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GOVERNMENT OF SIKKIM

Office of the Divisional Forest Officer
South & West Wildlife Division
Namchi

LETTER NO: 396 /SW/WL

DATE: Namchi, 10/12/02.

To,

Dr Vibha Ahuja
Member Secretary TPCG, Biotech Consortium Private Limited
Anuvrat Bhawan, 5th Floor, 210 Deen Dayal Upadhyaya Marg, New Delhi - 110002

Reference: Letter No: CONS/VA/9/1926 Dated: 5th Nov, 2002
Subject: Updation of Master Database of Rathong Chu LAC members

Madam,

Reference subject cited above kindly find placed below the updated list.

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Yours faithfully,

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GOVERNMENT OF SIKKIM

Office of the Divisional Forest Officer
South Wildlife Division
Namchi

REF NO: 586 **/SW/WL** **DATE:** Namchi, 5/3/03

To,

The Coordinator
Technical and Policy Core Group
NBSAP Project

Subject: **Final Report and VCD's of Rathong Chu Valley, BSAP**

Sir,

Reference subject cited above kindly find enclosed the following:

1. Final report of Rathong Chu Valley, BSAP
2. VCD 01 Containing recording of the Biodiversity Mela at Yuksam
3. VCD 02 Containing the three files of the Final report of Rathong Chu Valley, BSAP and

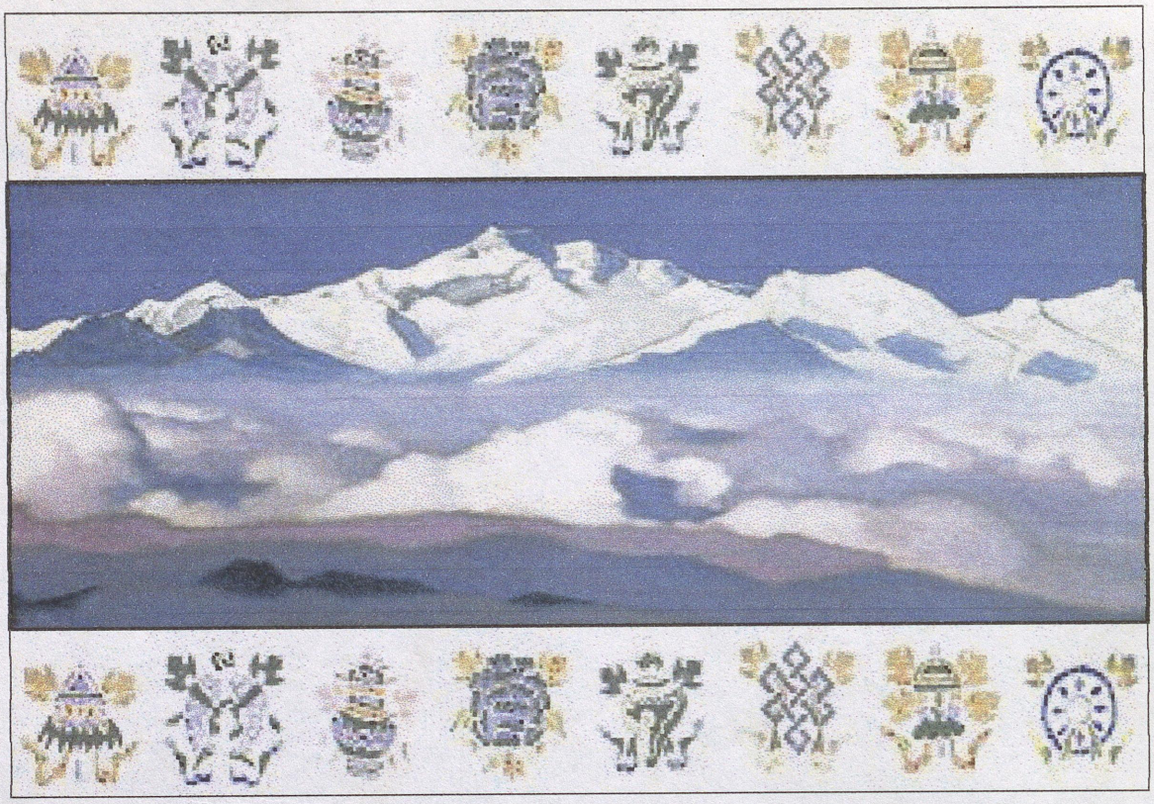
   remaining recording of the Biodiversity Mela at Yuksam
4. Revised list of LAC members of Rathong Chu valley sub state site
5. Khangchendzonga: A Biodiversity Handbook (contains details of our BSAP)
6. KCC Brochure

Yours faithfully,

(Sandeep Tambe)
DFO Wildlife cum nodal agency
NBSAP: Rathong Chu Valley

Divisional Forest Officer,
Wildlife Division
South/West. Namchi Sikkim

LAC Rathong chu 5.11.2/Thesis Doc/Draft Action plan/vol-2.



Rathong Chu Valley (Sikkim)

Substate Biodiversity Strategy and Action Plan

PREPARED UNDER THE NATIONAL BIODIVERSITY STRATEGY AND ACTION PLAN INDIA - 2002

Department of Forest, Environment and Wildlife
Government of Sikkim

This labour of love has been inspired by the grace and blessings of The Chief Country God of Sikkim

The Khangchendzonga



Source: The Gazetteer of Sikhim

Khang-chen-dzo-nga – The chief country god of Sikkim, of red colour, carrying a *Gyaltsen* or banner of victory, and mounted on a snow lion. His dwelling place is the mountain from which he takes his name. This graceful mountain, and third in height to the Everest, is in itself an object of worship, as it towers high above every other object in the country, and is the first to receive the rays of the rising sun and the last to part with the setting sun. Khangchendzonga literally means five repositories of God's treasure, namely that of gold, silver, gems, grains and holy books. This report dwells on His most valuable treasure namely Biodiversity.

Credits

NBSAP Executing Agency: Ministry of Environment and Forests, Government of India

NBSAP Funding Agency: United Nations Development Programme (UNDP) / Global Environment Facility

BSAP Technical Implementing Agency: Technical and Policy Core Group (TPCG) coordinated by Kalpavriksh

NBSAP Administrative Agency: Biotech Consortium India Ltd

Rathong Chu Valley Substate BSAP Nodal Agency: Department of Forest, Environment and Wildlife, Government of Sikkim

Nodal Agency Personnel: Sandeep Tambe IFS, DFO Wildlife, South and West Wildlife Division, Namchi, South Sikkim 737126 <sandeep_tambe@lycos.com>

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Abbreviations Used

4D	Discovery, Dream, Design and Delivery Technique for Microplanning
AH&VS	Animal Husbandry and Veterinary Services Department, Government of Sikkim
AOFFP	Area Oriented Fuelwood and Fodder Plantation scheme, CSS, MoEF, GoI
APPA	Appreciative Participatory Planning and Appraisal
BSI	Botanical Survey of India
CFP	Call for Participation, NBSAP
CSAP	SAP made by the community only CSAP = FSAP + MSAP
CSS	Centrally Sponsored Schemes of GoI
CVT	Community based Village Tourism
DFO	Divisional Forest Officer
ECOSS	Ecotourism & Conservation Society of Sikkim, Gangtok
EDC	Ecodevelopment Committee
ESP	Ecotourism Service Provider
FG	Forest Guard
FCA	Forest Conservation Act, 1980
FSAP	SAP made by the Female participants of the community only
GBPIHED	G. B. Pant Institute of Himalayan Environment and Development, Sikkim
GO	Government Organizations
GoI	Government of India
GPU	Gram Panchayat Unit
GSAP	SAP made by the government departments only
H-FG	Head Forest Guard
ISLT	International Snow Leopard Trust
IWDP	Integrated Wasteland Development Project, CSS, Ministry of Rural Development, GoI
JFMC	Joint Forest Management Committee
JTMC	Joint Tourism Management Committee
JTMP	Joint Tourism Management Plan
KCC	Khangchendzonga Conservation Committee
KBR	Khangchendzonga Biosphere Reserve
KNP	Khangchendzonga National Park
MLA	Member of Legislative Assembly, Government of Sikkim
NAEB	National Afforestation and Ecodevelopment Board under MoEF, GoI
NEEPS	National Environment Education Programmes for Schools, MHRD, GoI
NGO	Non Governmental Organisation
NHPC	National Hydroelectric Power Corporation, Government of India
NTFP	Non Timber Forest Produce
MoEF	Ministry of Environment and Forests, Government of India
MSAP	SAP made by the Male participants of the community only
PHC	Primary Health Center
PHED	Public Health and Engineering Department, Government of Sikkim
PHSC	Primary Health Sub Center
PRA	Participatory Rural Appraisal
SACEP	South Asia Co-operative Environment Programme
SPWD	Sikkim Public Works Department
RDD	Rural Development Department, Government of Sikkim
RRC	Regional Research Centre
SAP	Strategy and Action Plan SAP = CSAP + GSAP
SNT	Sikkim Nationalized Transport (Bus Service) Government of Sikkim
STCS	State Trading Corporation of Sikkim, Government of Sikkim
TAAS	Travel Agents Association of Sikkim, Gangtok
UDHD	Urban Development and Housing Department, Government of Sikkim
VIC	Visitor Information Centre
ZSI	Zoological Survey of India

Glossary Of Local Terms

Banmara	*Eupatorium* spp., a naturalized exotic weed
Bhagwan	God
Bongthing	Faith healer of Lepcha Community
Bhairung Pate	*Juniperus recurva* used as incense in monasteries
Champ	*Michelia spp*
Chilimey	Blood Pheasant
Chogyal	King of Sikkim
Chorten	Stupa
Chu	River
Churpi	Cheese
Danphe	Monal Pheasant
Danra	Hill
Dhara	Stream
Dhoop	Incense offered in monasteries
Dhoopi	*Cryptomeria japonica*, an exotic naturalized conifer
Dii	Vicious local demon
Dzo	High altitude pack animal, which is a cross between a yak and cow
Gheu	Butter
Goth	Permanent Cattle Shed
Gothala	*Goth* owner
Goucharan	Government Protected Forests
Gumpa	Monastery
Guransh	Rhododendron spp.
Himal	Snow clad mountain
Holungpa	Resident of Holung in Nepal, Foreign National
Jhankri	Faith healer of Nepali community
Jhoom	Slash and Burn agriculture
Kattus	Chestnut Tree
Khola	River / Stream
Lama	Monk
Lekh	Temperate Region
Malingo	*Arundinaria maling*, Dwarf bamboo, forms thickets in Temperate Forests, excellent fodder and also used for making mats etc
Mantra	Sacred hymns
Mela	Village Fair
Munal	Crimson Horned Pheasant or the Satyr Tragopan
Ney Pemathang	The hidden paradise on earth
Nirvana	Salvation
Oral	Cave
Paha	Frog
Phu	Cave
Pokhri	Pond
Salla	Conifer
Sardar	Petty Contractor
Shangrila	The hidden paradise on earth
Sunpate	*Rhododendron setosum* used as incense in monasteries
Supari	Hard Cheese
Tatopani	Hot Spring
Tsan	The tutelary demon of the ground
Uttis	*Alnus nepalensis* [Alder Tree] used as shade bearer extensively in agro-forestry model in Large Cardamom plantations. Fast growing, provides excellent firewood

Chapter 1

Introduction

1.1 Background

The Himalaya is a unique storehouse of precious biological treasures that have provided livelihood options to people since time immemorial. But due to rapid civilization, this cultural as well as natural wealth is fast eroding at an alarming rate. The reasons are numerous and consequences, multidimensional. It is assumed that all environmental problems, be it global warming or ozone hole depletion, are the results of synergistic causes of all types of human developmental activities. Records show with accompanying evidence that India had more than 70% forest cover with a bounty of natural resources a century ago. Most of these resources depleted in just a fraction of time considering the human civilization processes on this planet. Where have these resources gone? Why are more and more plants and animals becoming rare and endangered?

There are several answers and sometimes complicated even. The simplest thought is deforestation, habitat fragmentation and indiscriminate poaching in the past. The result is transformation of huge areas of forested lands to degraded or agricultural lands. Thus, animal habitats have sequestered into pockets of present day protected areas. Moreover, urbanization and modernization have also eroded our traditional values and knowledge, and cultural practices leading to a weakening of our cultural heritage.

The consequences that we are facing today are due to lack of proper education as well as the result of improper management plans of the past. In other words, many developmental packages were not area specific and also did not cater to the needs of the local community. Such improper planning and implementations have given way to a new thought on Conservation and Development in a more pro-environment context.

Our present day concern is biological diversity on which millions of people still solely depend on for subsistence living. In the year 1999, the Ministry of Environment and Forests (MoEF), Government of India prepared a document on National policy on macro level action strategy on Biodiversity through a consultative process. The document was based on macro-level statement of policies, gaps and strategies

needed for conservation and sustainable use of biological resources. The Ministry felt that such developmental strategies should be made, each at sub-state, state, regional and National level. For this process, the MoEF has accessed fund from Global Environment Facility (GEF) for the preparation of a National Biodiversity Strategy and Action Plan (NBSAP). The project envisages documentation of biodiversity related information at various levels, including distribution of endemic and endangered species and site-specific threats and pressures towards natural resources.

As a part of the on going process, a local area conservation strategy and action plan was initiated for Rathong Chu Valley in West Sikkim within the purview of NBSAP. The justification on choosing Rathong Chu Valley can be based on the fact of it being regarded as a sacred landscape. The entire landscape originating from Mt. Khangchendzonga to the lowlands of Yuksam and the surrounding areas are considered sacred by the local inhabitants. All the physical components such as lakes, streams, caves, snow-capped mountains, etc are treated as deities. Moreover, a wide variety of ecological zones ranging from the warm temperate belts to the alpine meadows provide a luxuriant habitat to many rare and endangered animals such as the Snow leopard, the Red Panda, Musk deer, and a variety of pheasants.

1.2 Process

As a conservation process for this unique biological house, both as a National asset as well as for sustainable development of the people living in the region, a multi-disciplinary team undertook the responsibility for development of the strategy and action plan. The team consists of forest officers from Sikkim, local and regional NGOs and community people who launched the program in the area with great enthusiasm. A six-member steering committee was formed and the first meeting with the local communities of Yuksam and its adjacent villages was held at Yuksam in January 2001. The meeting addressed different environmental issues perceived by these communities. This meeting was held with the presence of 60 active participants [Refer Box Item 1]. With these issues, a strategic plan was framed out for dissemination of responsibilities amongst the concerned departments of Government of Sikkim, community members and the NGOs.

During the second week of May 2001, an extensive tour and trek was organised to cover the other remote villages

of Rathong Chu Valley. A team of nine members visited the remote villages of West Sikkim, namely, Labdang, Karjee, Gangyap, Tashiding and Khecheopalri. Public hearings, environmental education campaigns through models and green games were organised in all of these villages. Wastes management charts were displayed and explained, and a model showing the consequences of deforestation was also exhibited for different community members in every village.

Many interesting environmental issues were explored and noted using 4D methods (Refer Box Item 1). It was indeed noteworthy to see the people showing immense concern for conservation of sacred features such as caves, hotsprings, lakes, monasteries followed by the surrounding forests, wildlife living therein, water sources and catchment areas. Apart from this, a majority of the villages gave high preference to ecotourism as a potential human developmental activity for sustenance. Greater emphasis was laid on strict implementation of the forest and wildlife laws, eviction of foreign nationals and infrastructure development for tourism, education, health and sanitation. Also the major threats to biodiversity were perceived from the greed of a few influential people and settlers from outside. It was also found that while these influential people gobbled up the benefits from biodiversity unsustainably, the local community had to bear the costs of the ensuing environmental degradation. Thus community strategy and action plan was prepared in this participatory manner. This was then placed before various government departments, policy makers, scientists etc and their feedback incorporated.

After the successful completion of this venture, a biodiversity *mela* was organised at Yuksam to demonstrate environmental issues, useful plants, and the rich traditional and cultural heritage of the area to the communities and tourists alike. A wide variety of non-timber forest produce (NTFP) including medicinal plants, wild edible fruits and vegetables, local handicrafts, handlooms, traditional dresses and instruments were also displayed. Moreover, various programmes pertaining to the local culture, and a play depicting the importance of Rathong Valley area was also enacted. The *mela* made the various communities as well as the tourists, aware of the richness of their area in natural and cultural resources.

This was how the biodiversity strategy and action plan for Rathong Chu Valley was prepared.

1.3 Objectives

The "Guidelines and Concept Papers" of NBSAP was very useful in crystallizing our thoughts. During its first meeting at Yuksam in January 2001, the team decided on the paradigm shift of concentrating on the process. Keeping this approach in mind, the following concerns were drawn up, based on which the whole project was implemented.

1. Reaching out to the remotest of the villages
2. Positive bias towards the views of women and weaker sections of society
3. Participatory involvement of local community, NGO's, GO, scientists, religious heads, academicians etc.
4. Inter sectoral integration with polices and programs of various state and central government departments.

1.4 Methodology

1. **Public Hearings** have been organized in the remotest of villages with the help of a number of NGO's as facilitators such as Khangchendzonga Conservation Committee (KCC), Ashoka Trust for Research in Ecology and Environment (ATREE), WWF Sikkim Unit, Society for Environmental Education and Development (SEED), Khecheopalri Holy Lake Welfare Committee (KHLWC) etc.
2. **Models and Charts** explaining the problems of deforestation, garbage, soil erosion and water pollution. The models were made using local material at the village itself. There was a model of Khangchendzonga Biosphere Reserve, Soil runoff model, water source pollution model, etc. The charts from Centre for Environment Education, Posters and Photographs of Wildlife etc were also explained in the local language i.e. Nepali.
3. **PRA using APPA and 4D Model:** Interactive, Appreciative appraisal, mapping of the current resource map of the village and the dream village ten years hence, was done using the APPA and 4D techniques (Refer Box Item 1)
4. **Biodiversity Exhibition:** A Biodiversity festival was organized in Yuksam, West Sikkim during May 2001. This Biodiversity Festival featured:
    1. Display of various NTFP with their uses
    2. Display of indigenous seeds of agricultural crops
    3. Display of traditional cuisine
    4. Display of traditional clothes and handicrafts
    5. Display of indigenous handloom
    6. Display of Models and Charts
5. **Biodiversity Programme:** The programme at the Biodiversity Festival featured:
    1. Religious plays on conservation, "*Ney Pemathang*"

2. Humorous Skit on the impacts of tourism and local issues
3. Presentation of CSAP by the key community members
4. Folk Dances
5. Musical performance using indigenous musical instruments
6. Conservation message by the local faith healer or *Jhankris* and *Bongthings*

6. **Exposure and Exchange Programme**: The key community members from the villages were invited to make a presentation of their CSAP, at the Biodiversity Festival. Listening to the CSAP's of the other villages, these key community members were exposed to the whole gamut of development initiatives adopted in the region by the various villages.
7. **Nature Games:** In order to make the villagers realize practically the esoteric concepts of conservation, to liven up the proceedings and act as energizers and also act as ice-breakers, nature games like "Web of Life", "Commons Dilemma", "Who am I", etc were organized.
8. **Religion:** The state of Sikkim is a sacred landscape and hence religious plays; discourses by *Lamas* and faith healers on conservation were organized in this Biodiversity Festival.

1.5 Typical Agenda For The Public Hearings

1. Welcome Speech
2. Self Introduction
3. Introduction to Biodiversity
4. Introduction to NBSAP
5. PRA and Micro-planning using APPA and 4D Tools
6. Resource Mapping

LUNCH BREAK

7. Future Resource Mapping
8. Feedback from Participants
9. Vote of Thanks

Box Item 1: Microplanning for Conservation

A specific tool called 4D (Discover, Dream, Design and Deliver) was used in the process, which is a modified form of Participatory Rural Appraisal (PRA), Participatory Learning and Action (PLA), and Appreciative Participatory Planning and Action (APPA).

The team introduced NBSAP with its goals and objectives. This was followed by a detailed explanation on the importance of the biological resources in the day-to-day lives of the villagers. The participants were asked to discover the different natural and man-made resources in their village in which they took pride. For this, the facilitators tried to involve every participant including the womenfolk, to gather as much information as possible. All information was noted down in a chart paper in the presence of the participants.

In the second round, the participants were asked to draw a map to locate the various resources with respect to their relative positions. The participants were then asked to draw a vision of the area for the future. They were also asked to give their views and ideas on the initiatives that could be taken for future development and conservation activities. All inputs coming from the villagers were noted in the chart. Finally, the participants were asked to draw a comparative map against the previous one with locations for these future activities such as footpath construction, afforestation, etc. The facilitator took great precautions in inclusion of each person's input and involvement in the process.

A strategic plan was developed through discussions on each of these dreamt issues. The activities were drawn according to their priority, responsible organisations/institutions/ departments identified, and locations and time frames discussed and noted. The process to be followed and commitments from the communities were also incorporated in a large sized chart paper. At the end of the discussions, the people had prepared a comprehensive strategy and action plan with the assistance of the facilitators.

