation is the most pressing problem in this area. Problems originating from land degradation can cause various types of devastating consequences in this mountainous environment. Therefore, land management should be considered the top priority, with terrain evaluation, continuous deforestation, and land use being the most important factors to address. To prevent continued degradation, a well-organised, long-term national park system could be introduced.

Awareness of environmental conservation should be taught in our education system starting from elementary school level. Public education through literature, talks, and television programmes should also be established

A change from shifting cultivation to terrace cultivation is also essential to improve land quality. In the transformation of the cultivation system, officials should discourage taungya farming by highlighting the demerits of shifting cultivation and supplying farm implements for terrace cultivation.

Future Prospects and Recommendations

kakaborazi National Park has a naturally rich biodiversity. It is rare to find such natural stands of forests and wild animals in the world. Thus, Hkakaborazi National Park should be recognised as a world heritage site in the future.

The following recommendations for the development of the Hkakaborazi area are based on existing problems and needs.

The area is affected by soil erosion and places where there is no vegetative cover, such as steep slopes, partially snow-covered areas, and abandoned taungya lands, should be afforested with suitable plant species.

Food, clothing, medicines, and medical care should be provided to local people by the state until they can afford to buy these necessities themselves.

Terraced cultivation should be introduced on selected sites on sloping hillsides.

Suitable crops and high-quality seeds should be distributed free of charge on the chosen farming sites.

A better variety of young domesticated animals should be supplied on a family basis and the basic techniques of raising them should be taught.

“food, clothing, medicines, and medical care should be provided to local people by the state until they can afford to buy these necessities themselves”

Through training and workshops in elementary schools and for family members living in the area, education on forest conservation, wildlife conservation, protection of soil erosion, and understanding the fundamentals of the natural environment should be provided.

Local ethnic groups that wish to do so could be helped to migrate, through a formal arrangement, and new agricultural lands could be created in the newly occupied areas.

The crossing of the international boundary around Hkakaborazi National Park should be controlled by security officials and immigration department officials.

“new agricultural lands could be created in the newly occupied areas”

Footpaths connecting Naung Mung town and Tahawadam Village in the extreme north should be upgraded, at least to mule roads, to enable easier transportation of goods and other necessities.

Systematic research on the conservation of wildlife including birds, rare species of plants, and medicinal plants should be carried out together with conservation and restoration of the natural environment of areas within the National Park.

Limited parts of the National Park should be used for ecotourism and the income generated used for conservation of forest.

Conclusion

“limited parts of the National Park should be used for ecotourism”

Hkakaborazi National Park, rich in biodiversity, is suffering from land degradation and deforestation due to human interference. Feeding areas for wildlife are gradually decreasing and the existence of some species is threatened. Multidisciplinary systematic research and detailed surveys are required in order to protect against further damage to this area.

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