1.7 Phases In Implementation

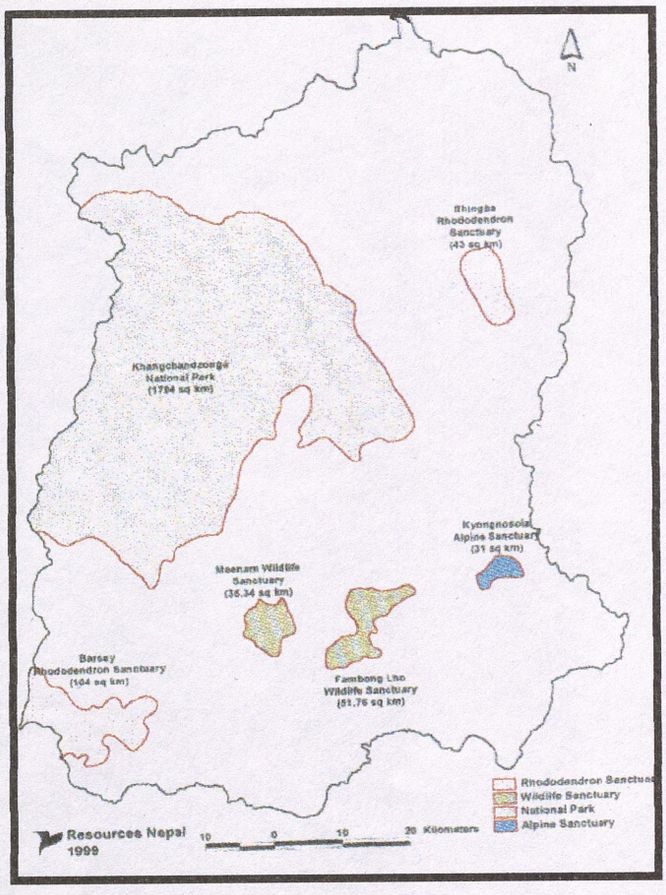
Male SAP + Female SAP = Community SAP

Community SAP + Government SAP = SAP

Table 1: Phases in Implementation

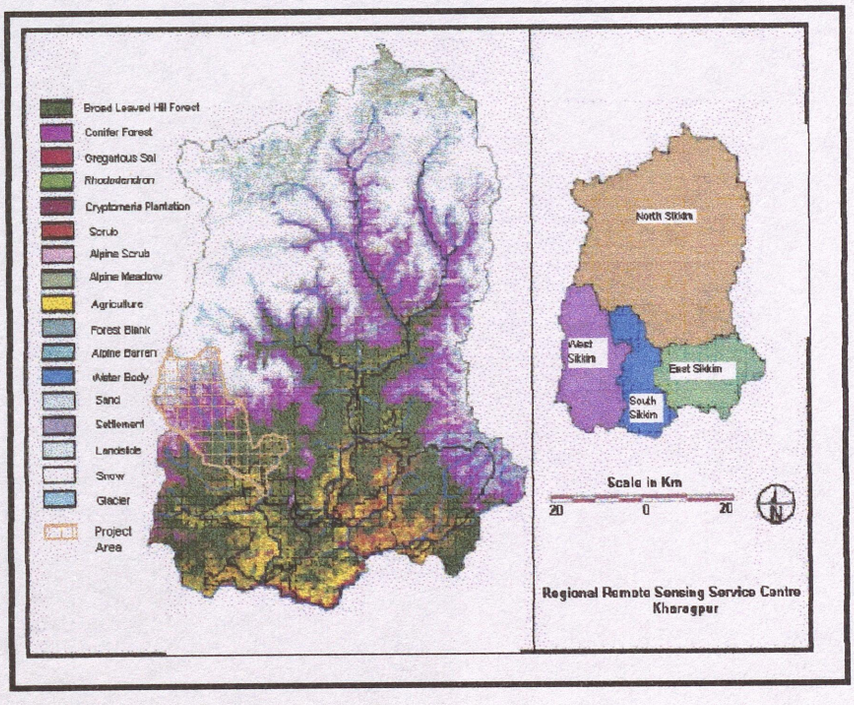
Phase	Details	Methodology
Phase I	Preparation of CSAP	1. Public Hearings in the villages, 2. Interview of key resource persons 3. Tying up with Religious Festivals 4. Soliciting inputs through advertisements, letters, distributing CFP in local languages 5. Capacity Building of Local NGO's, Key Community Members and Forest Officers 6. Taking feedback on the CSAP from key community members CSAP = FSAP + MSAP
Phase II	Preparation of GSAP	Questionnaire for the State and Central Government Departments Meetings of the District Level Steering Committees Feedback on how the CSAP can fit into the existing schemes
Phase III	Preparation of SAP	Brainstorming between the key community members, independent experts, NGO's and government officers. CSAP + GSAP = SAP

Figure 1: Protected Areas of Sikkim



Source: © WWF Nepal

Figure 2: Project Area: NBSAP Rathong Chu Valley



Chapter 2

Profile of the Area

2.1 Geographical profile

The area of Rathong Chu valley extends from 27°19'13" to 27°29'4" north latitude and 88°9'18" to 88°15' east longitude. This Valley is a stretch of forest that lies between the lowland of Yuksam (1780m) to Rathong glacier (6000m). The Valley is about 45 km long and extends from the Temperate to Alpine zones covering areas such as Sachen, Bakhim, Tshoka, Phethang, Dzongri, Base camp, Thansing etc. Its diverse tropical mixed broad-leaved forest, sub-alpine conifer-rhododendron forest, alpine meadows, cascading streams, sacred lakes, a wide variety of birds and flowering plants and panoramic view of the World's third highest mountain - Mount Khangchendzonga are a tourists delight. Ultimately the valley leads to Goecha La, a paradise of panoramic views of Mt Khangchendzonga surrounded by Mt. Pandim, Mt. Kabur, Mt Narsing and many other snow-capped mountains. Heterogeneity in culture and tradition, rich biodiversity, scenic beauty and historical religious places such as Norbu Gang, Dubdi Monastery and Khechopalri Lake have made this area an attractive place for tourists. Ecologists and environmentalists, earth scientists and nature lovers, botanists and zoologists, are all equally fascinated.

The Rathong Chu Valley lies along the extensive forest areas with many pristine patches of forests. Tshoka and Dzongri are situated on the ridge lifted out from Onglathang and Tekep La valleys. The two rivers flowing through these valleys namely Prek Chu and Rathong Chu merge into the Rangeet River. The rock is chiefly made up of Darjeeling Gneiss and comprises of high-grade gneiss containing quartz and feldspar with streaks of biotite (Geological Survey of India, 1984).

2.2 Legal Status

The forests of Rathong Chu Valley lie within Reserve Forests and also the Khangchendzonga National Park in West Sikkim (Refer Figure 1). All the Reserve Forests of the state are free from rights and concessions. Owing to the rich diversity of flora and fauna, Khangchendzonga National Park (KNP) was notified on August 1977 vide Notification No: 43(9)Home/77 dated 26/08/1977 with an initial area of 850 sq km. This was later expanded to 1784 sq km in May 1997 vide Notification No: 1/KNP(WL)/F/27 dated 19/5/1997 on

account of its intact continuous tract of mountain land reserved for conservation of native wildlife with many rare and endangered species (Lepcha 1997). The park occupies as much as 25.11% of the total geographical area of the state with an elevation range of 1829 to 8550 m amsl. Recently, on 7th February 2000, the Ministry of Environment and Forests, Government of India notified KNP as a Biosphere Reserve with a total area of 2192 sq km. The newly notified KBR includes the settlements of Bakhim, Tshoka, Karjee, Labdang, Gangyap, Khecheopalri, Chong, Dubdi and Yuksam in its southern periphery.

2.3 Socio-cultural profile

Sikkim is unique in its cultural heterogeneity. Many distinctive ethnic groups with their exclusive traditions and culture live in harmony. Lepchas are the aboriginal race of Sikkim. They are short statured with fair complexion and charming face. They have a culture and tradition of their own. Basically they were hunters and gatherers and had been living in harmony with nature for ages. This way of life has enriched their knowledge on indigenous flora and fauna. They have their own nomenclature for almost all the flora and fauna of the locality. Bhutias are another ethnic race living in Sikkim. Buddhism is their religion and they worship in monasteries. Another race is the Nepali, who arrived in the late nineteenth century. Majority of Nepalis are Hindus and they are a dominant group representing 70-75% of the total population of Sikkim.

A mixture of ethnic groups inhabits the Rathong Chu Valley. Literarily, the dominant races in the Rathong area are Nepalis with higher proportion of Subbas, followed by Bhutias, Lepchas and Tibetans who live mainly at high altitude. Firewood, fodder and timber collection, grazing in forests, non-timber forest produce (NTFP) collection and leaf litter collection for farm uses are common practices among these ethnic groups. Besides these, tourism has been increasing in the area at a rapid rate and more and more people are engaged in this profession.

2.4 Socio-economic profile

Primary occupation of the communities in the valley is farming while some are associated with tourism enterprise in the form of lodge operators, porters, pack animal (*Dzo*) operators, cooks and naturalist guides. More than 81% of the inhabitants are engaged in agriculture. Tourism, being secondary but substantial source of income for the local community, puts an extensive burden on the natural resources of the area.

About 60% of the total population of this area is involved in the tourism sector. Employment in the government accounts for 5-10% of the total population.

Annually about 2000 domestic as well as foreign tourists visit the high altitude area of the Valley. More than 150 support staff, 140 *Dzos* (hybrid of cow and yak) and 30 horses are engaged on an average of six times a year. Seasonal grazing with sheep herds is a traditional profession of the Gurung Shepherds. Apart form these the Himalayan Mountaineering Institute (HMI), Darjeeling organizes about ten mountaineering courses on the Rathong glacier annually.

2.5 Political profile

Yuksam, a panchayat block has 12 settlements including Tshoka with 274 families and 1572 population. Yuksam, with mixed ethnic groups, is the biggest settlement having 55 households with a population of 293 individuals. This is followed by Tshong and Khongtay in which Nepalis are the dominant group. One settlement with 9 families resides at Tshoka on the trail occupying 13 ha area in the KNP. (Refer Table 2)

Table 2: Political Profile of Rathong Chu Valley

Revenue Unit	Revenue Block	Area (ha)	Population	Households
Yuksam Dubdi	**Yuksam**	**812.16**	**1652**	**315**
	Dubdi	**338.11**	**278**	**44**
Thingling Khechelopalri	**Khecheopalri**	**478.21**	**419**	77
	Thingling I	**249.63**	**473**	**103**
	Thingling II	268.71	603	99
	Tsozo	**501.87**	**378**	**65**
Laso Tashiding	**Tashiding**	**663.11**	**1262**	**238**
	Laso	**540.49**	**940**	**164**
Nessa Arithang	Chongrang	548.72	1028	168

	Arithang	356.25	701	114
Gerethang Labing	Gerethang	260.88	821	139
	Labing	447.24	802	137
Karchi Magnam	**Dupidara**	**566.39**	**334**	**45**
	Narkhola	**569.24**	**411**	**61**
	Mangnam	**945.50**	**275**	**44**
Labdang	**Labdang**	**314.61**	**347**	**47**
	Kongri	631.72	312	51
	Gangyep	**893.05**	**542**	**83**
	Total	**9385.89**	**11,578**	**1994**

Locations in **Bold** typeface indicate areas where public hearings were held

Census of India 1991

2.6 Ecological profile

Temperate conditions prevail at lowland such as Yuksam, Khecheopalri, Karjee, Labdang, Gangyap, sub-alpine at Tshoka, and alpine at high altitude alpine meadows. The climate is moist, rain occurs almost round the year and is divisible into three seasons viz., monsoon (June to September), winter (October to March) and mild summer/spring (April to May). Mean annual rainfall is highest at 1780 m (3760 mm) followed by 3648 mm at 3000 m and the lowest in 4000 m (2312 mm).

Minimum average temperature of -3° C, 8°C and 4.4°C occurs respectively at alpine, sub-alpine and temperate in winter. Summer temperatures at these zones is mild ranging from 20°C to 24°C at temperate, 15° C to 16°C at sub-alpine and 11° C to 13°C at alpine. The area remains humid throughout year with greater than 90% humidity during the rainy season. Great variation of temperature occurs along with altitude even on the same day due to extensive physiographic differences. The valley is unique that in just a 45 km stretch, one can start from temperate climate passing through sub-alpine and reach the alpine zone.

Figure 3: **Food Web of Rathong Chu Valley**

सुक्ष्म घाँसको बिजन र पौधादेखि लिएर हिम-चितुवासम्म,
पहाड़ीपौधा र वन्य जीवनको एका-अर्का बिचमा घनिष्ट सम्बन्ध छ ।



Source: *© International Snow Leopard Trust*

2.7 Ecological zones

According to classification by Champion & Seth (1968), the Rathong Chu valley broadly comes under the sub-type 11b of Northern Montane Temperate forest type and the group 12 of Himalayan Moist Temperate forest and Moist Sub-alpine Scrub. The valley broadly has three forest types viz., temperate forest (1780-2730 m amsl), mixed conifer forest / sub-alpine (2730-3650 m) and alpine scrub and grasses (above 3650 m). Temperate broadleaf forest is represented by *Quercus* spp, *Castanopsis* spp, *Acer* spp., *Juglans regia*, *Machilus edulis*, *Cinnamomum* spp. associated with *Rosa* sp., *Rubus* spp., *Berberis aristata*. and *Viburnum* spp. as shrubs. There are a few patches of relatively pure stands of oak (*Quercus lamellosa*) with dense under storey of *Viburnum cordifolia, Eurya acuminata* and *Symplocos ramosissima* with mosses, lichens and other epiphytes. Major part of the valley has mixed type of vegetation with well-marked strata of tree layers of different species. *Q. lamellosa* and *Castanopsis tribulloides* are the top canopy layer trees followed by *M. edulis, Acer* spp. and *S. ramosissima.* The forests at the higher elevations of the temperate belt have broad leaf tree species such as *Magnolia* spp, *Quercus* spp, and *Acer* spp. Some areas have pure top canopy stands of *Magnolia* associated with second storey species like *Rubus* sp, *E. acuminata* and tall forms of rhododendrons.

In mixed coniferous forest, the lower elevation range of sub-alpine belt is dominated by Himalayan hemlock (*Tsuga dumosa*) mixed with rhododendrons and *Betula*. As the elevation increases, the hemlock is replaced by silver fir (*Abies densa*) with dense undergrowth of rhododendrons associated with *Viburnum, Daphne* and *Eurya*. Most part of the forests have *A. densa* as the dominant species, attaining heights of 30-40 m with luxuriant undergrowth of rhododendrons. This forest is extensive with more species of rhododendrons at elevations above 3400 m. Above 3650 m in the alpine condition, tree growth is completely arrested with bushy vegetation of xeromorphic species. A few stunted bushy species of rhododendrons mixed with tough clumps of *Juniperus*., *Berberis* and *Rosa* are common. The area above 4000 m gives a clear picture of alpine pasture. The vegetation in this zone is practically of scattered scrubs, often barren at higher elevation. Most of the species are stunted, thorny and scrub type. Two most dominating genera are *Juniperus* and dwarf forms of rhododendrons. The wide flattened area within the altitudinal range from 3800

to 4400 m represents alpine meadows with *Cyperus, Primula, Potentella, Juniperus* and also comprising of a wide variety of flowering plants. Further above, areas are with completely arrested growth of vegetation and often-barren rocky cliffs. Most of these areas are covered by snow perpetually.

2.8 Historical Profile



Guru Padma Sambhava

'Yuksam' is a meeting place of *Lama* Lhatsun Chempo, Gnadak Rinzing Chempo and Kathok Sempa chempo who came to Sikkim from three different directions with an intention to establish Buddhism. These monks searched for a fourth person as per the vision of Saint Padma Sambhava (Guru *Rim-bo-che*), and found Phunstsog Namgyal, who was brought to Yuksam and coronated as the religious king of Sikkim. The event took place in 1642 at Norbugyang with the title of "*Chogyal*" meaning "the king who rules with righteousness or dharma raja". The construction of Dubdi monastery also took place around the same time. The *Lama* and the local people of Sikkim and Tibetans implicitly believe that Saint Padma Sambhava, found Sikkim during his journey to Tibet and personally consecrated every sacred spot along the Rathong Chu Valley in Sikkim.

Rathong Chu is an area, which the people of Sikkim perceive as the very basis of their present culture. Padma Sambhava, who is highly revered and worshiped by the Sikkimese Buddhists is considered to have blessed Yuksam and the surrounding landscape, by having placed within it a large number of hidden treasures *(ters)* and it is believed that they will only be slowly revealed to enlightened *(terten) Lamas* and discovered at appropriate time.

Yuksam region is considered to have 109 hidden lakes. Both the visible and less obvious notional lakes identified by religious visionaries are said to be presiding deities, representing good and evil. Propitiating these deities with different ceremonies is considered to be the path for salvation. Conserving and protecting these treasures from polluting and disturbing influences is considered to be vitally important for human welfare. Any major disruption to the river system would disturb the entire system of the area.

Later, the yak herders used this area as pasture for grazing. Since 1960s, the

Himalayan Mountaineering Institute (HMI) started to use the trail for basic and advance mountaineering training on Rathong Glacier. During the late 1960s, a nine-house Tibetan settlement was established at Tshoka. The magnificently diverse landscapes and rich cultural heritage of Sikkim have contributed to rapid growth of adventure tourism since 1985.

Box Item 2: Key Events and Dates of Rathong Chu Valley

7th Century AD: Guru Padma Sambhava blessed the landscape of Rathong Chu

1641: Great Tantric master Lama Lhatsun Chimpo arrived from Tibet by flying over Mount Kabru.

1642: Chogyal Phuntshok Namgyal coronated as the first religious king of Sikkim

1643: Pang Labsol festival to worship the guardian deity Mt. Khangchendzonga celebrated annually at *Daphla Gang*

1854: Sir J. D. Hooker, world-renowned naturalist visited Khangchendzonga region

1933: Earthquake damaged Dubdi monastery, Norbugang, Khecheopalri monastery, Sange Choeling monastery

1953: Only one yak *goth* of the Chogyal and a few sheep sheds. No tourists only few royal guests.

1954: HMI started establishing, started by Sherpa Tenzing Norgay.

1961: Religious expedition to Dharma Dhoka took place

1969: Tshokha village was settled

1971: First Dzo got from Holung in Nepal by people of Tshokha

1973: Massive Forest Fire destroyed large areas of virgin temperate forests

1975: Sikkim merged into India

1977: Foreign nationals came as labourers in road construction from Tashiding to Phamrong and settled in Yuksam

1977: KNP notified by Forest Department

1980: First Tourist lodge "Dzongrila" opened

1982: Yak sheds started multiplying

1985: Tourists started coming regularly, also stray dogs started multiplying

1985: Musk Deer poachers arrested by Forest Department and Shri Mane Aju

1989: Pagala Pokhri lake and Tinkune lake outburst

1994: Construction for Rathong Chu Hydro Electric Project started
1995: Rathong glacier started receding very fast, Doodh Pokhri also started crumbling

1996: Rathong Chu Hydro Electric Project stalled for hurting cultural sentiments

1997: KCC was registered

1997: Area of KNP increased to 1784 km^2

2000: KBR notified

2000: NBSAP comes to Rathong Chu valley

2001: Humana People to People International NGO buys about 13 acres of Rathong Chu Hydro Electric Power Colony including 32 buildings from Sikkim Government

Chapter 3

Current Range and Status of Biodiversity

3.1 Status of Biodiversity

Floristic wealth of the Rathong Chu valley is rich and diverse, both in composition and value. Forests represent a variety of plant communities that include diverse vegetation types corresponding to variation in climate and edaphic factors. A wide variety of woody tree species, shrubs, lianas, epiphytes and mosses have enriched the valley. Among the woody trees, *Quercus* and *Castanopsis* are few among the dominant species of temperate region whereas *Abies densa* and rhododendrons the dominant at sub-alpine zones. There are some pure patches of *Castanopsis* at temperate region and *Magnolia* at sub-alpine areas. The area is equally rich in rhododendrons in their shape, size and colour. The species show a wide variation starting from giant 25 m tall *Rhododendrom arboreum* at temperate conditions to small *Rhododendron setosum* and *Rhododendron anthopogon*. Apart from these, the area is equally rich in other flowering plants such as *Primula, Meconopsis, Aconitum, Potentilla, Bistorta* and *Gentiana* which add an additional charm to the alpine meadows.

About 10 species of Bamboos (*Dendrocalamus* spp and *Arundanaria* spp) are used by the communities for house construction and local handicrafts. A number of wild plants such as *Rhus semialata, Litsae citrata, Juglans regia, Machilus edulis, M. odoratissima, Basia butyracea Bauhinia variagata, Pentapanax leschenaultii, Girardinia palmate, Laportia terminalis* and *Tupistra nutans* are eaten in different ways by the villagers. Apart from these about seven edible varieties of mushrooms, numerous *Diplazium* spp (*Ningro*) and *Dioscorea* (Ban Tarul) are also found in the area.

About 29 species of widely used medicinal plants were recorded from the area. *Artemesia vulgaris, Eupatorium adenophorum, Hydrocotyle asiatica* are widely used for different purposes and are not marketed. On the other hand, *Aconitum* sp., *Berginia ligulata, Heracleum nepalense, Litsae citrata, Oroxylum indicum* are extensively marketed in the local markets. *Picrorhiza kurrooa, Piper longum, Orchis latifolia, Rubia cordifolia* are even exported to local agents. Most of these species are also used by local practitioners (*Bijuwa* and *Baidya*) as herbal medicines.

Rathong Chu forests are also a source of varieties of natural attractive materials in the form of decoratives. Roots of plants, dry flower, capsules, dry mushrooms, cones of conifers, leaves of fern, fern shoots and seeds of different plant form decoratives of all designs and types. More than eight types of such decoratives are recorded from the area, which are mostly used for local purposes. Dried *Anaphalis contorta*, *A. triplinervis* and *Lycopodium clavatum* are widely used as decorative in different occasions where as *Pollinium mollis* and *Raphidophora* sp are used as decorative in houses. Cones of *Pinus longifolia*, *Abies densa* and *Tsuga dumosa* are also found to be use as decorative in different form.

Argeli (*Edgeworthia gardeneri*) and Lokta (*Daphne cannabina*) are widely used by locals for making fiber materials and tying cattle, etc. These plants, especially Argeli grow abundantly in the low lands of Rathong Chu valley whereas Lokta are distributed at sub-alpine zone.

Incidental animal sighting records by the villagers have mentioned at least 19 species of noted wildlife, including endangered species such as snow leopard, red panda, musk deer and few rare and endangered birds (Chettri 2000a). According to villagers, commonly sighted animals in the area are Himalayan barking deer, Himalayan black bear, Ghoral, Clouded leopard and Leopard cat (Refer Table 1). Many of the schedule I species inhabit the alpine area of KBR (Rastogi & Chettri 2001). Other than these, Wildlife Circle, Department of Forest, has also reported Shapi from high altitude areas of KBR (Lepcha 1994).

Rathong Chu Valley is inhabited by a wide variety of birds (Chettri 2000a,b). During the last couple of years, about 250 species of birds were recorded from the Valley (Chettri unpublished data). The most common birds are bulbuls, warblers, magpies and thrushes. The state bird of Sikkim 'blood pheasant' was also recorded from the trail area. Rare birds like Satyr tragopan and Monal were confirmed with sightings at about 2500 m on the way to Dzongri. Some of the less sighted bird species at temperate locations are Whitetailed nuthatch, Nepal parrotbill, Redtail minla, Spectacled barwing, Himalayan snowcock, Eastern solitary snipe, Yellowbellied fantail flycatcher, Nepal cutia and Sultan tit (Refer Table 1).

Table 3: Important wildlife of Rathong Chu Region reported by the community, and their threat categories under IUCN

Common Name	Scientific Name	Ecological zone	Local name	Schedule/ part	Status
Barking deer	***Muntiacus muntjak Zimmermann***	ST	Mirga	III	T
Bharal	*Pseudois nayaur (Hodgson)*	AL	Nervati	I	V
Clouded leopard	*Neofelis nebulosa Griffith*	ST	Nigalay Chituwa	I	E
Common langur	*Presbytis entellus Dufresae*	TE	Hanuman Bander	II/1	C
Ghoral	*Nemorhaedus goral Hardwicke*	TE	Himal ko goral	III	R
Great tibetan sheep	*Ovis ammom hodgsoni Blyth*	AL	Tibet ko Bheran	I	E
Hill fox	*Volpes v. montana Linn.*	AL			
Himalayan black bear	*Selenarctos thibetanus (Cuvier)*	TE	Konthe Bhalu	II/2	V
Himalayan thar	*Hemitragus jemlahicus Smith*	AL	Jharal	I	E
Himalayan yellow throated marten	*Martes flavigula Boddaert*	ST	Malasampro	II	E
Indian porcupine	*Hystrix indica Kerr*	ST	Dumsi	IV	C
Indian wild pig	*Sus scrofa Linn.*	ST	Bandel	III	IK
Marbled Cat	*Felis marmorata Martin*	TE	Jungali Biraloo	I	E
Musk deer	*Moschos charysogaster*	AL	Kasturi	I	E
Orange belled squirrel	*Dremomyths lokhriah Hodgson*	ST	Lotharkay	IV	C
Red Panda	*Ailrus fulgens Cuvier*	TE	Kundo	I	E
Serow	*Capricornis sumatraensis (Bechstein)*	AL	Thar	I	V
Snow leopard	*Uncia uncia Schreber*	AL	Semu	I	E
Tibatan wolf	*Canis lupus Chanko*	AL	Buanso	II/2	V

Birds: Common name	Species	Ecological zone	Local name	Schedule/ part	Status
Blood pheasant	*Ithagenus cruentus (Hardwick)*	AL	Chilime	I	V
Crimson horned pheasant	*Tragopan satyra (Linn.)*	AL	Munal	I	R
Forest eagle owl	*Budo nepalensis*	ST	Lat Kusyal	I	E
Himalayan golden eagle	*Aquila chrysaetos daphanea*	AL	Sunaulo Giddha	I	E
Lammergeier	*Gypaetus barbatus*	AL	Budo Giddha	I	E
Monal pheasant	*Lophophorus impejanus (Latham)*	AL	Danphe	I	E
Snow partridge	*Lerwa lerwa*	AL	Larewa		T
Snow pigeon	*Columba leuconata*	ST			T
Sparrow hawk	*Accipiter niscus*	ST		I	E
Tibetan snowcock	*Tetragaolus tibetanus*	AL		1	E
White breasted dipper	*Cinclus cinclus*	AL		I	R

Source: Chettri, N. (2000a).

AL = alpine, ST = sub-tropical, TE = temperate, E = endangered, V = vulnerable, T = threatened, C = common, R = rare

3.2 Status of natural ecosystem and plant and animal species

Land use demarcation along the valley, estimated from Survey of India topo-sheets (1:50,000) and IRS-IA LISS II satellite data of 1988, shows that more than 80% of corridor area is covered with forest. About 44% of the forest cover has been found as dense forest, 25% open forest, 25% degraded and pure rhododendrons, alpine scrubs and forest blank account for about 6%.

Within the stretch of Rathong Chu Valley many species of plants and animals are facing threats by various means. Selective felling of trees for fuelwood and timber brought about decrease in abundance of preferred species such as Rani chanp (*Michelia exelsa*), Lapsi (*Spondias axillaris*), Mehel (*Eriolobus indica*) and Mandane (*Acrocarpus fraxinifolius*). Over exploitation of high altitude medicinal plants also resulted in rarity in species such as Kutki (*Picrorhiza kurrooa*), Jatamansi (*Nardostachys jatamansi*), Bikhma (*Aconitum ferox*), Khokim (*Bergenia purpurascens*) and Chimphing (*Heracleum nepalense*). Indiscriminate poaching in the past have led to a marked decline in the population of the Snow leopard (*Uncia uncia*), Red panda (*Ailurus fulgens*), Musk deer (*Moschus moschiferrus*), Blue sheep (*Pseudois nayaur*) and some pheasants such as Tragopan (*Satyr tragopan*) and Himalayan Monal (*Lophophorus impejanus*).

3.2.1 Status of natural wetlands

The prominent lakes in this region which also serve as a stop-over point for migratory birds are Khecheopalri Pokhri, Laxmi Pokhri, Lam Pokhri, Dudh Pokhri, Jor Pokhri and Dalley Pokhri. Grazing and resulting allied activities severely degrade the catchment areas of these high altitude lakes. Research on status of aquatic biodiversity also needs to be carried out.

3.2.2 Status of NTFP

A considerable number of families use a wide variety of NTFP for food, medicine and house construction in the RCV region. These practices play a major role in the local economy of the people as many of these species find use as medicine and even food and vegetables. Some family members are also involved in selling these items at local markets as part of their livelihood. Wide variety of edible fruits, vegetables and berries are used as NTFP. These variations have provided additional charm in the biological diversity of the region. Traditional systems of medicine notably Ayurvedic and Tibetan practices and NTFP are extensively used in their day-to-day life. A large number of

such plants are collected from the wild even from the protected areas. The exploitation of NTFP contribute to the biotic impoverishment of the forest through extraction activities, possibly because extractors do not leave enough seed in the forest for further development. Field survey revealed that a wide variety of medicinal plants, incense and decorative are collected from higher elevation, which are still in fragile condition. It was also noted that the use of these NTFP have decreased drastically due to un-availability.

NTFP collecting activities appear to be compatible with conservation only when supported by careful resource management regulations with wide local community participation. Moreover, human pressure on natural resources like firewood, fodder, cattle grazing, tourism and infrastructure development have been increasing since last few decades, resulting threats to the fragile ecosystems of the region. Unless immediate decisive steps are taken to counter the effects of habitat degradation in the remaining wilderness areas, pragmatic assumption foretell that much of the valuable resources will be lost within a few decades. Poor socio-economic condition of people is directly causing to loss of our valuable resources. Collection of NTFP such as fruits, nuts, oils, resins and medicinal plants in a sustainable manner is an integrated process for development and conservation. But a real economic potential of extractive activities and their compatibility with conservation of biodiversity should be properly known. Therefore, participatory planning with the local people for area specific development and provisions for economic incentives to them seems promising effort for conservation of these valuable resources. *Castanopsis* spp., *Garcinia cowa*, *Machilus edulis*, etc. are all nutritious fruits. Young shoots (tama) from *Dendrocalamus*, *Arundanaria* for preparation of pickles *Diplazium* and wild mushroom as vegetables have high potential as a part of the menu for the tourists. The area possesses high potential in micro enterprises development for medicinal plants. Market survey revealed that Jatamasi (*Nardostachys jatamasi*), Kutki (*Picrorhiza kurrooa*), Chirata (*Swertia chirata*) and Panch Aungulay (*Orchis latifolia*) have high potential for commercialization. Broom grass (*Thysanolaena maxima*), Bamboo (*Dedrocalamus* spp, *Bambusa* spp.) and Rattan cultivations are other means to support local handicraft production that brings economy *vis a vis* control soil erosion. This micro enterprise development can certainly boost the

economy of people if value addition and product marketing is also carried out.

3.3 Status of agriculture ecosystem and domesticated plant and animal species and varieties

3.3.1 Agriculture

Historically, low land areas such as Yuksam are known as *Dema-zong*, meaning the land of paddy where extensive paddy cultivation is practiced. In recent years most of these paddy fields has been transformed to large cardamom cultivation areas in agroforestry systems. Still, in many areas, a wide variety of agricultural practices are recorded from the region. The low land agricultural fields practice maize as the major crop followed by finger millet, buckwheat and variety of vegetables. Some villages of Yuksam also practice wheat cultivation along with other vegetables. In high elevation area (Tshoka), potato is the major agricultural product followed by cabbage, bajra along with variety of other vegetables such as beet, radish, carrot and a number of green vegetables.

The major crops practiced in RCV are cereals, vegetables (potato, cabbage, beans, raddish etc), fruits (Guava, pears) and maize. Potato is the major crop in the village for which the villagers prepare farm during December followed by sowing in January, weeding in April and finally harvesting in July. The people reported that three decades ago, the villagers used to practice a wide variety of crops such as rice, maize, pea, cereals, green vegetables etc. However, the practices slowly diverted to large cardamom because of its high value, low volume and low manpower.

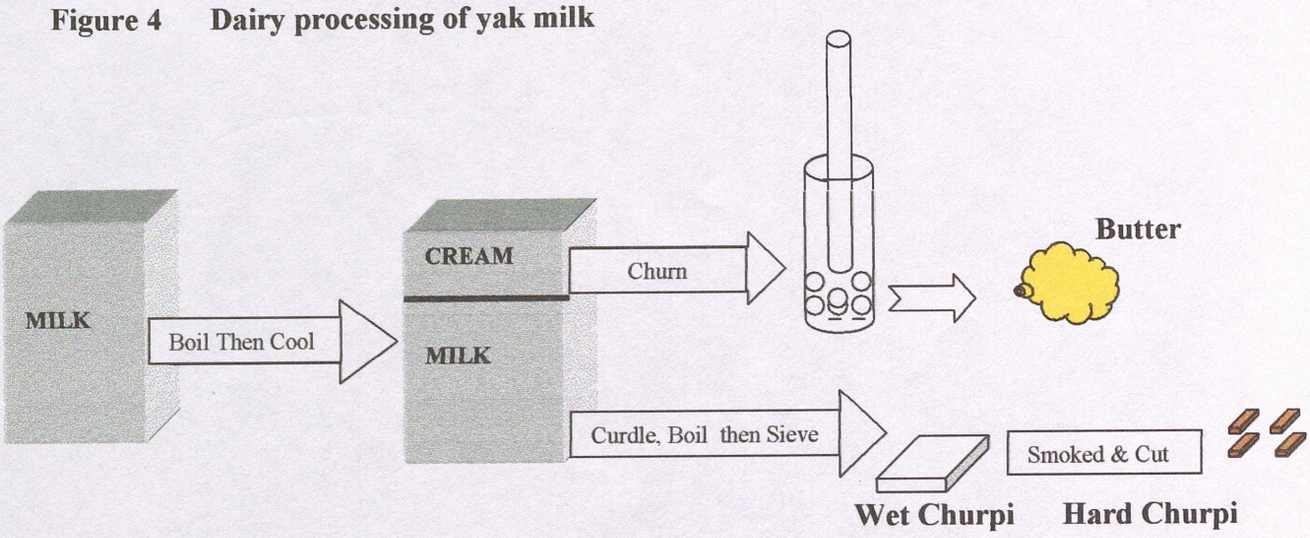
3.3.2 Livestock

Income of the Rathong Chu Valley people mostly comes from composite source of agriculture, horticulture, tourism and animal husbandry. Livestock rearing was mainly done to produce milk, meat, manure, cheese and to use as pack animals along the trekking corridor. The yaks are milked twice, and a better part of the day is spent in churning the milk for Butter and curdling it for Cheese (*Churpi*). The fresh cheese is left to dry above the community fireplace. After dehydration for a couple of months it becomes stone hard, and is then sold as hard cheese (*Supari)*. Butter and hard cheese are the two main marketable items of this yak dairy trade (See Figure 3).

Generally, almost all the families living in the villages possess some livestock. All the ethnic groups practice cows, sheep, pigs and fowls for their

subsistence livelihood. It is found that in some tourism potential areas, pack animals such as Dzo and horses are widely used. The proportion of different livestock in the visited areas revealed higher number of cattle followed by goat, sheep and pigs. A considerable number of Dzo, Yak and horses are also recorded from some part of the valley. The field experiences reveal that more number of sheep belongs to Gurung community, and yak and Dzo to Tibetans and Bhutias. Most of the livestock, other than cows are of local variety. Some villages such as Karjee, Labdang, Chong is having few numbers of Jersey breed cows.

Figure 4 Dairy processing of yak milk



Source: Tambe S. (2000)

Chapter 4

Statement of the problems relating to Biodiversity

4.1 Proximate causes of loss of Biodiversity



Rathong Chu Valley faces immense pressure on its natural resources due to extensive use of fuelwood and overgrazing in forests as well as alpine pastures. These activities are bringing about deterioration of this pristine and sacred landscape. Removal of selective canopy species for firewood and fodder has changed the forest structure and also opened some of the forested areas (Chettri 2000a). These open areas are now dominated by secondary species and regeneration of canopy species has been arrested due to such invasion. It was evident from the field observation that the regeneration of many canopy trees is poor due to overgrazing and trampling.

The rise in tourist number in the trekking trail has added additional concern for conservation. Tourism related pressure on the forest has been more distinctly visible at some camping places. The pressure of fuelwood use by tourists and HMI is comparatively high in the high altitude areas.

Water runoffs along the trail due to continuous trampling by the animals are bringing about massive soil loss along the trail and in the pasturelands. Due to lack of canopy cover in waste- lands and croplands are also experiencing similar problems.

Lack of proper Garbage management system in this high altitude tourist destination has led to continuous accumulation of trash on the route up to Goecha La, HMI base camp and the sacred lake area. The increasing proliferation of plastic, metals and glasses has been exacerbated not only by careless disposal of trash but also by the increased non-biodegradable garbage being generated by tourists and HMI trainees.

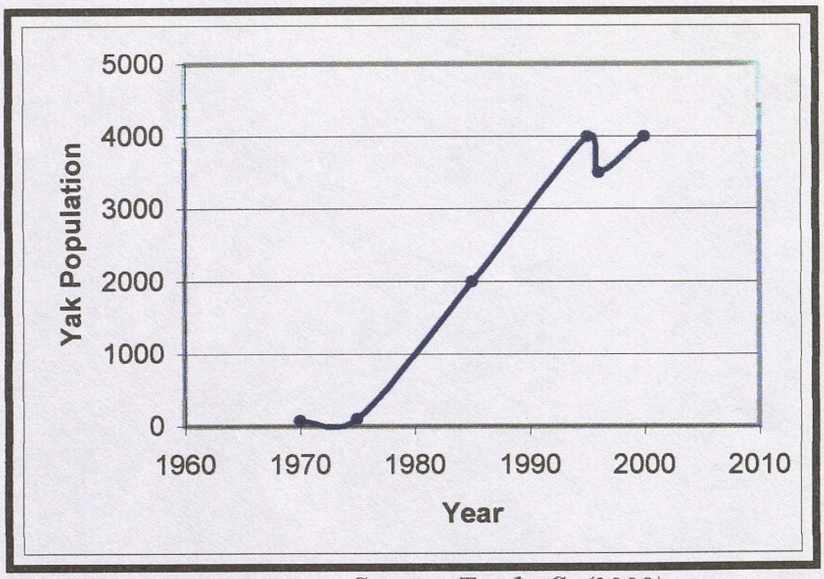
Box Item 3: Interview of Shri Birkha Man Subba, Head Forest Guard who has patrolled these forests since 1966

Long long ago when our *himal* was barren, Shiv *Bhagvan* came to meditate here. Then *Sunpate* and *Bhairungpate* (Rhododendron shrubbery) were also not there. Since Shiv *Bhagwan* desired for scented objects, Goddess Parvati created these scented plants for Him. The flowers of our alpine meadows were also created by Her. This is the reason why these alpine plants are not found in the tropical belt.

Conservation is in our religion also. *Himal* provides us with invaluable sacred things. Similarly when Shiv *Bhagwan* would have fallen sick, medicinal plants were created by Goddess Parvati. Hanuman got Sanjeevni herb from here only. During the Kalchakra *Pooja* at Bodhi Gaya, His Holiness Dalai Lama had requested for *Dhoop* from here only, since it is considered very sacred. Conserving our *himal* is our duty, since this is also the source of life giving water. All valuable trees like *Champ*, *Kattus*, *Guransh*, *Dhoopi*, *Malingo*, *Salla* are found here.

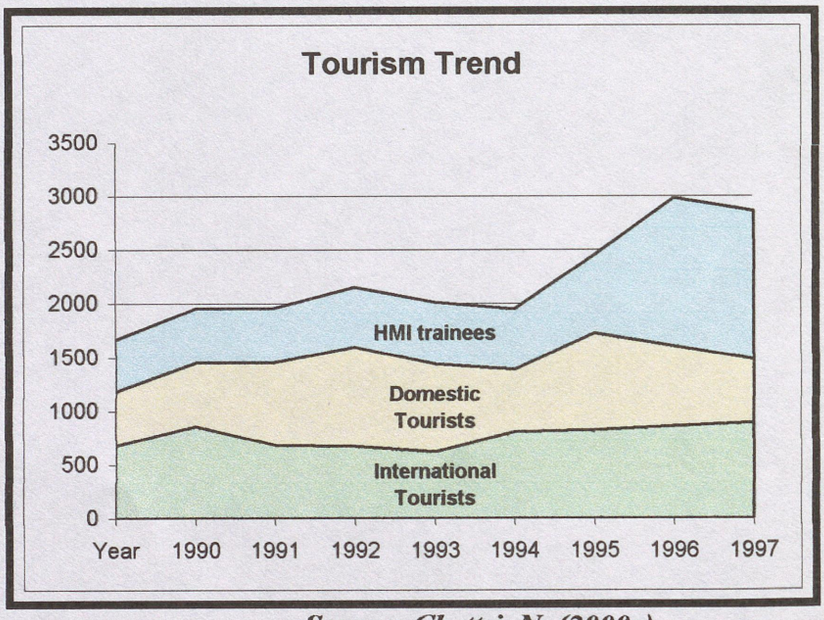
Previously these forests were very dense, *Champ* and *Kattus* trees of more than 25 feet girth were plentiful. These forests are still more or less conserved, however our alpine meadows have got degraded. Earlier Musk deer, blue sheep, pheasants were plentiful. Transboundary poaching from the porous border with Nepal was the main reason. Graziers from there laid chain traps with more than 100 knots, killing pheasants and other birds by the hundreds. Supply of medicinal plants like *Bikh*, *Kutki* etc to Darjeeling severely depleted our rootstock. Collectors from Nepal also created havoc. In a nutshell the yak graziers, their dogs and HMI destroyed our meadows.

Chart 1 Yak population explosion in Rathong Chu Valley



Source: Tambe S. (2000)

Chart 2: Tourism Trend in Rathong Chu Valley



Source: Chettri, N. (2000a)

Chapter 5

Major Actors and their current roles relevant for Biodiversity

5.1 Government of Sikkim

1. To preserve the fragile ecology and heritage, the state government has banned the scaling of important peaks, including Khangchendzonga for mountaineering expeditions. For preservation and protection of unique terrestrial and aquatic ecosystems of the wetlands in the state, the state government has not permitted, and will not permit in future, any commercial activities in all the natural lakes / wetlands of Sikkim.
2. Banned green felling in forests, no clear felling, only dead, dying and diseased trees are allowed to be removed for the bona fide use of the people in the state.
3. Banned grazing in reserved forests areas, plantation areas and water sources and the fodder and firewood collection is allowed for bona fide use on sustainable basis only.
4. By Legislation banned the use of Non-biodegradable materials like plastic, polybags etc very successfully.
5. Government has directed through a notification to all the government departments and institutions to keep their compounds green and pollution free.
6. Declared the period 2000-2010 as '*Harit Kranti Dashak*" for Forestry with free distribution of seedlings, massive afforestation program and protection of natural resources through people's participation at all levels.
7. Eco-governance has been strengthened, by launching the "CM online" Website for bringing about accessibility, accountability and transparency in government functioning. All government / cabinet decisions and notifications are readily accessible on the Internet. Also Community Information Centers are to be setup (40 nos) all over the state.
8. Compulsory environmental education for school children including forest, wildlife, cultural heritage etc. Extension and training programs for the same.

Source: Mr. S. B. S. Bhadauria IFS CF(FCA)

5.1.1 Forest, Environment and Wildlife Department

There are two circles of the Forest Department having overlapping jurisdiction namely the Territorial and the Wildlife. The range office of the territorial division is located in Yuksam with Yuksam and Tashiding as the two Blocks. Total staffing and infrastructure of the territorial staff posted in Yuksam range is as follows:

5.1.1.1 West Territorial Division

Posts (Yuksam Range)	Numbers
Range Officer	1
Block Officer	2
Forest Guards	8
Forest Rest House Chowkidar	3
Daily Wages	5

Infrastructure	Numbers
Quarters	
Range Office cum Residence	1
Block Officer Quarter	1
Forest Guards Quarter	2
Forest Rest House	3
Forest Check Post	1
Nursery	1
Communication	
Wireless Set Static	1
Wireless Handset	1
Vehicle	0

5.1.1.2 KNP Wildlife Division

Posts (Yuksam Range)	Numbers
Assistant Conservator of Forest	1
Range Officer	2
Block Officer	0
Forest Guards	2
Daily Wages	5

Infrastructure	Numbers
Quarters	
Range Office cum Residence	1
Block Officer Quarter	0
Forest Guards Quarter	2
Wildlife Interpretation Centre	1
Wildlife Check Post at Yuksam	1
Wildlife Log House at Phedang, Dzongri, Thangsingh, Kasturi and Lampokhri	5
Communication	
Wireless Set Static	0
Wireless Handset	0
Vehicle	0

Hence the nature of staffing indicates that while the territorial division is incharge of the protection and policing, the Wildlife Division is top heavy, is geared towards implementation of various development and ecodevelopment projects.

5.1.2 Tourism Department

All the employees of Tourism Department posted in Yuksam are on daily wages basis.

Posts (Yuksam)	Numbers
Tourism Fees Collector	1
Trekkers hut Chowkidar	6
Sweeper	1

Infrastructure (Yuksam)	Numbers
Trekkers Hut	
Yuksam	2
Chokha	1
Dzongri	1
Cokchoorong	1
Thangsingh	1
Samiti Lake	1
Khecheopalri	2
Tashiding	1
Bikhbari	1

5.1.3 Police Department:

Posts (Yuksam)	Numbers
Assistant Sub Inspector	1
Havaldar	1
Reader	1
Constable	4
Home Guard	1

Infrastructure (Yuksam)	Numbers
Police Outpost	
Yuksam	1
Communication	
Wireless Set static	1

5.1.4 HMI

Post	Numbers
Chowkidar	2

Infrastructure	Numbers
Trekker Hut	
Zamling Gang acclimatization camp	13
Base Camp at Chauri khang	
Instructor Bunker	14
Trainees Dormitory	1
Dispensary	1
Chowkidar Bunker	1
Common Kitchen	1
Laterine	3
Helipad	1
Camping Ground	1

5.2 NGO's

5.2.1 Khangchendzonga Conservation Committee (KCC)

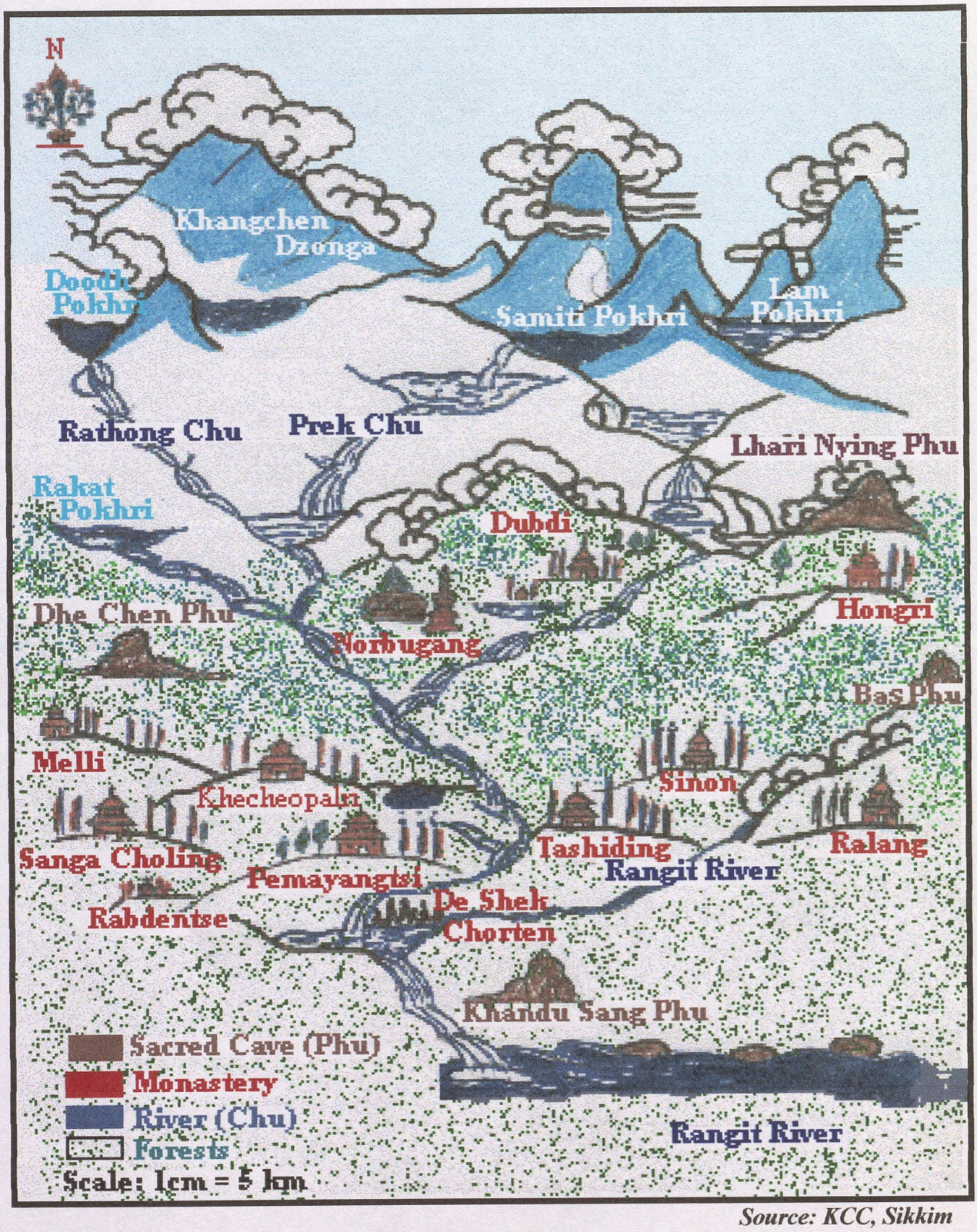
Different stakeholders related in tourism enterprises from the community came under one banner in the name of Khangchendzonga Conservation Committee (KCC) and started the work for the well being for the region. The initial activities at the grass root level started from the beginning of 1996, however the organisation was formally registered and recognized by the Government of Sikkim only on 19th February 1997. Members from village community, students, teachers, tourism stake holders like cooks, porters, guides, pack animal operator, lodge operator etc. started taking active part in the organisation and become member of KCC. KCC was also an active partner in the Sikkim Biodiversity and Ecotourism Project, which was a collaborative initiative designed to promote conservation activities for protection of biological diversity of tourism promotion zones. The core activities of the project encompassed participatory approaches that link tourism related diverse enterprises and traditional cultural practices with conservation action. Working with communities, the private sector and government, the project built upon their skills, interests and knowledge, to enhance: (i) community and private sector conservation practices and ethics; (ii) economic returns from ecotourism services and enterprises; and (iii) contribution to policies that meet ecotourism and conservation goals. KCC is a common platform from where the negative impacts of tourism related activities could be checked, conserve the key resources of the area, educate visitors, students and community stakeholders and advocate for appropriate policy changes.

The concern activities of people like deforestation, unplanned tourism activities, uncontrolled population growth, over grazing, over exploitation of forest resources has put imbalance in the ecosystem. It is in this context that KCC has decided to dedicate our efforts in a small way to help all other big and small friends to conserve the valued treasure of nature for sustainable development.

The major thrust areas for the conservation work of KCC are of

1. **Conservation Education:** Awareness campaign among the rural masses through workshops, fairs, street plays and model demonstrations; involving students actively in conservation activities; Conducting seminars and quizzes in schools and also training school teachers on how to impart conservation education to school children.
2. **Training:** Different skill development training at a very basic level for porters, vegetable farmers, cooks, pack animal operators and local guides.
3. **Microplanning:** In order to ensure a more holistic approach to development, we carry out microplanning exercise jointly with the various government departments, specially the Forest Department. This grass root level planning through the technique of Participatory Rural Appraisal ensures that both conservation and development go hand in hand.
4. **Advocacy with Government agencies:** Advocating and lobbying with the government agencies for appropriate policies in tourism sector for sustainable development, which would benefit the community to conserve the natural resources.
5. **Monitoring:** Monitoring the use of natural resources in and around the Khangchendzonga Biosphere Reserve. Monitoring the tourism enterprise that are operating trek in the area to control illegal extraction of herbs, incense and other medicinal plants as well as proper disposal and management of waste. Strengthen the monitoring of wildlife and poaching with the help of porters, cook, tourists and guides.

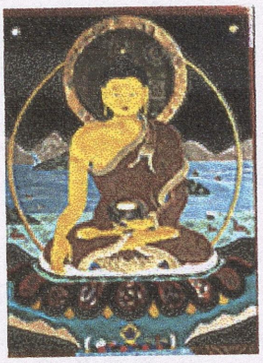
Figure 5: **Sacred Landscape of Rathong Chu Valley**



Source: KCC, Sikkim

5.3 Religion

Buddhism And Conservation



Gautam Buddha, the founder of Buddhism preached that "non violence' is the highest form of religion and further asserted that no one is to harm or take life of any living being, since we cannot give their life back. According to the four noble truths of Buddha, the desire to have more is the root cause of suffering and this makes great sense in the present world of scarce resources. The better management of community resources is the key point for sustainable development and conservation. After attaining Buddhahood, lord Buddha first gave his sermon to the herd of deer at Sarnath. This shows how important animals were for Gautam Buddha.

The form of Buddhism that is prevalent in Sikkim is known as 'Tibitian Lamasim", which is a form of Buddhism mixed with mysticism. Of the four Buddhist sects namely the Nyngmapa, Kagyupa, Sakyapa, and Gyalukpa, the Nyngmapa sect is the most significant sect in Sikkim.

A person when ordained as a monk is made to take a vow of not harming and killing any living being in his life. A Buddhist while making prayers, prays for the well being of a whole sentient being. It is said that all human beings have Buddha nature in them of love and compassion, and one must know how to cultivate them. Therefore while bowing, one concentrates on three points namely Body, Speech and Mind. Since all the sins and bad deeds are committed through either body (physical), speech (verbal) or mind (mental). So to accumulate merit one directs ones physical, mental and verbal efforts towards the well being of all living beings.

Every year during summer, monks, nuns and villagers go on retreat for a period of one month. Since this is the germination period for plants, this saves the seedlings from getting trampled. Some of the animals are religiously protected like the Elephant is regarded as a holy animal and is protected, the snakes are regarded as '*Naga*' or the protector of holy texts and is represented in the form of Dragon which occupies a special place in Buddhist altar. It is also said that if a persons kills a cat, it is equivalent to destroying three monasteries or an incarnate monk.

According to Buddhist philosophy life is an endless cycle of birth and death until one attains *Nirvana*. If one attains *Nirvana* then one is free from the cycle of birth and death

Box Item 4: Interview of Shri Sanga Tempa, Head Lama of Dubdi Monastery, Yuksam

Khanchendzonga, the guardian deity of Sikkim is regarded as the premier highland deity of mountain and its surrounded with hundred to thousand smaller hills and its deities like Khabur Tsen, Dzongri *Tsan*, etc. The four holy caves viz, Lhari Nying *Phu* (The old cave of God`s Hill) in North, Khandu San *Phu* (Cave of the Occult Fairies) in South, Bas *Phu* (Sacred Cave) in East and De-Chen *Phu* (Cave of Great Happiness) in west direction surrounds the great Khangchendzonga. All this deities are the protector of Mountains, lakes, wild animals, flowers, forests and rivers.

The midland deities comprise of Pao Hungri with 21 major deities and a hundred thousand *Tsan* and a hundred thousand *Dii*, Bar Pin Dheen, deities of Chak Drok Drak, Singe Drak, Bap Churong, Bakteng Re (*Tsan* Na), Lanka Bur etc. Any developmental work resulting in clearing of forests, blocking of rivers, dynamiting a place and even its smell disturbs these local deities which causes landslide, disease, other natural calamities like cyclone, hailstorm etc.

The lowland deities comprise of Ka Gye (Eight Protector Deities) and deities of the important hills like Tashiding, Sanga Choling, Pema Yangtse, Rabdentse, Pham Rong, Drak Thong Rong, Dorjee Drak and the deities of the 100 species of trees and flowers.

Every hill has an importance and its significance, for example, at a place called Nalung just before entering KNP, one has to make a vow not to pollute the land, lakes, rivers and streams and not harm animals and plants. A place called Ra Luk Yasha below Bakhim, one is not allowed to carry meat especially pork, not to make noise or merry making and abstain from getting intoxicated.

The following activities like road construction, tree felling, pollution of lakes, river sources, streams etc, dynamite with loud noise and chemical smells and destruction of the area provoke the Yul Lha Zibda (the local country deities) and results in the natural disasters. It is my duty to make prayer every morning at Dubdi monastery and offer holy water and prayers to these deities in order to keep the place free from all natural calamities.

Box Item 5: **Ney Pemathang [*Shangrila*]**

The hidden paradise on Earth

The stories about the existence of *Shangrila* or the hidden paradise can be heard in different parts of the Himalayan region. Like Nepal claims that *Shangrila* exists somewhere in Nepal and so does Bhutan. Tibet made their claim but in my knowledge, the search for the *Shangrila* or *Ney Pemathang* or Demazong also known as Dharma-Doka in Nepali was made twice in Sikkim. The story about the existence of *Shangrila* can be found in sacred book called Ney-yek which gives details about the life inside the *Shangrila* and where about of the place. The copy of this book can be found in most of the monasteries of Sikkim and this book is regarded so sacred that everyone cannot have access to it. The book also says that only particular incarnate persons known as *Tertens* or the "treasure finder" can find this place at the right time only.

The second expedition was made sometime in early 1960s. Local people recall the arrival in Yuksam of Rimpoche Terten Terzey Lingpa from Ladakh. Many Yuksam residents joined the group and trekked in to the area surrounding Mt Khangchendzonga. After spending several months in the area, the followers grew impatient for the Rimpoche to open the gateway to *Ney Pemathang*. Unfortunately, while preparing to open the way, the Rimpoche and some of his followers died in an avalanche, and the *Ney Pemathang* remained unopened. It was said that the major cause for the failure of this expedition was due to the unethical practices followed by the followers like polluting of the place and not respecting the sanctity of the area. According to the legend, among the three *tertens* who know of the location of *Ney Pemathang*, two have failed to open the gate. The last *terten* is expected to born in the 21st century. People still talk of the place where life is immortal and where one grain of rice can feed the whole population of *Ney Pemathang*.

Source: KCC, Sikkim

But if one remains in *'samsara'* one is likely to get birth in either of the six worlds i.e. world of God, the world of Titans, the human world, the world of hunger, the animal world and hell.

Love and compassion to animals are very important as congenital defects such as blindness, dumbness and lameness are viewed as retribution which are due to the individuals having in their pervious life, abused or sinned with the particular limbs or organ presently affected. Thus a man is blind because he sinned with his eye in his previous life. For a like reason, cattle's are humanely treated and wild animals never killed. As a Buddhist no one should take meat of any animal, because in our endless cycle of birth and death, we must have been a father, mother, son, or daughter, of these animals at some time or the other. When we eat meat, it is like eating the meat of our own relative.

Sometime in the 7th Century AD Lord Padma Sambhava [Great Indian saint] was invited to Tibet by king Trisong Deutsen to establish and introduce Buddhism. It is believed that on his way to Tibet, he went via Sikkim and is said to have hidden many treasures or *'Ters'* according to the *'Ney-sol'*. Therefore Sikkim is regarded most holy of all the places and it is said that one merit done here equals a hundred thousand merits done elsewhere. *Ney-sol* the directory of holy places kept in monasteries and referred as a guide book has prophesied that Sikkim will become a Buddhist country one day (See Figure 4). Accordingly in the year 1642, three great monks from Tibet came to Sikkim via north, south, and west gates and met at Norbugang (Yuksam). Yuksam in Lepcha language translates to meeting place of the three learned ones. These three monks were Lhabchen Chempo, Gnadak Sempa Chempo, and Kathok Rikzin chempo. After consulting *'Ney-sol'*, these three monks consecrated Phuntsok Nymgyal from the east direction of Sikkim as the first Dharma Raja.

With the concretion of the first *Chogyal* or [religious king] of Sikkim at Norbugang, Yuksam in West Sikkim in the year 1642 and with the establishment of the first Buddhist monastery at Dubdi near Yuksam, Buddhism was introduced into Sikkim and was a State Religion until Sikkim became a part of India in 1975. A stone throne shaded by a 300 years old Cypress tree still stands here today. A foot- print on stone in front of the throne is said to belong to Lhatsun Namkha Jigme and is worshiped by the Sikkimese people. Opposite this throne is the Norbugang *Chorten* [*stupa*], which contains soil and water from all over Sikkim. Norbu Gang is the oldest chorten built in Sikkim and is believed to contain conch shell, hair and cloth of past and present Buddha, and also contains cloth of Maha-Maugdalayana and Sariputra (Two disciples of lord Buddha). It also contains left foot shoe of Lord Padma Sambhava and hair of Khandu Yashe Chogay (Concert of Lord Padma Sambhava). Prayers in the east direction of the chorten result in

longevity, north direction prayers result in prosperity, prayer in the west direction will result in the increment in personal wealth and south direction with the blessing of peace. Proper prayers in all the four directions of the chorten will result in the birth of a baby boy, for those who do not have children but one is to make one wish at a time and it should be helping sentient being somehow or the other.

Thus Yuksam, the first capital of Sikkim occupies an important place in Sikkimese history and the history of modern Sikkim starts from here.

Dubdi monastery, the oldest Buddhist monastery in sikkim is located on the top of a hill about an hour's walk from yuksam. Dubdi translates to "Hermits cell" and was founded by Gyalwa Lhastun Namkha Jigme in the year 1701. There are two monasteries at Dubdi, and the smaller one is dedicated to the protector deities of the region. The people of Yuksam make an offering of newly harvested food crops every season to thank these deities for their blessings. The Head Monk has the power to divert hailstorms, cyclone and other natural calamities when it is blown with the recitation of *Mantras*. This helps in saving the crops from getting destroyed.

Kathok and Khecheopalri lakes are two important lakes in this area. Khecheopalri known as, 'wishing lake' is one of the most sacred lakes of Sikkim. Khecheopalri lake was originally at Yuksam, and people dumped carcass of donkey, dogs and other dirty things, polluting the lake and hence destroying its sanctity. The deities of Kheochelpari lake got annoyed and sifted to the current location at Khecheopalri. It is said that long time back a lake deity in the form of a Bull came to the village called Chojo. Some people taking advantage of finding a bull without an owner killed the bull and ate the meat. It is said that all those who ate the meat fell sick and none of them survived. This story tells us about how important it is to conserve our natural and cultural heritage. On the 15th day of the first month of the Tibetan calendar a big *puja* is organised by the monk of Kheochepalri Monastery and the community of Khecheopalri village in order to persuade the lake deities to avert disease, natural calamities and personal harm. This festival attracts thousands of devotees from all over Sikkim, Darjeeling, Bhutan and Nepal.

Sikkim is also known as *'Demazong'* by the Sikkimese people, which translates to "hidden valley full of treasure, fruit and flower", is considered as a sacred land blessed by the Saint Padma Sambhava. *'Neysol'*, describes that the whole region around Khangchendzonga [*great mountain which contains five treasures*] has hidden treasure or *'Ters'* which will be revealed in the course of time. In the month of august during Panglhabsol festival, Buddhist monks performs rituals and prayers in the name of the Khangchendzonga deity. The monks and the devotees go all the way upto Dzongri 'Dhaplha Gang' to offer prayers and rituals to Khangchendzonga deities for good

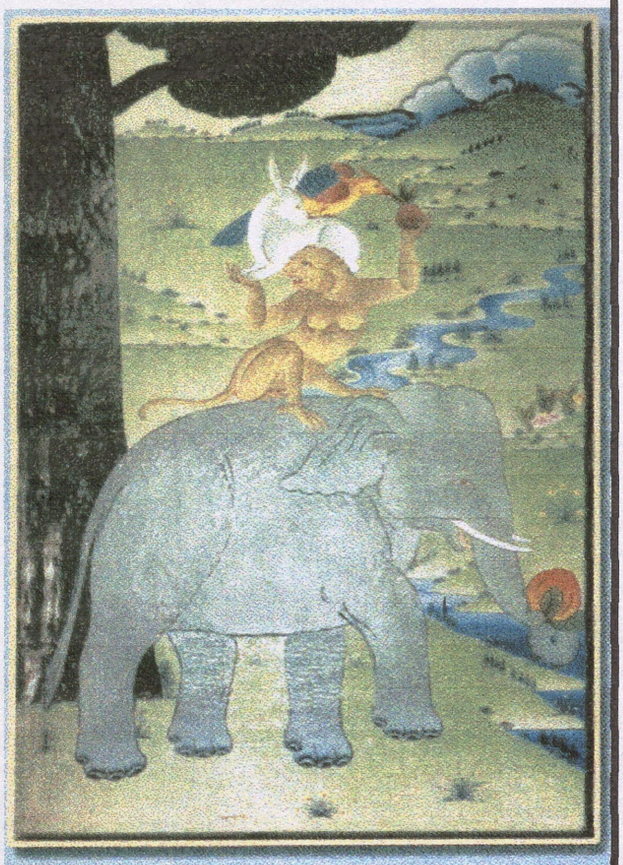
harvest, free the whole country and world from disease, hunger, famine, war etc. There are all together 109 existing large and small lakes in Sikkim regarded sacred by the Sikkimese people. No one pollutes these lakes and all the streams and lakes are considered as holy. Besides the Khangchendzonga area, there are four holy caves in the four directions of Sikkim viz, Lhari Nying Phu in North directoin, Dechen Phu in West direction, Khandu Sang Phu in South direction and Bas Phu in East direction. Out of these four holy caves, the cave of Lhari Nying Phu, and Dechen Phu are in remote corners and amidst forests. These areas are religiously protected. Therefore any large-scale disturbance induced by human beings in this area will destroy these hidden treasures and will harm the sentient being through natural calamities.

Since the whole region surrounding Khangchendzonga is regarded very sacred, Yuksam is considered to be a 'Lhakhang' or Altar for offerings to the khangchendzonga deities. The seven holy lakes surrounding Khangchendzonga viz, Kheocheopalri, Katok Tso, Bar Cho Marpu, Phu Cho Karpu, Ka Bur la tso, Sume ten tso and Dafuk yum tso are the seven offering bowls to the Khangchendzonga deties. Every landscape of highland, middle land and low land and every river, stream, cave, big trees are believe to have guardian deities [*yullha, Zibda*] of their own and therefore during the morning ritual in every monastery, these deities are worshiped with great devotion.

Gnadak Sempa Chempo established a Monastery at the holy place of Dhakar Tashiding [The elevated glorious white rock]. The site of the monastery at the high promontory between the junction of the Great Rangit and the Rathong river is believed to have been miraculously raised up by Saint Padma Sambhava. It is said that Gnadak Sampa Chimpo after reciting *'vajra guru'* mantra a hundred thousand times was able to find the vase filled with holy water, which was regarded very auspicious. The water of this vase is kept inside Tashiding monastery and taken out once every year. The level of water is predictive of future events of possible properties and natural calamities, disease, war, famine etc. The water of Rathong chu is mixed with the holy water of the vase and distributed amongst the devotees who come from all over the Sikkim, Bhutan and West Bengal.

Thinpo Pin Zie or The Four Friends

A long time ago there was a village, which was sad and the lands were no longer fertile, the soil was hard-baked and wasted. The water sources had dried up, the skies were filled with a haze of dust and the people were tired, hungry, ill and irritable all the time. One year, things were worse then usual. The people could not bear it any longer. They decided to visit the wise old lama who lived high up in the mountains and ask him what was the root of their collective misfortune. After meeting with the lama, they related their tale of woe and misfortune. The old man told them to return home through the enchanted forest and their answer will be found.



ཡན་གྱི་ཐུན་བཞིའི་ཐུང་གཏམ་ལྟར། །མཐུན་གྲོགས་རང་གཞན་མི་རིགས་ཀུན། མཐུན་པའི་བསམ་སྒྲུབ་གོང་དུ་སྐྱེལ། །མཐུན་ཚེང་འགྲོགས་ན་འདི་ཕྱིར་བདེ།།

The villagers more mystified returned home through the thick forest and suddenly they came upon a clearing with an unusual sight. In the shadow of a magnificent fruit laden tree stood an elephant. On the elephant's back sat a monkey and on the monkey's shoulder sat a rabbit and on the rabbit's head perched a bird. They made a peculiar pyramid. The villagers were surprised to see the site and at the same time the elephant spoke. He said when we first came to this spot many years ago; this tree was just a new sprout and each of us laid claims to this plant. "Each of us felt that we could tend it best. I, the Elephant thought that as I was stable and strong as the very soil, I could nurture the plant better." Like wise the monkey, Rabbit and the Bird claimed that each one of them could take care of the plant better. We quarreled over the ownership so much so that after a while, we forgot all about the tender plant and it become a weak and drooping sapling.

One day, just as there seemed to be no hope left for the little sprout to survive, an old lama was passing through this forest. He came upon the four of us, angry and sulking, and asked us what caused this scene of discord. When we explained he told us to be united and cooperatively take care of the plant. Then after we decided to try and work together to tend the tiny plant before we lost it through our squabbling. After taking care of the soil, plant, air and water, our tree has grown large and luxuriant and we all share the fruits.

This is our special tree, but it is also a world in itself, home to a myriad other living things. You too, young humans can learn from our story. The villagers went back satisfactorily after getting their answer. The answer lies in nurturing the plants, saving forests and wildlife, which in turn will provide clean water and air, peace and prosperity to the village.

Source: Forest Tales ©1994 SACEP

Chapter 6

Ongoing Biodiversity Related Initiatives

Chart 3: Participative Performance Ranking of the Agencies with regards to their impact on biodiversity

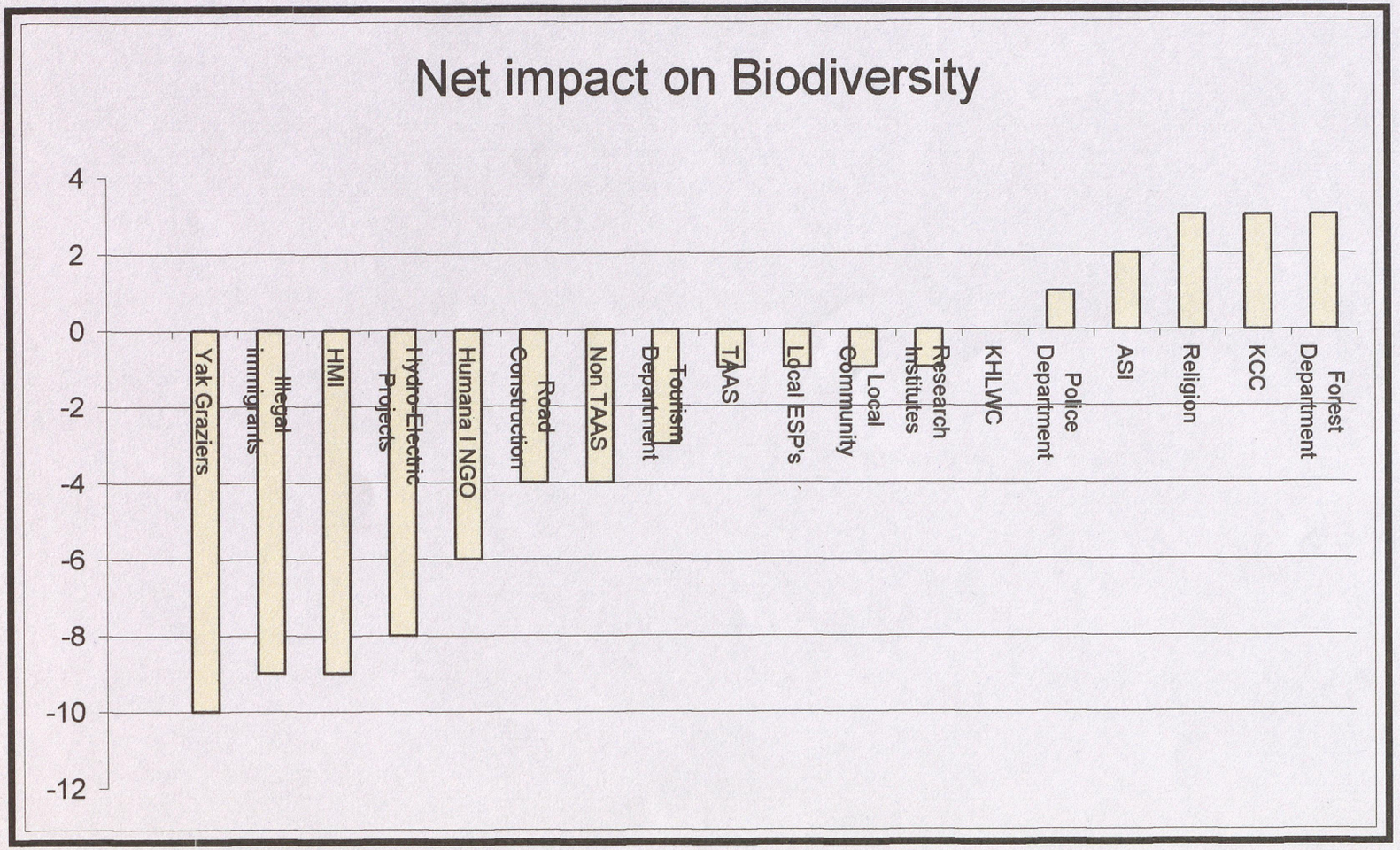


Table 4: Participative Performance Ranking of the Agencies with regards to their impact on Biodiversity

Agency	Biodiversity			Justification
	Save	Consume	Net	(-):-- Consume (+):-- Save
Yak Graziers from Nepal and Sikkim		ooo ooo ooo o	ooo ooo ooo o	- Destruction of Rhododendron and Juniper forests for firewood and pole collection - Poaching of Musk Deer, Pheasants, Himalayan Black Bear etc for trade - Smuggling of medicinal plants and Juniper for sale outside Sikkim - Dogs with the graziers prey on pheasants, ground nesting birds and their young ones and cause disturbance to even smaller mammals - Over grazing of alpine meadows and proliferation of unpalatable species like *Potentilla peduncularis, Meconopsis paniculata, Rosa spp, Berberis spp* etc. - No contribution to the local economy since the dairy products like *Gheu* and *Churpi Supari* are sold in markets outside Sikkim - Sale of local liquor in tourist season inside the national park - Environmental costs of this illegal grazing is borne by the local community while monetary benefits are gobbled up by these graziers from Nepal. Hence these graziers have now become very wealthy and drive around in luxury vehicles and own hotels and shops. Some of them are believed to have illegal domicile certificates too and are now slowly infiltrating into the political system.
Illegal immigrants residing in Yuksam		ooo ooo ooo	ooo ooo ooo	- Like parasites for the local tourism enterprise, since compete illegally with the local ESP's and work for very low wages. - Since they do not own any land, totally dependent on the adjoining reserve forests for firewood, fodder, open grazing, NTFP collection and medicinal plants. - Since they are non locals, they do not have any sense of ownership or respect with the local natural and cultural resources.

Himalayan Mountaineering Institute, Darjeeling		ooo ooo o	ooo ooo o	+ Employment generation for local ESP - Irreversible Habitat destruction of Blue Sheep, Snow Leopard and Pheasants due to: - Indiscriminate exploitation of high altitude herbs, shrubs and trees as firewood - Garbage dumping in this fragile ecosystem since late 1960's - Loud noise and merry making around camp fires - HMI trainees outnumber the tourists visiting KNP and the accompanying *Dzos* numbering about 100 in one group cause trampling, trail degradation and over grazing in this fragile area - Over grazing of the medicinal plants in the alpine meadows in their vegetative phase, prevents them from flowering and fruiting and hence propagating.
Hydro-Electric Projects of Power Department and NHPC	o	ooo ooo o	ooo ooo	+ Short term employment generation for local community, electricity generation for the state - Environment Impact Assessment procedure not transparent, since the agency carrying our EIA is funded by the user agency - Local community not consulted while carrying out feasibility study. Cultural feasibility not taken into account. This was the main reason behind abandoning of the Rahong Chu Hydroelectric Project. Local community of Gangyap was unhappy with the proposed construction of Relli Chu Hydroelectric Project by Power Department since it would submerge the Gangyap *Tatopani* - Mass destruction of the fragile and biodiversity rich river valley - Influx of foreign nationals as laborers and petty *sardars* disturbing the demographic profile of the area and heavy demand on firewood, fodder and NTFP. - The De Shek *Chorten* at the confluence of the Rathong Chu and the Rangeet was submerged and hence destroyed due to the damming of the Rangeet. This stupa signified world peace and harmony. The new stupa constructed above it, was just for namesake and

				did not have any sanctity, value or faith. This type of practice of replacing old for new should not be encouraged in future.
Humana People to People International NGO, Yuksam		ooo ooo	ooo ooo	+ Employment on daily wages for about a dozen local people in the nursery school run by Humana, on payment basis. - Objective and programs not known and Communication gap with the local community. Lack of transparency in acquiring the Power Colony land of about 13 acres at throw away price. - Activities and programs of hardly any benefit to the local community - Unchecked inflow of foreigners in this restricted area may result in future problems.
Sikkim Public Works Department (Roads and Buildings wing)		ooo o	ooo o	+ Road connectivity for communication of local community and tourists - Usually insensitive towards biodiversity values, earth and boulders thrown down hill sides while construction, use of dynamite for blasting and use of firewood from forest for carpeting of road - Buildings constructed by SPWD usually lack the traditional Sikkimese design
Non TAAS	o	ooo oo	ooo o	+ Small Employment generation for local ESP - Usually employ ESP from outside Sikkim. No Camp site management, fooding usually not provided to porters hence have to use firewood, ESP not trained about conservation of nature and culture, hence smuggling of biodiversity by ESP. Do not possess a code of conduct also.
Tourism Department	oo	ooo oo	ooo	+ Income from ecotourism encourages conservation - No legal means to implement code of conduct for Ecotourism. - Firewood over exploitation, Garbage dumping, Over Grazing of Dzos - Water pollution due to poor sanitation facilities and firewood self-consumption and sale by caretakers of the trekkers huts. - Use of timber in large quantities for maintenance of trekkers hut and trekking trail

TAAS	oo	ooo	o	+ Employment generation for local ESP, Code of Conduct, Orientation Camps for ESP - Major chunk of tourism related income channelized to tour operator, hence little benefit to local ESP. No proper Camp site management, fooding usually not provided to porters hence have to use firewood, ESP not trained about conservation of nature and culture, hence smuggling of biodiversity by ESP
Local Ecotourism Service Providers	o	oo	o	+ Monitoring of health and threats to biodiversity, behave responsible keeping in view long term benefits - Use firewood for cooking.
Local Community	o	oo	o	+ Local community in general is mostly close to nature and possess a sense of ownership with the biodiversity. They are very rich in indigenous knowledge, specially medicinal herbs. Consumption of biodiversity is for meeting bona fide needs only and hardly poses any pressure on the sustainable use of natural resources. - However powerful persons indulge in cutting down of trees, yak grazing, hunting and other forest offences. Most of the threats to biodiversity are from these rich and powerful persons who consider themselves above law. This creates an imbalance in the otherwise sustainable use of natural resources by the local community.
Research Institutes like GBPIHED, BSI, ZSI, WWF etc	o	oo	o	+ Local field assistants get temporary employment and gain some knowledge by association with experts. This also results in awareness for the community to some extent - Scientific documents are usually not shared with the local community as well as other departments. Hence local community and park managers hardly benefit from the research projects of these institutes. Also the scholars who have now developed expertise in this region, instead of working for the betterment of this region, use this expertise to shift to greener pastures. - Sample collection of plants and animals.
KHLWC, Khecheopalri	o	o		+ Signage for awareness and garbage management at Khecheopalri lake side. During the Mela the KHLWC does Mela management, prayer flags are hoisted on bamboo poles instead of tree poles - Since the NGO is still in the nascent stage, capacity of all the members needs to be

				developed. More villagers should be involved in a participatory manner and garbage management needs to be improved. Garbage dumping in Khecheopalri lake outflow unchecked.
Police Department	oo	o	o	+ Regulate tourists and ESP by registering them before entry into the National Park. Assist in apprehending wildlife offenders and local conservation initiatives. - Stricter regulation for foreign ESP's and eviction of foreign nationals (*holungpas)* should be implemented.
Archaeological Survey of India	oo		oo	+ Conservation of monuments like Norbugang, Dubdi Monastery in an eco-friendly manner + Approach path and boundary wall constructed with care and expertise - Transparency in project implementation to be improved
Religious Institution (*Lama*)	ooo		ooo	+ According to Ney-sol, the Rathong Chu valley has been blessed by Guru Padam Sambhava and is a sacred landscape. Hence all activities impacting nature out here, also impact religion in some way or the other. During religious + festivals like *Bumchu* at Tashiding monastery, fairs at Khecheopalri and Karthok Lake, Pang-Labsol and many more, natural deities are worshipped and their blessings sought. + On new moon, 8th day and on the full moon of every month, Saga Dawa and Lhabhav Dsuchen killing of all animals is prohibited by the holy texts + After joining with mainstream India, and ensuing democratic rule, the *Lama*s of the monasteries are gradually losing their power. Westernization has adversely affected the respect which the community earlier reposed on the *Lama*
KCC, Yuksam	ooo		ooo	+ Awareness and Training of ESP's and school children, Monitoring of biodiversity along the trekking trail. Ensuring that maximum benefits from tourism are got by the local community. Community policing (Russian biopiracy case) and advocacy for appropriate policy changes - Relationship with various state and central government departments needs to be improved, number of active members is less, systematic functioning needs to be strengthened

Forest Department	ooo o	o	ooo	+ Forest and Wildlife Laws, Staff and Infrastructure, Afforestation Projects. - Opening up new forest areas for Tourism and Developmental Projects. Implementation of wildlife law needs to be strengthened.

Chapter 8
Community Strategy and Action Plan

Yuksam

Agenda

10:00 Registration of Participants
10:20 Self Introduction
10:30 Welcome Speech [P. G. Bhutia, KCC]
10:40 Introduction to NBSAP [Ashish Kothari, NBSAP]
11:10 Follow Up from first Public Hearing [Sandeep Tambe, Forest Dept]
11:30 Tea Break
11:45 CSAP Discussion

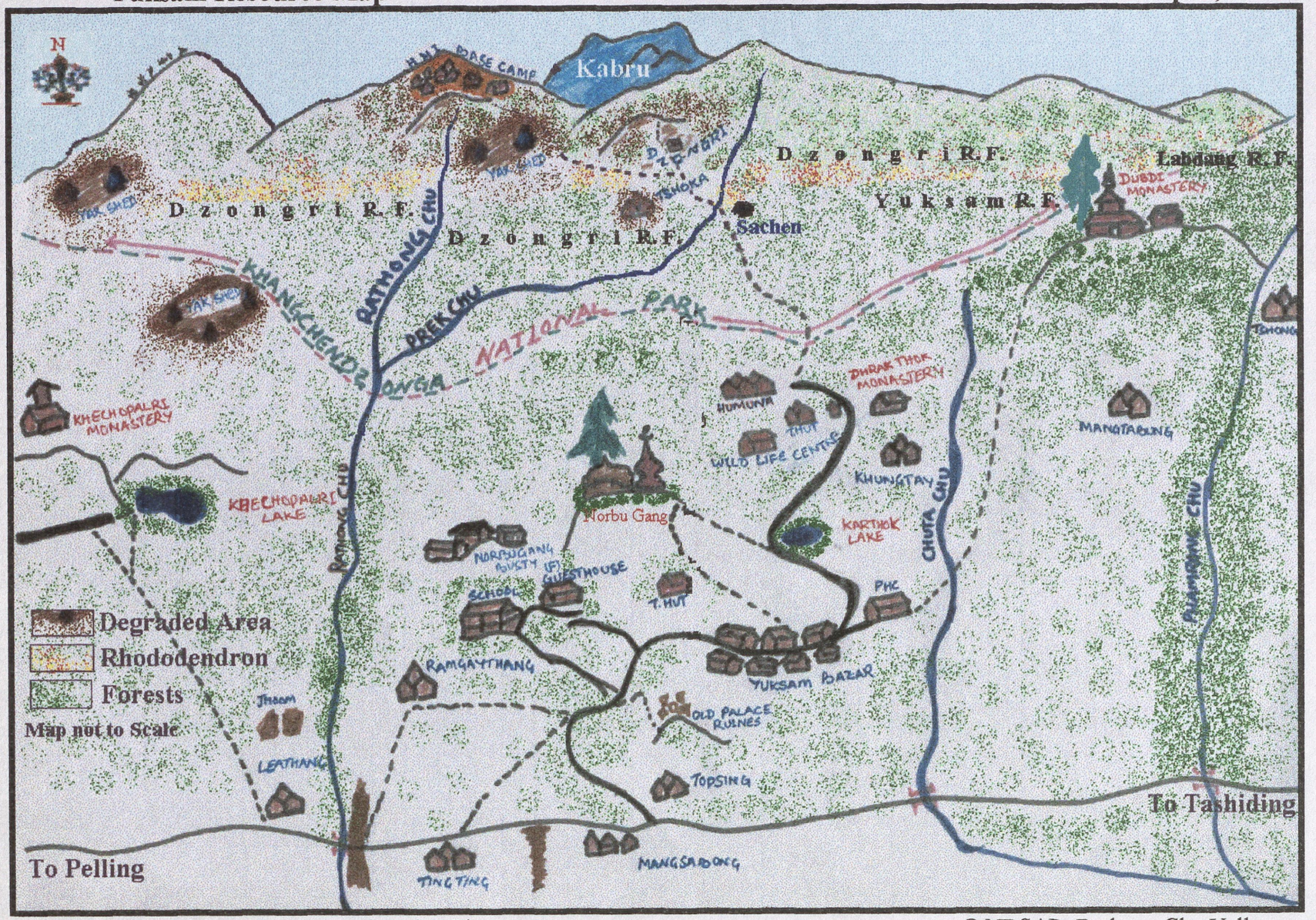
Resources (Discovery)

1 Yuksam is the first capital of Sikkim
2 Dubdi is the oldest monastery of Sikkim
3 Location of Yuksam near to *himal*
4 Cooperation among the villagers
5 Clean drinking water
6 Rich in forests and wild Life
7 Cultural diversity
8 Good agriculture and agro forestry of large cardamom
9 Famous tourist spot of Sikkim
10 Good infrastructure facilities and communication facility
11 KNP
12 Sacred landscape, and the area blessed by Guru Padma Sambhava
13 Ethnic look of the village
14 Rich in NTFP
15 Norbu Gang *Chorten* and its area
16 The holy Kathok lake
17 K.C.C. and its contribution in bio-diversity conservation
18 Rich in Wild Orchids
19 Beautiful landscape of the area

Future development (Dream)

1. Phased eviction of Yak and sheep *Goth* from KNP
2. Eviction of Foreign Nationals (*Holungpas*) from Yuksam
3. Closing down of HMI Training Camp on Rathong Glacier
4. Tshoka Village Relocation
5. Maximum benefits from Tourism should go to local community
6. Survival percentage of Forest Plantations to be improved
7. Garbage Management within KNP
8. Firewood stock for cremation at Dubdi
9. Reduce *Jhoom* Cultivation
10. Integrated Town Planning
11. Stop Bamboo Extraction from Reserve Forests by outsiders (*Holungpas*)
12. Participatory Monitoring of natural resources along the trekking trail
13. Reduction in the Stray Dogs in the *Bazaar*
14. Increased availability of Kerosene for supply to tourists

Yuksam Resource Map **12th April, 2001**



National Biodiversity Strategy and Action Plan

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Strategy and action plan for Yuksam

Activities	Why	Who	Where	How	Indicator
Phased eviction of Yak and sheep *Goths* from KNP	Unsustainable collection of firewood from the Rhododendron and Juniper forests in huge quantities. To allow regeneration of the alpine meadows, which are currently heavily overgrazed Clandestine smuggling of medicinal plants and other forest produce *Goth* Dog is very ferocious and preys on ground nesting birds and small mammals, also used for hunting Yak grazing is not a traditional activity within KNP and most of the graziers are from Nepal	KNP and West Territorial Division forest staff, Police Department, KCC, Tourism stake holders and local community	KNP	1. Calling awareness meeting of the yak and sheep owners and caretakers 2. Passing Panchayat resolution confirming the stand and support of the community 3. Section 35(6) of the Wildlife (Protection) Act 1972 to be implemented strictly. Support from Police Department to be taken 4. Phased eviction of the permanent yak and sheep *Goths* starting with the foreign nationals first, followed by the wealthy persons. 5. Participatory monitoring of the border to ensure that these *Goths* do not reestablish	Regeneration of the alpine meadows. Reduction in the spread of *Potentilla peduncularis* No *Goths* within the national park
Eviction of Foreign Nationals (*Holungpas*) from Yuksam	Heavy dependence, exceeding the carrying capacity of Yuksam and lack of ownership with the natural resources	Police Dept, Forest Dept (West Territorial) KCC, Tourism	Gechen and Khyongtey village	1. Police Department to book the Holungpas under the Foreign Nationals Act 2. Local Villagers to stop renting out	Regeneration of the Selep, Nalung, Paha Khola,

	Competition with local community in ecotourism related employment opportunities. Source of anti social activities, crime and slum like development	stake- holders and local community		their houses to them 3. West Territorial Division, Forest Department to seize the Dzos and horses belonging to the *Holungpas* when grazing in reserve forests.	Bakting, Gyamtong forest areas Benefit from ecotourism reaching to the local community
Closing of HMI Training Camp on Rathong Glacier	The trainees along with the support staff, number over 200 in one group. There are a total of ten groups in a year, spending three weeks each at the HMI Training Camp on Rathong Glacier. Irreversible Habitat destruction of Blue Sheep, Snow Leopard and Pheasants due to 1. Indiscriminate exploitation of high altitude herbs, shrubs and trees as firewood 2. Garbage dumping in this fragile ecosystem since 1960's 3. Consequently the Rathong glacier has started receding and cracks have appeared on the glacier as far up as Doodh Pokhri	A meeting in this regard was held in August 2000 at HMI Darjeeling. GBPIHED, ATREE, KCC participated in this meeting with the director HMI. In this meeting HMI agreed: Not to use firewood throughout their stay within KNP. Expressed inability in reduction of number of trainees since	KNP	A Code of Conduct to be prepared by the Forest Dept and the same enforced after due consultation with the President HMI, Darjeeling This code of conduct should include the following safeguards: 1. No use of firewood within KNP 2. All the garbage dumped by HMI over the last 30 years to be brought back within a few years 3. Drastic reduction in the number of courses and trainees. Total number of Trainees and staff should not exceed 500 in an year 4. Environmental orientation for the trainees mandatory at Yuksam 5. Payment of entry fees mandatory for all the trainees and staff 6. No new construction or repair without informing the Forest Dept.	Reduction in the number of courses and trainees Code of Conduct strictly enforced

	4. Loud noise and merry making around camp fires 5. Accompanying Dzos numbering about 100 in one group cause trampling, trail degradation and over grazing in this fragile area 6. Over grazing of the medicinal plants in the alpine meadows in their vegetative phase, prevents them from flowering and fruiting and hence propagating.	trainee quotas were already fixed Expressed inability in closing down the camp for a few years Infact HMI has plans of expanding and increasing the number of courses even involving foreign trainees			
Tshoka Village *(3,000 masl)* **Relocation**	1. Heavy dependence on forest resources within KNP at Tshoka and Sachen (total 7 households) by these refugees from Tibet who were settled here by the then *Chogyal* in 1969 by allotting them total 13 acres of land	Forest Dept., District Administration	Relocation from Tshoka to Yuksam	1. The new generation is averse to staying in this hostile and remote place. The Tshoka villagers are themselves eager to shift out to a more hospitable place. Animal Husbandry of Yak and Dzo and Ecotourism are the livelihoods practiced by them. All of them have already purchased land and constructed houses at Yuksam and Gangtok. 2. Compensation package needs to be agreed upon and funded through MoEF schemes	Tshoka villagers relocated at Yuksam. Forests recovering at Chokha and Sachen
Maximum benefits	1. Lion's share of	Tourism Dept.		1. Tourism Dept should issue Trekking	Travel

from Tourism should go to local community	tourism income gobbled up by outsiders, community gets only leftovers 2. Incentive for conservation through income generation 3. Income generation for larger section of society	Forest Dept. TAAS Non TAAS KCC Panchayat, MLA		Permit for international tourists from Yuksam. Hence international tourists can directly come to Yuksam, instead of coming via Gangtok. This will result in local community of Yuksam can opening their own travel agencies and derive direct and maximum benefits. International tourists were also happier with this arrangement. 2. Promotion of home stays, wherein the tourists can stay with the local community instead of in hotels and lodges. Hence even those who cannot afford to build hotels can also benefit. On the other hand the tourists can also get a first hand experience of the local culture, cuisine and customs. 3. Backward and forward linkages like vegetable production, poultry, piggery, camping equipment hiring, souvenir shop etc need to be setup to stop leakage of tourism income to outside agencies. 4. Skill development of local youth as guides, cooks, lodge operators etc. So that demand of ESP's can be met locally. 5. Legal empowerment of local community to ensure that all the tours and travels are routed through the local community	agencies opened in Yuksam List of home stays found with all travel agents Travel agents buying vegetables from the local community Local Trained guides and cooks being employed EDC functional

Survival of Forest Plantations to be improved	1. JFMC / EDC not fully functional, hence no sense of ownership 2. Planting Stock in nursery not sufficient. Also Plantation carried out rather late in the months of July - August instead of May - June Plantations usually not carried out technically 3. Grazing in plantation areas in winter			1. Forest plantations and protection to be carried out jointly with JFMC / EDC. *Smriti Ban* concept to be popularized and implemented 2. Forest Nurseries to be modernized 3. Timely approval and sanction of plantation schemes from Planning and Finance Depts. 4. Grazing to be banned, since the Dzo's belong to outsiders (*Holungpas*)	Modern Forest Nurseries Plantations in May No Dzos in forests
Garbage Management within KNP	1. Garbage dumps specially non-biodegradable around Camping sites and trekking trail 2. Water source polluted by garbage mismanagement 3. Garbage Pollutes the natural and cultural sanctity of the area	EDC, TAAS, HMI, Tourism Dept, Forest Dept., KCC etc	Camp sites, HMI Base Camp, Trekking Trail	1. Code of conduct to be given legal backing and non-biodegradable garbage to be brought back. 2. Wildlife Checkpost at Yuksam and EDC should ensure the strict implementation of the same. 3. Garbage bins to be setup along the trail for biodegradable waste. 4. Garbage dumped over the last thirty years to be brought back, segregated and disposed off in an environmentally clean way. 5. Performing rituals and prayers for cleansing the sacred landscape with the help of the local *Lama.*	Tourists getting garbage back Trekking trail clean
Dubdi Crematorium	Traditionally chestnut	Lama,		1. Firewood from fallen trees to be	Firewood

	trees are cut down for burning dead bodies near Dubdi Gumpa. Hence the forest cover is decreasing	Panchayat and KCC to convince the community Forest Dept to provide the firewood free of royalty from Dubdi and adjoining forests free of royalty		collected and stocked at Dubdi. 2. Around seven *pils* of firewood to be stocked and used during cremation. 3. Afterwards the user should replenish the stock from fallen trees.	stock at Dubdi Standing trees not cut down for cremation
Reduce *Jhoom* cultivation	*1. Jhoom* cultivation specially on steep hill sides causes landslides, and hardly any regeneration 2. Also Jhooming carried out illegally in protected forests 3. Wild animals coming to feed on the crops are hunted	Panchayats, NGO's, Forest Dept etc.	Leythang, Khyongtey	Awareness for the villagers	No fresh Jhoom patches to be seen
Integrated Town Planning	Haphazard development Non traditional, multi - storied construction. Sanitation, parking, recreation facilities lacking	UDHD, Panchayat, Planning Dept. Panchayat, Police and KCC	Yuksam	Blue print for integrated town development of Yuksam Implementation of the UDHD notification restricting the no of stories of all buildings to three. All buildings should have traditional touch	Blueprint of development available with Panchayat and KCC
Participatory	Checking illegal collection	TAAS, Tourists,		By providing training on natural	Feedback

Monitoring of Natural Resources along the trekking trail	and transit of natural resources Provide early information of illegal activities to concerned department	Forest Dept, EDC, Tourists, NGO's etc Wildlife check post and KCC jointly		resources monitoring and Code of Conduct to the ESP's By getting feedback from the visitors to KNP	forms filled and returned at the Wildlife checkpost and KCC-VIC
Bamboo Extraction from R.F. by outsiders	Preservation of local resources for local community	Territorial staff of Forest Dept.	Yuksam R.F.	Permit for extraction should be given only after checking the domicile certificate	
Reduction in Stray Dogs in the *Bazaar*	Stray dogs accompany the visitors and ESP's to KNP and disturb wild animals specially ground nesting birds and small mammals Stray dogs roam in packs at night and often attack visitors and steal young ones of livestock	Local resource persons, veterinary dept, Police Dept etc	Yuksam Bazaar	Panchayat resolution needs to be passed and then necessary action initiated by the local community	Less number of stray dogs in the Bazaar
Increased availability of Kerosene for supply to tourists	Availability of kerosene ensures that firewood is not used within KNP	Food and Civil Supplies Dept, Multipurpose Cooperative Store Yuksam Bazaar, Panchayat and KCC	Yuksam Bazaar	The Kerosene stock for Yuksam has to be increased from 10 barrels to atleast 20 barrels. This has to be supplied by the Food and Civil Supplies Dept. from their godown at Jorethang, South Sikkim.	Kerosene available at regular rates in Yuksam bazaar in tourist season

Rathong Chu Valley: Past, Present and Future

A Pictorial Study by Peter S. Lepcha

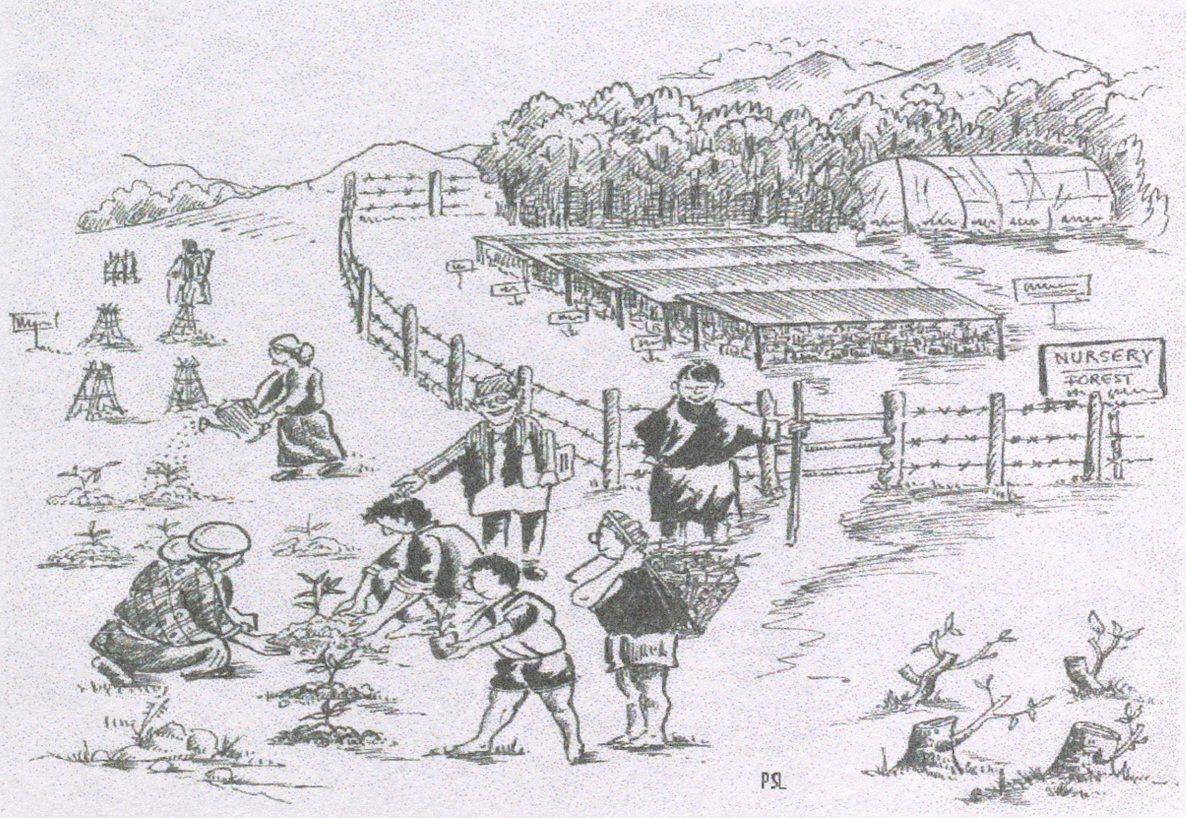
Figure 6: Past



Figure 7: **Present**



Figure 8: **Future**



Labdang (7th May 2001)

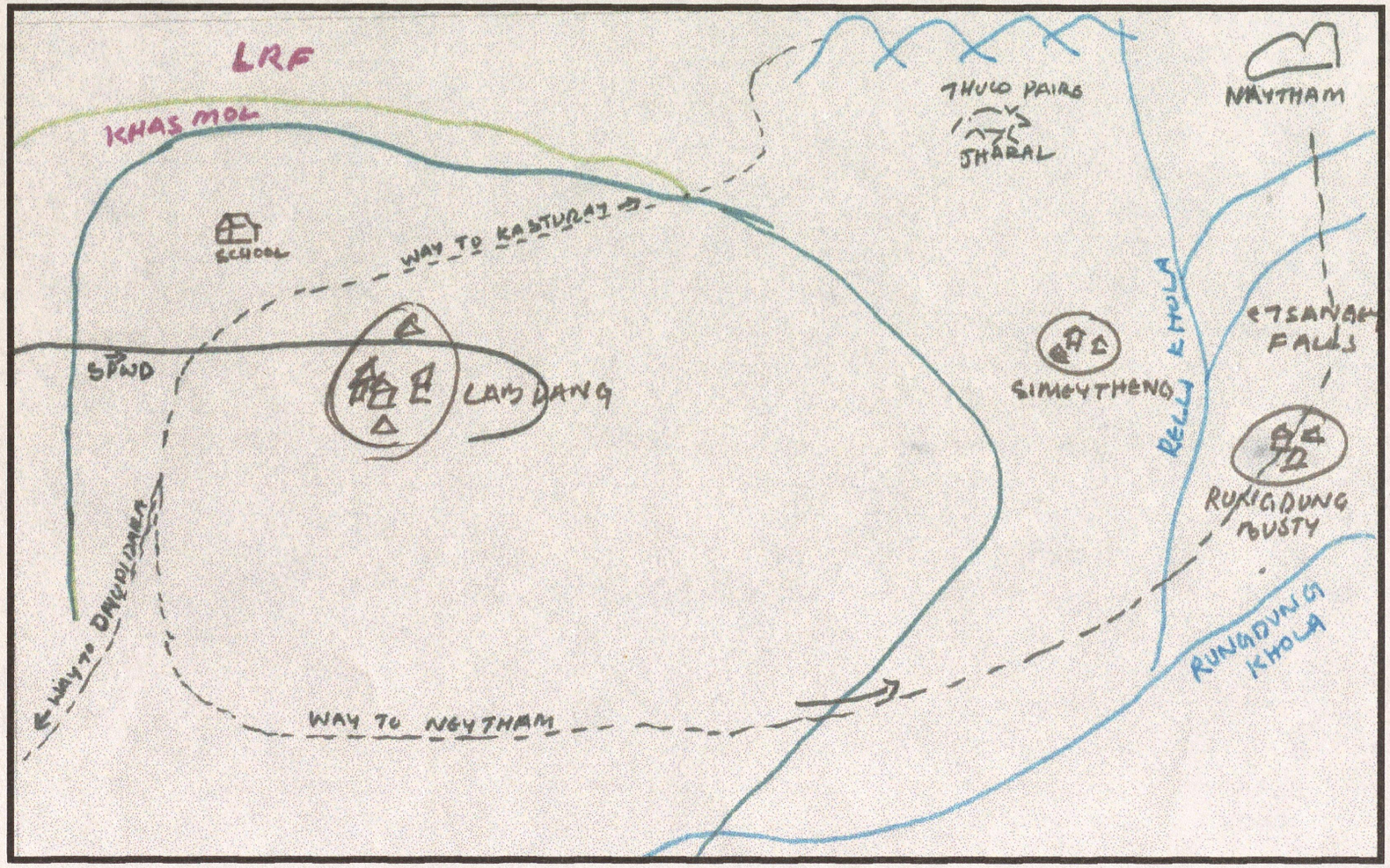
Discovery

- Good forest
- Fresh vegetables
- Rhododendrons and orchids
- Alpine flowers
- *Losar* festival
- Mountain view
- Agricultural products and large cardamom
- Indigenous cattle and poultry

Future development (Dream)

- Community based tourist lodge at Labdang
- Trekking route improvement: Labdang to Lampokhari
- Skill development programme (e.g. polyhouse vegetable cultivation, local handicrafts)
- Improved drinking water supply
- Village beautification
- Forest office functional round the clock
- Buffer food stocking center or Food Godown
- Health center, School up-gradation
- Public toilet
- Steel bridges for inter village communication
- Pitched road

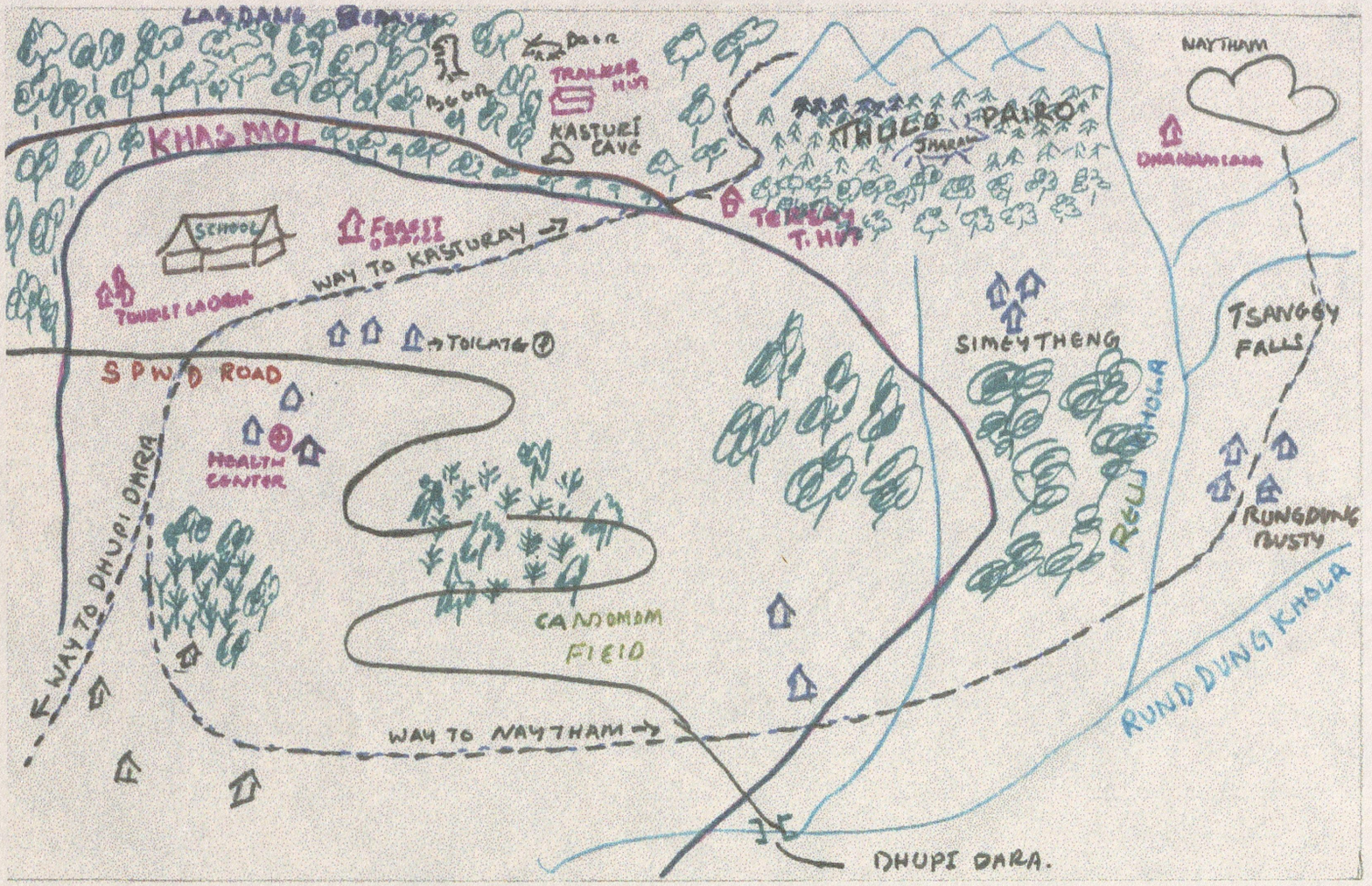
Labdang Resource Map **07th May, 2001**



National Biodiversity Strategy and Action Plan

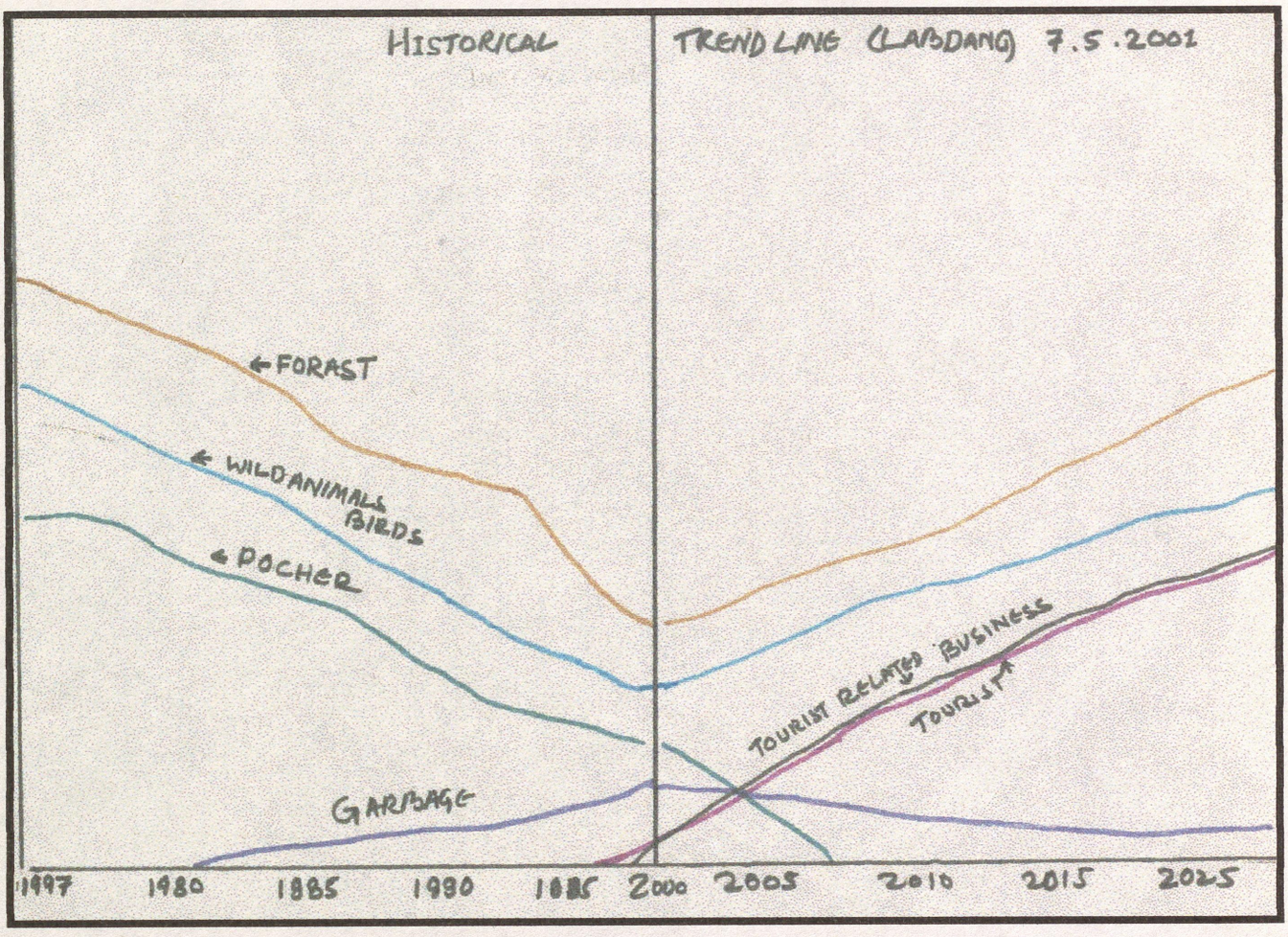
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Labdang Dream map **07th May, 2001**



National Biodiversity Strategy and Action Plan © NBSAP- Rathong Chu Valley

Labdang Trend Line **07th May, 2001**



National Biodiversity Strategy and Action Plan © NBSAP- Rathong Chu Valley

Karjee (8th May 2001)

Discovery

- Cardamom
- Orchids, Lekh Chandan tree
- Plantation in degraded forests
- Agricultural products (Maize, potato, millet, peas)
- Lake (*pokhari* at Narkhola)
- Community club (Vikas Yuva Sangh)
- Religious Deities of Panghidhara
- Religious Caves (Zhayang, Chariyangphu, Ramdung, Tanding, Sangsa fuk, Soda Ney)
- Hotspring
- Ruins of Mangdhar Neongdey
- *Stupa* at Dhupi
- Tungsung Khola
- Goucharan
- Panchayat Bhawan
- Health center and school
- Tourism though in small extent

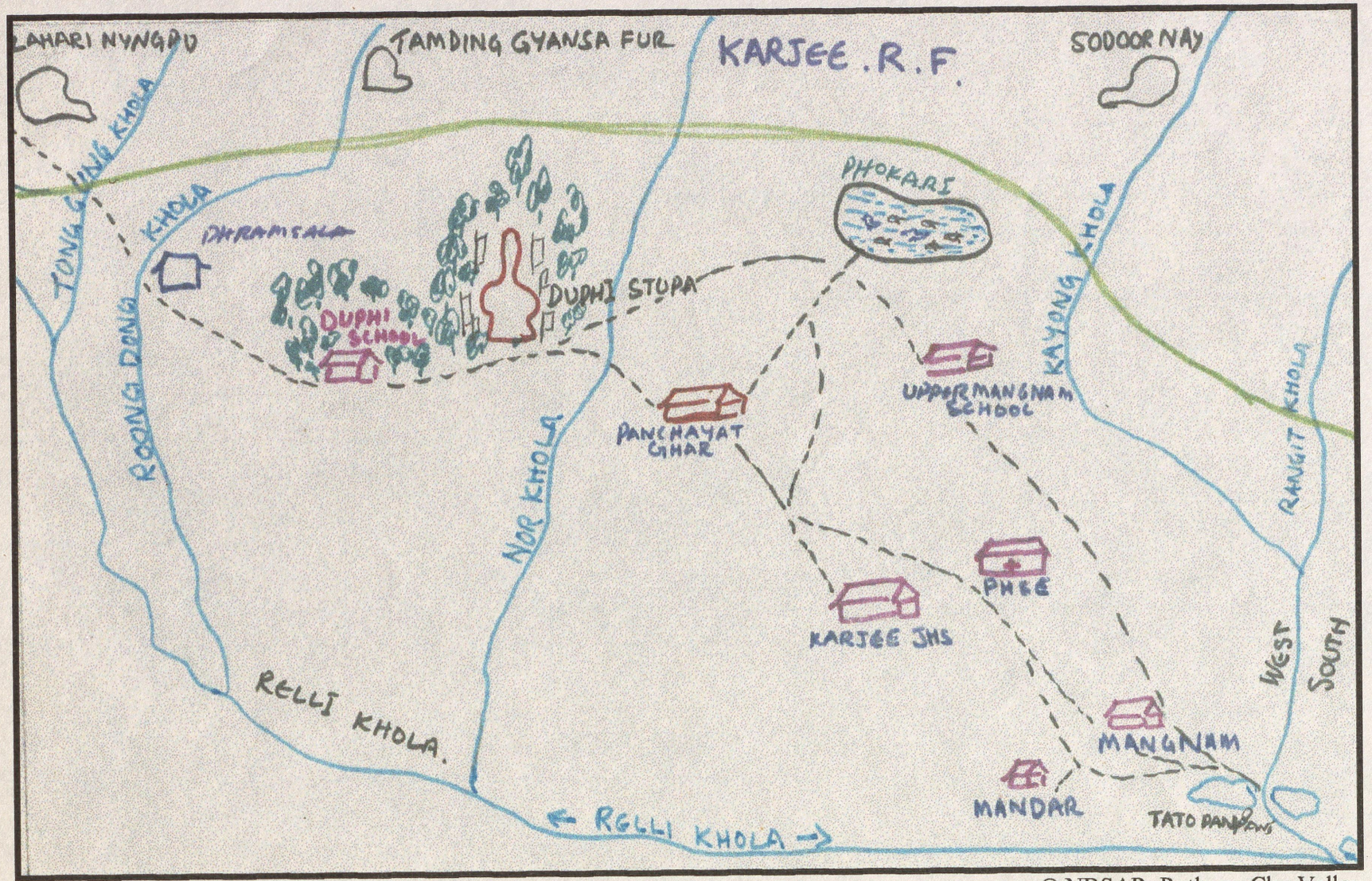
Future development (Dream)

- Road and bridges at Relli, Rangit, Tunsung, Rumdung and Narkhola
- Plantation along the road
- Protection and plantation at *Pokhari*
- Conservation of wildlife, hotspring, drinking water sources
- Good school, health center and accommodation for teaching staff
- Tourism development

Strategy and action plan for Karjee

Activities	Why	Who	Where	How	When	Indicator
Road and bridge at Relli	Transport, accessibility to tourists	PWD & local community	Labdang-Borang	Construction	5 years	Cheaper essential commodities
Plantation with protection	Compensate damaged done by road construction	Forest & local community	Roadsides, degraded and barren lands	Voluntary	8 years	More trees along roadside
Protection of pokhari	Sacred and source of drinking water	Community	*Pokhari*	Voluntary	Ongoing	Intact *pokhari* area
High yielding cardamom	Better economy	Horticulture & Cardamom community	Individual lands	Self labour	1-2 years	Increased production
Wildlife conservation	Tourist attraction & future security	Community	Whole area	Education campaign	Now onwards	Visibility and population increases
Hotspring conservation	To maintain sacredness & promote tourism	RDD, RVP & community	Hotspring	Strict rule and voluntary service	1-2 years	Intact hotspring
Better water supply	Drinking purpose	RDD	Dhupi, Karjee	Pipeline to each household	1-2 years	No water crisis
School construction with staff quarters	Proper education	Education Dept.	All schools	Construction	5 years	Educated villagers
Health center	Proper medication	Dept. of Health	Karjee and Dhupi	Construction	1-2 years	Healthy community
Tourism development	Self sustenance	Dept. of Tourism, EDC, KNP Office	Karjee	Jointly with Depts.	5-10 years	Sound economy

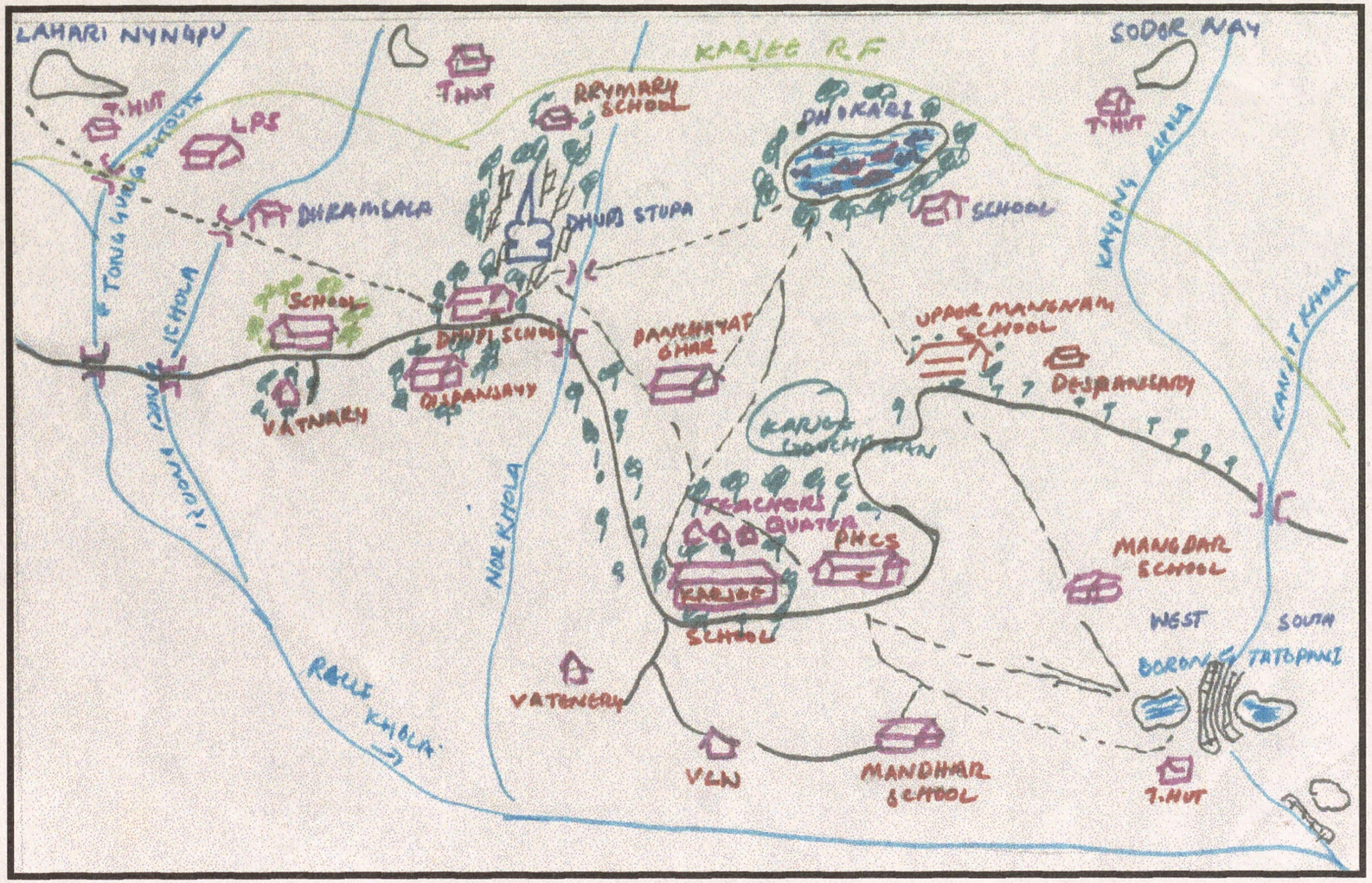
Karjee Resource Map **08th May, 2001**



National Biodiversity Strategy and Action Plan

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Karjee Dream map **08th May, 2001**



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Gangyap Village (9th May 2001)

Discovery

- Gangyap hotspring
- Chubung hotspring
- Rhododendron and orchids
- Mountain views
- Sinen Gumpa
- Footprint of Tertenlingpa
- Pahakhola falls
- Resung Chorten
- Natural forest
- Agricultural crops (cardamom, maize, vegetables)
- Wildlife (Ghoral, Barking Deer, Bear, Monkey)
- Culture (traditional houses, dresses)
- Strong village club (Mayal Club)
- School
- Water resources

Future development (Dream)

- Village beautification by plantation (Rhododendron and Orchids)
- Hotspring protection by objecting to the NHPC hydroelectric project on Relli River
- CC footpath from Gangyap to Tatopani monastery
- Community zoo (a zoo managed by the villagers)
- Traditional trekkers hut owed by villagers in Gangyap
- Development in agricultural crops and animal husbandry by better variety of seeds and technology
- Promotion of handicraft by providing trainings
- Restoration of Sinen Gumpa
- Hospital with good medication and doctors
- Pitched road from Tashiding to Gangyap and further
- Conservation of water resources by plantation
- School playground
- VLW center, Panchayat Bhawan, Bank, RDD, Post office
- Eco-tourism development by capacity building programme to different stakeholders

Strategy and action plan for Gangyap

Activities	Why	Who	Where	How	When	Indicator
CC foot path	Convenience for visitors	RDD / local community	Gangyap-Tatopani	Contract basis	1-2 years	Feedback from visitors
Beautification of area	Tourist attraction	Forest Dept. and community	Whole block	Plantation	5 year	Forests adjoining to village
Firewood plantation for cremation purpose	Convenience and conservation	Community and Forest Dept	Near cremation area	Plantation	5 years	Conservation of other areas
Trekkers hut	Economic benefits	Loan from Govt. construction by local community	In the village	Villagers	5 years	Tourists will stay at Gangyap
Better (pitch road)	Convenience for villagers, students and tourists	PWD with local contractors	Upto Gangyap	Govt. fund	1-2 years	Cheaper essential commodities
Conservation of water sources	Drinking, irrigation and for livestock	RDD and community	Rangyang, Nambury and Reri	Plantation	1-2 years	People will not suffer for drinking water
Training: Tourism, handicrafts, vegetable and mushroom production	Better economy	Government Depts. And NGO's	For Gangyap	Trainings	5 years	Trained guides, showroom and vegetable shops
Objecting to Tatopani hydroelectric project of NHPC	Religious sentiments	Local community, Panchayat	Tashiding	Through Panchayat	Within a week	News papers
Community Park	Recreation for tourist and education for children	Land and management by community	At Risam-Gangyap	Community initiation	10-15 years	Developed tourism and educated children

Khecheopalri(11th May 2001)

Discovery

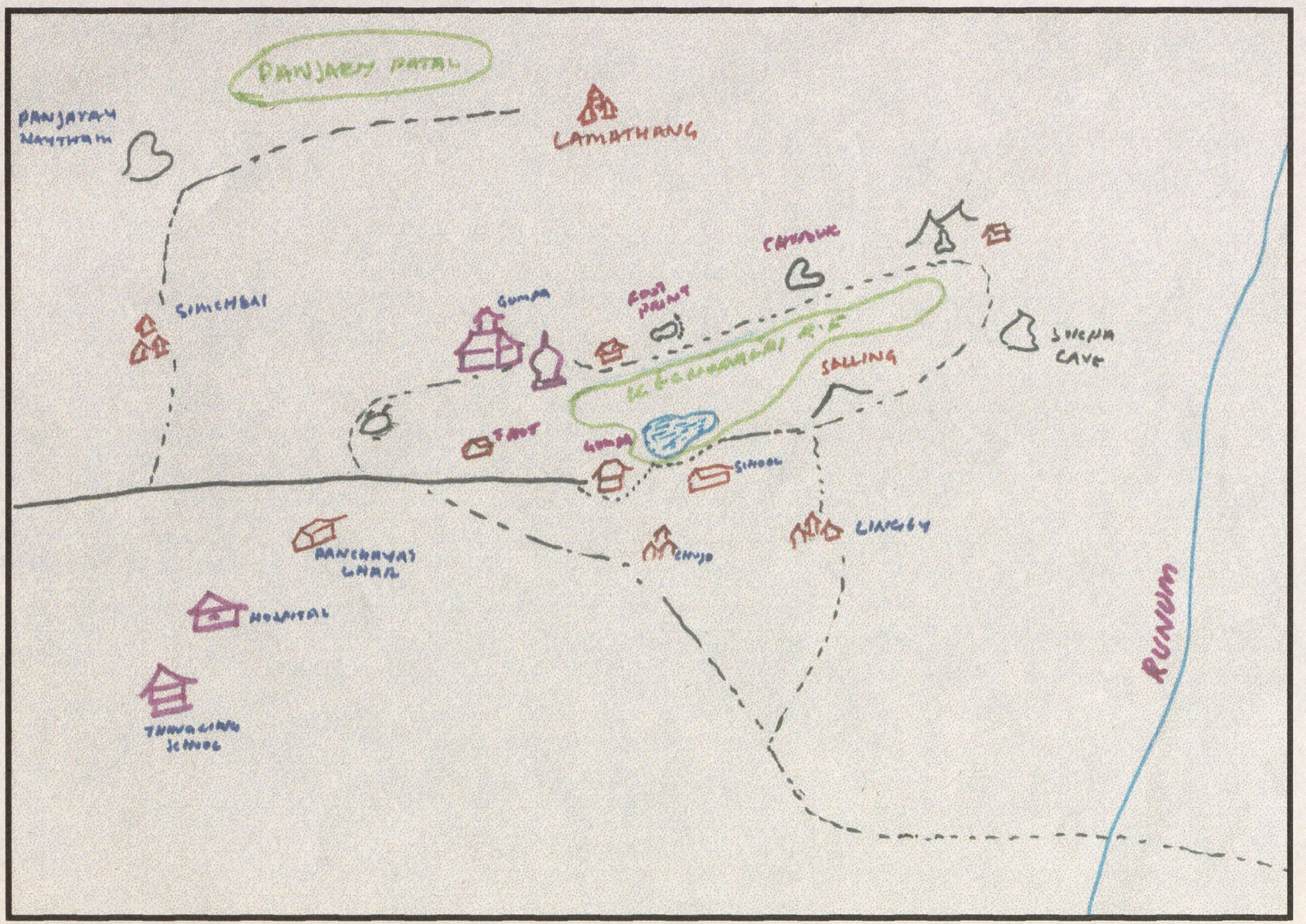
- Cardamom, maize, barley, medicinal herbs, vegetables
- Lake
- Trekking route to Satabaya
- Duphuk ney, Yuksam ney, Fregrey, Torjum, Chubuk, Chechu phuk, Sokpa cave, Tinghamgey
- Khangchendzonga falls
- Silling view point
- Forests
- Schools
- Water sources at Ratey khola and Gautheley
- NTFP

Future development (Dream)

- High yielding cardamom and vegetables with modern technology
- Ban on grazing
- Micro enterprise development in medicinal herbs
- Sanctity of lake maintained
- Proper trekking route to Satabhaya
- Better water resources
- More wildlife and birds
- More handicraft
- Telephone
- Tourism development

Strategy and action plan for Khecheopalri

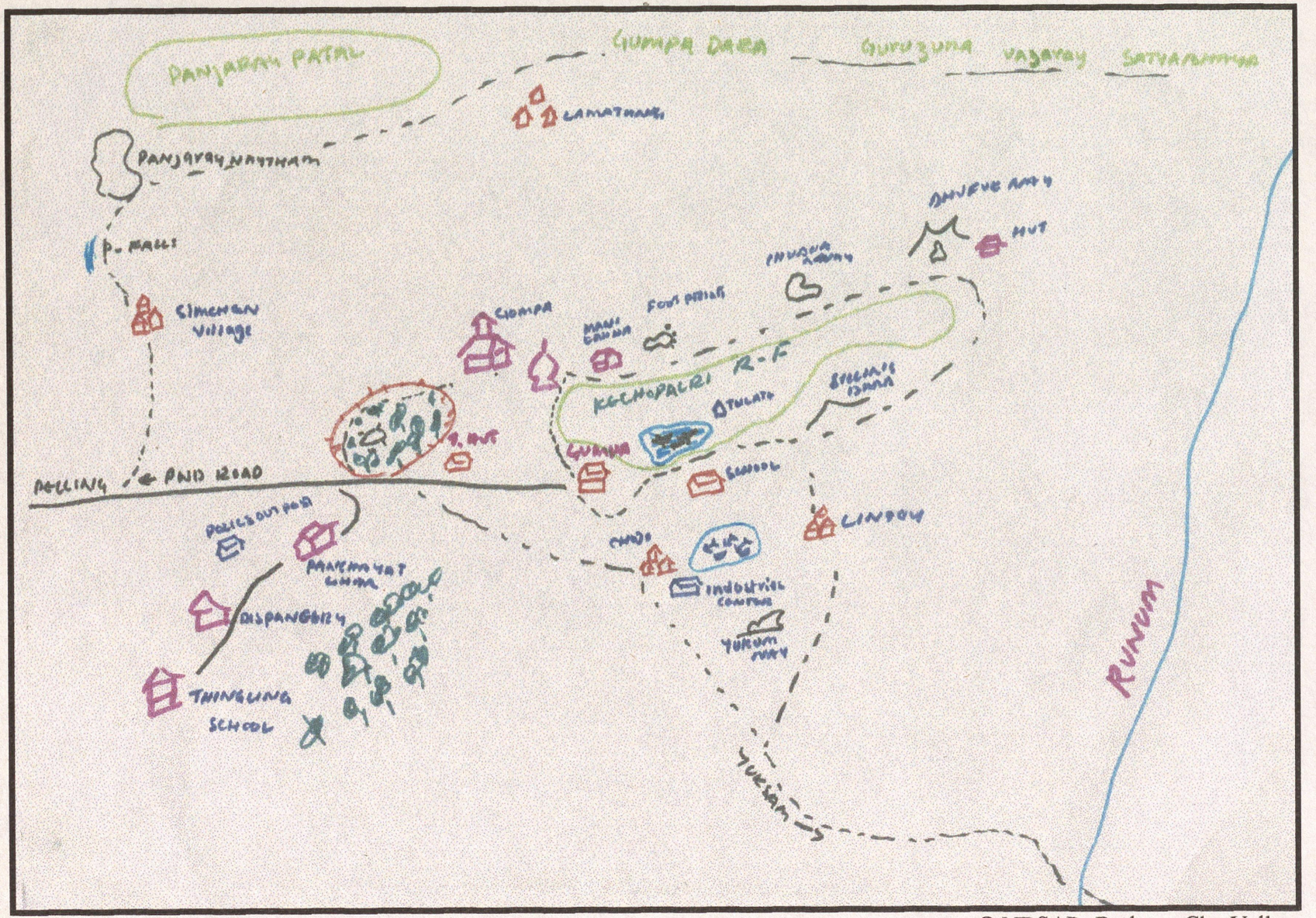
Activities	Why	Who	Where	How	When	Indicator
High yielding cardamom	Better economy	Horticulture	Private land	Approach concern Dept.	1-2 years	More money flow
Ban on grazing by sheep, cow and Yak	Conservation and natural regeneration	Forest, Panchayat and Community	Surrounding forests	Organising meetings and passing resolutions	2 years	Intact forest
Better NTFP, vegetable, apple orchards production	Maintain traditional culture	Forest, agriculture, community	Private lands at Khcheopalri & Thingling	Trainings	2 years	Traditional medicine use and vegetable available
Conservation of Lake	Sacredness & economy	KHLWC, community	Lake area	Religious resolution	Ongoing	Intact lake
Trekking route	Local income to community	Tourism, KHLWC & community	Khecheopalri to Satabhaya	Approach concerned Dept.	2-3 years	More tourist
Water source protection	Survival	Panchayat & community	Ratey khola	Plantation	1 year	No water crisis
Wildlife conservation	Tourists attraction	Panchayat & KHLWC	Surrounding forests	Public awareness	Ongoing	Visibility of wildlife
Handicraft promotion	Cultural conservation & better economy	KHLWC & concern Dept.	Khecheopalri	Trainings	Ongoing	Showroom & better economy
Health center, Telephone & public toilet, police station	Convenience	Concern Dept. & Panchayat	Khecheopalri	Construction	5 years	Better communication
Eco-tourism development	Conservation & better economy	Concern Dept. & KHLWC	Khecheopalri	Trainings	3 years	Beautiful area & adequate tourists
Artificial lake at Chojo	Employment to youths	Tourism and RDD	Chojo	Construction	10 years	Employed youths



National Biodiversity Strategy and Action Plan

© NBSAP- Rathong Chu Valley

Khechopalri Dream map **11th May, 2001**



National Biodiversity Strategy and Action Plan © NBSAP- Rathong Chu Valley

Tashiding (12th May 2001)

Discovery

- Tashiding Gumpa, Sinen Gumpa
- Gangyap hotspring
- Rathong river
- Pokhari *danra* and lake
- Kasturi *Oral*, Lhari Nying *Phu*
- Good environment
- Good private forests
- Good private *dhara* (natural stream)
- Intact tradition and culture
- Bhumchu Mela
- Guru Rimpoche Cave
- Crematorium
- Stupa
- Fertile soil and good agricultural crops
- Cho-Chingey stone
- Water quality
- Handicraft (carpet weavers and sculptures)
- Khasmal forest
- Good tourism destination
- Good society with Paehungri club
- Good school and hospital

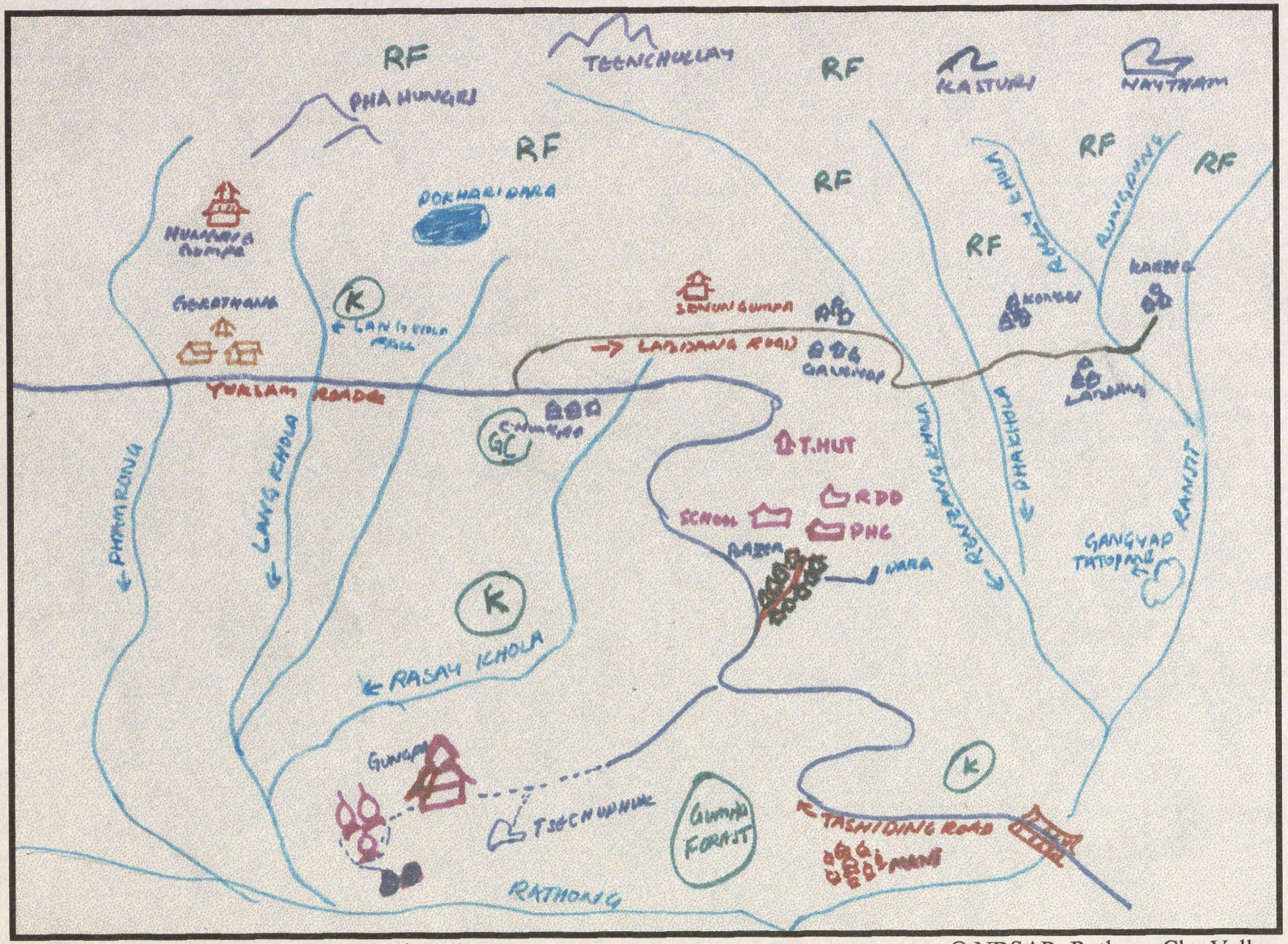
Future development (Dream)

- Conservation of forest by plantation
- Construction of concrete bridge at Rangit River
- Beautification of lake and more tourists
- Beautification and conservation of Paha *khola* falls
- Plantation at water sources (*Panisaj, Kabra, Datura, Kera* and *Kaijal*)
- Beautification of Tashiding Gumpa, Sinen Gumpa
- Trekking route to Pahungri, Pokhari, Lari Neungpa and Tinchuley
- Plantation and fencing at khasmal forest
- Roadside terrace wall
- Improve agriculture, handicrafts and sculpture through trainings
- Good water supply
- Central Bank at Tashiding
- Up gradation of school and hospital

Strategy and action plan for Tashiding

Activities	Why	Who	Where	How	When	Indicator
Protection by plantation in landslide prone areas	Check landslides, conserve water resources	Community	Along the road, Lassa, Sinen Gumpa Pokhari Danra	Voluntarily	2 years	More forests, less landslides
Bridge construction	Convenient for all villages	SPWD & Panchayat	Rangit river	Application, lobbying	5 years	Heavy vehicle moving
Footpath to hotspring	To promote tourism	RDD, Tourism & Panchayat	Pahungri, Hotspring, Lhari Nying Phu, Paha khola, Tinchuley, Kasturi	Approaching concern dept.	5 years	Tourists using the trail
Hospital renovation, school upgradation	For better health and education	Concerned dept.	Tashiding	Approaching concern dept.	2 years	Better health and education
Central bank	Social development	Concerned dept.	Tashiding Bazar	Approaching concern dept.	5-6 years	Social upliftment
Khasmal, Gaucharan fencing	Protection	Forest & community	Chongrang, Lhaso & Peuthare	Survey, fencing	3-6 years	Conserved area
Agriculture, orchards development	For benefit of community	Agriculture & Horticulture Dept.	Private holdings	Trainings and seeds provision	1-2 years	Fresh vegetables at market
Tourism development	Better economy	Tourism, community	Tashiding	Trainings with the help of KCC & Dept.	2-3 years	Trained professionals
Conservation of water sources	Better water supply	Community	Tashiding	Social fencing	Ongoing	No water crises
Skilled artisans	To enrich the traditional handicrafts	Concern Dept. and community	Tashiding	Trainings	2-3 years	Showroom with handicrafts

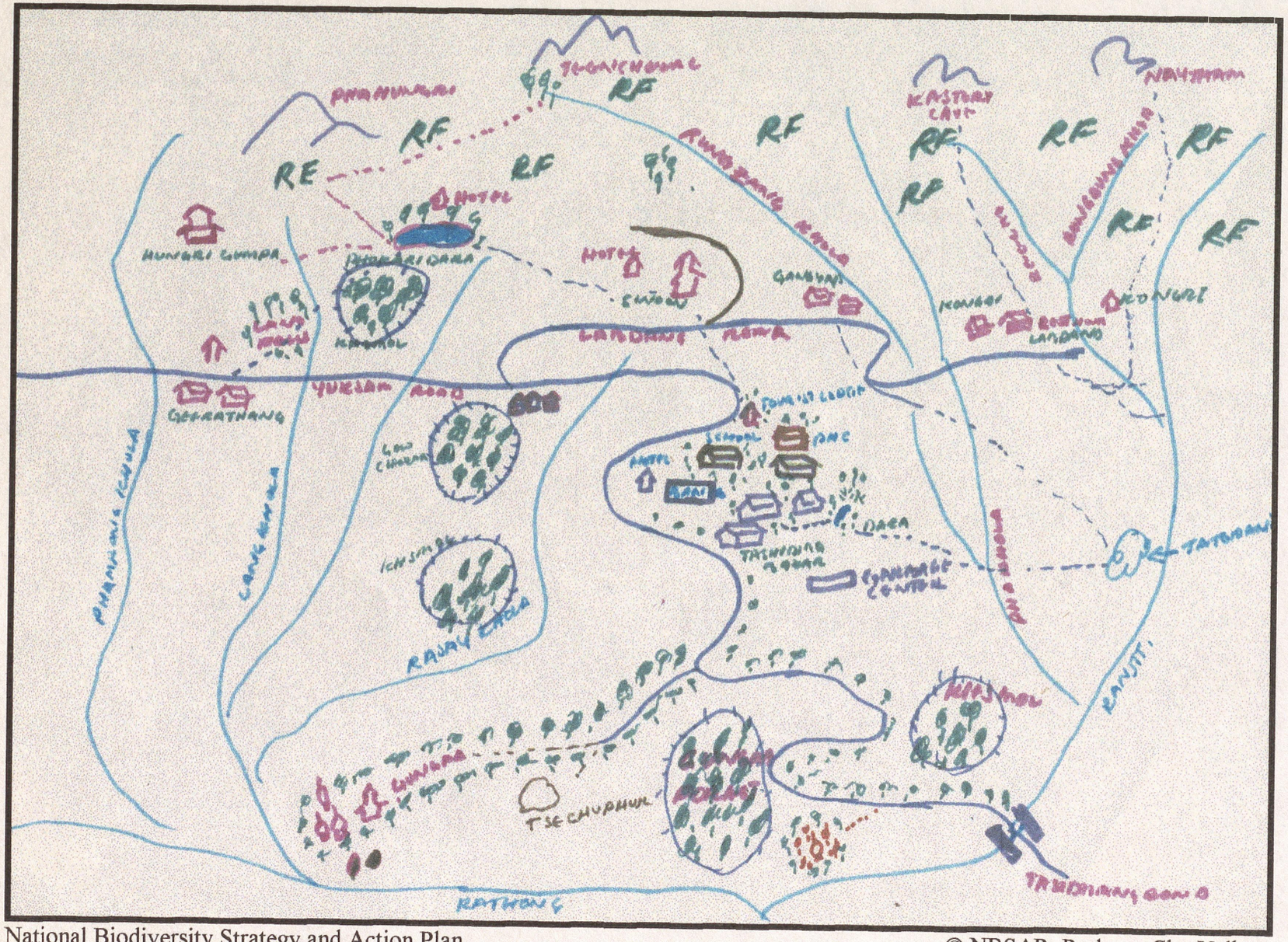
Tashiding Resource Map **12th May, 2001**



National Biodiversity Strategy and Action Plan © NBSAP- Rathong Chu Valley

Tashiding Dream map

12th May, 2001



National Biodiversity Strategy and Action Plan

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Chapter 8

Government Strategy and Action Plan: GSAP

A questioner was circulated amongst the Government Departments of West Sikkim. During the process feedback was obtained from Agriculture, Animal husbandry, Education, Social forestry, Territorial forest, horticulture, police, RDD, Department of sports and Department of accounts. The feedback given by these departmental officials are given in the following table. It was noticed that the habitat destruction by human activities such as NTFP, fodder, firewood, and timber extraction are the main threats to biodiversity. It is followed by alienation of local community from natural, Contradictory policies and laws, Human disturbances by construction and the least effective being the lack of monitoring.

Table 5: Priority ranking of the causes of loss of biodiversity

Causes	Average score
Habitat destruction by human extraction	8
Alienation of local community from natural resources	6
Contradictory policies and laws	5
Human disturbances by construction	5
Lack of administrative coordination	4
Lack of awareness	4
Unsustainable models of development	4
Artificial insemination	3
Lack of planning	3
Lack of study of natural resources of the region	3
Over centralization of decision making	3
Social political and economic inequalities	3
Crossbreeding policy	2
Damage of water sources	2
Lack of monitoring	1

8.1 Suggestions of the various government departments for biodiversity conservation are as follows:

1. All the developmental schemes by different departments should have some percentage of funds for the cause of conservation, for example, when a road construction scheme of SPWD of five crores is to be implemented, one percent of the budget i.e. five lakhs should go for restoration and avenue plantation.
2. All departments should emphasize on Biodiversity conservation through the formation of village level committees. These committees should be strengthened with various skill development programmes.
3. While constructing roads or footpaths, care should be taken to see that alignment is made through areas having less forest cover, and minimal disturbance to the wildlife habitat, and water sources.
4. The concerned department should initiate awareness programme through the documentation of traditional culture and religion.
5. RDD, Department of forest should device suitable alternative energy devices to be provided to the villagers to reduce their dependence on biological resources.
6. Massive conservation education in schools, community and village level. The NEEPS programme of MHRD, GoI need to be strengthened.
7. All departments should join hands and initiate integrated approach to plan a blue print for sustainable development. While the implementation should be done by the concerned department.
8. Rewards for extraordinary work in the field of nature conservation should be constituted to strengthen the conservation efforts
9. The Department of Education hardly has any schemes, it should be supported with funds for initiation of green education including excursion to wildlife areas, bird watching trips, environmental projects etc.

Chapter 9

Strategy and Action Plan: SAP

While the Rathong Chu region specific strategy and action plan has been elaborated in Chapter 7 and Chapter 8, this chapter deals with the macro level strategy and action plan needed to conserve biodiversity in Sikkim.

9.1 Integrated, Cross-sectoral And Participatory Planning

9.1.1 Bottom up, Integrated Development with Microplanning

Planning Department, UDHD, Forest Department along with other line departments should prepare a blue print for integrated development for all urban and rural areas. This blue print is to be prepared by a team of multidisciplinary experts in a participatory manner using PRA tools at Panchayat Unit level.

Local community is very capable of integrated planning and is free from the narrow vision of most Government Departments, who can usually not see beyond the role of their concerned department. Sustainable planning e.g. Avenue Plantation after road construction suggested in Labdang CSAP.

This blueprint has to be then reviewed by a team of experts including policy makers, senior bureaucrats, scientists, academicians, NGO's etc and then by incorporating minor changes the final blue print for development has to be made. After approval of the final blue print from the local community it has to be then implemented department wise. Monitoring of the implementation is to be done by the local community.

9.1.2 State Specific Centrally Sponsored Schemes of GoI

Most of the developmental works in the revenue starved north-eastern states is done through the various CSS of GoI. These schemes need to be implemented as per the guidelines laid down by GoI.

Due to the unique socio-cultural setup of the north-eastern states often these schemes do not meet the aspirations of the local community. It would be appropriate to have only the objective of the scheme defined from the Central Government. Individual state could then formulate their state specific guidelines for meeting these objectives. These state specific guidelines could then be approved by the Central government. This would be a more decentralized and state specific developmental model.

9.1.3 Ecotourism Model for Sikkim: "Community Based Village Tourism"

There are mainly two main negative impacts of Tourism on environment namely,

1. Deforestation
2. Garbage Dumping

An effective strategy needs to be in place to deal with this. Consequently most of the "Ecotourism Destinations" have a small life. In order to ensure that the benefits of Ecotourism percolate down to the local community and the tourism destinations have a long life, the following model needs to be implemented by the Tourism Department.

Abbreviations used

CVT: Community based Village Tourism

JTMC: Joint Tourism Management Committee

JTMP: Joint Tourism Management Plan

Constraints for Ecotourism Development in Sikkim

1. **Maintenance of Assets:** Though creation of infrastructure is relatively easy, maintenance of the same is often not possible. As is true with the other North East States, there are limited funds available with the State Government for maintenance of assets. There is also a strict restriction on absorption of new manpower, downsizing is in vogue.

2. **Utilization of Funds:** As is true with any government setup, due to several constraints and other factors, funds are often not utilized for the purpose they are earmarked for.

3. **Local Community Involvement:** Schemes and infrastructure designed, created and maintained by any government department hardly leaves any space for meaningful involvement of the local community. The benefits arising from this activity, do not really benefit the local community, and hence there is no sense of belongingness and ownership towards the facility created.

How to Overcome these Constraints ?

Approach and Methodology:

1. Appreciative Participatory Planning with the Local Community

Using the PRA techniques like APPA and 4D, tourism planning shall be done at village level. Based on this a JTMC will be developed. For facilitation of the above process, involvement of the local NGO's is a must.

2. Formation of Joint Tourism Management Committee:

Village Level Committees like JTMC's need to be created and registered. Fund sharing mechanisms needs to be designed. For ecotourism in forest areas, the concerned JFMC / EDC shall take over the role of JTMC's.

Creation of Infrastructure:

Based on the JTMP, infrastructure will be created by the concerned department in consultation and help of the local community. Also some part of the funds need to be released as loans to the local community to create community lodges.

Management of Infrastructure:

The management of this infrastructure and its future development will be based on the JTMP.

Maintenance of Infrastructure:

The committee will be solely responsible for the maintenance of the infrastructure created. Maintenance of this infrastructure will be the responsibility of the JTMC / JFMC / EDC.

9.2 Empowerment and Equity

9.2.1 Sikkim Ecodevelopment Notification

The Sikkim Ecodevelopment Notification is under preparation and shall be notified by the Department of Forest, Environment and Wildlife soon. This legislation aims to empower the local community living adjoining to protected areas in the following ways:

Decentralized Planning and Decision-making:

1. Preparation of microplan only after detailed PRA mandatory
2. Panchayat, Village elders, women and Local NGO's involved
3. Powers equally given to all the members of the executive committee
4. EDC empowered to register cooks, porters, guides etc and hence would be a major player in the ecotourism enterprise. 5% of the remuneration of the porters, cooks, guides etc to be credited to the EDC revolving fund account
5. Women have been given special membership both in the EDC, its executive committee and its leadership. Presence of atleast 50% of women members is a prerequisite for conducting any meeting

Legal powers to local community:

1. In apprehending forest and wildlife offenders

Contribution and Involvement of the local community:

1. Cofinancing in cash, labour or physical resources mandatory in the ecodevelopment schemes. Atleast 25% cofinancing mandatory from the individual beneficiary

2. 100% share of firewood, grass, bamboo and other NTFP from the protected area
3. 20% share of the compounding amount, wherein the offence has been detected with the assistance of the EDC members.

9.2.2 Livestock Rearing: Who Gains and at Whose Cost

Yak, Dzo and Sheep rearing are the three kinds of livestock husbandry that impact the alpine meadows. An interesting study regarding the economics, equity and ecological degradation caused by these three activities was carried out.

Yak Rearing:

In spring (March), once the snow starts melting the yak graziers perform transhumance to the summer grazing grounds. From March to September in the peak monsoons they move along the migration routes camping in the yak sheds. Before the first snows arrive in October, they migrate back loaded with dairy products.

Caretakers whose agility and speed over this treacherous, rugged terrain is unmatched manage these yak herds. They possess tremendous traditional knowledge about this land and its biological resources. The yak herd owners pay them a meager salary.

The yaks are milked twice, and a better part of the day is spent in churning the milk for Butter and curdling it for Cheese (*Churpi*). The fresh cheese is left to dry above the community fireplace. After dehydration for a couple of months it becomes stone hard, and is then sold as hard cheese (*Supari)*. Butter and hard cheese are the two main marketable items of this dairy trade.

Sheep Rearing:

Sheep are reared mainly for wool and meat. It is a common practice for households to pool their sheep together in a flock under a caretaker. These herds reach out to even the most inaccessible high altitude pastures, and the caretaker stays in flimsy makeshift sheds made of plastic and poles. The caretaker himself consumes the meager milk supply.

Dzo Rearing:

The resultant male from a cross between a male yak and a female upland cow, is the Dzo and is used as a pack animal. The first Dzo was brought from Holong in Nepal in 1971, and realizing its great utility, their numbers have since then multiplied. Owing to its high utility in this terrain, they are highly prized and valued by their owners. During the long monsoon season, these Dzo's graze freely in the alpine pastures in a semi-wild state, without a caretaker. Only when the tourist season begins from September onwards, are they brought down from these heights. They are used to carry the camping gear and rations of the trekker groups. Each Dzo can carry upto 60 kgs load on very steep slopes. These trekking parties comprise mainly of foreign tourists or those from West Bengal. It is the magnificent vistas of the razor-edged Shingalila range, the Rhododendron flowering and the alpine flora that draws them here.

Comparison of Benefits:

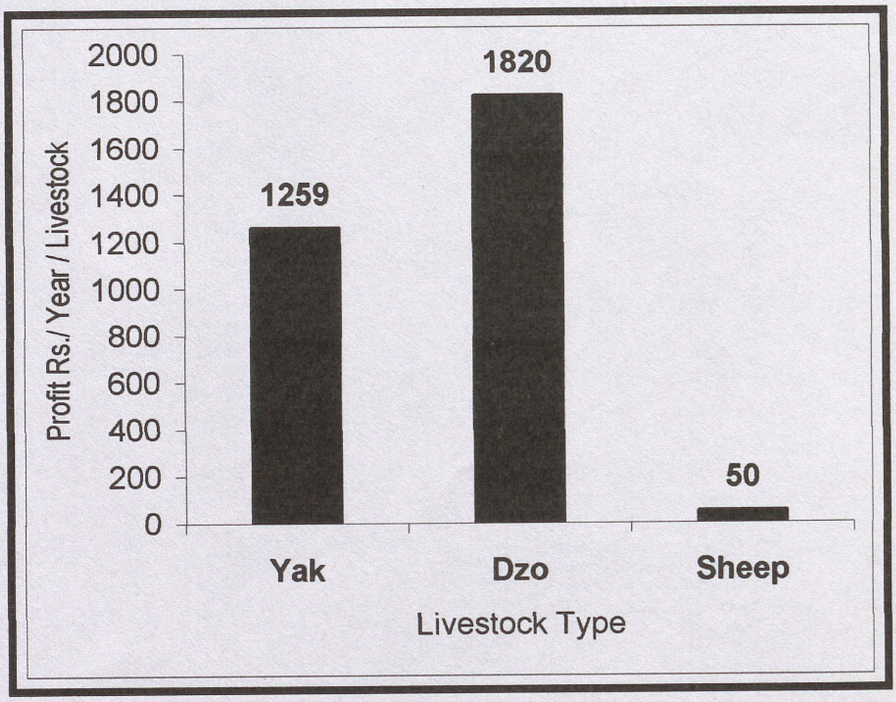
Tourism and Livestock Husbandry are the only two economic activities ecologically feasible in this region. The comparison of economic benefits from Livestock [Refer Chart 4] indicates that the Dzo is a very valuable animal. This is because they are left free in the alpine meadows, without any caretakers, and hence no maintenance costs are associated with them during the monsoon months. Also since no establishments, like yak sheds need be maintained for their husbandry, in the alpine meadows, the degradation from the allied activities is also not there. Their grazing pressure is also distributed evenly over the meadows, since they are free ranging animals, causing no localized degradation. However they do destroy the plantations in the temperate zone in winters, when little forage is available elsewhere. Since they are quite powerful and sure footed, no man made fence can deter them. Yak husbandry is the chief cause for all the grazing and allied activities related degradation. [Refer Chart 5] While only a handful of people benefit from yak husbandry, the benefits from Dzo husbandry are more equitably distributed amongst the community.

Comparison of Costs:

The main cause of concern is the intensive, localized collection of firewood from the forests adjoining these yak sheds. It gets quite cold at these altitudes and firewood is the only source of energy. The firewood demand is enormous and is met mostly from the Rhododendron shrubbery. The growing season and the rate of growth of plants here is quite small and hence these forests are not able to replenish this localized extraction.

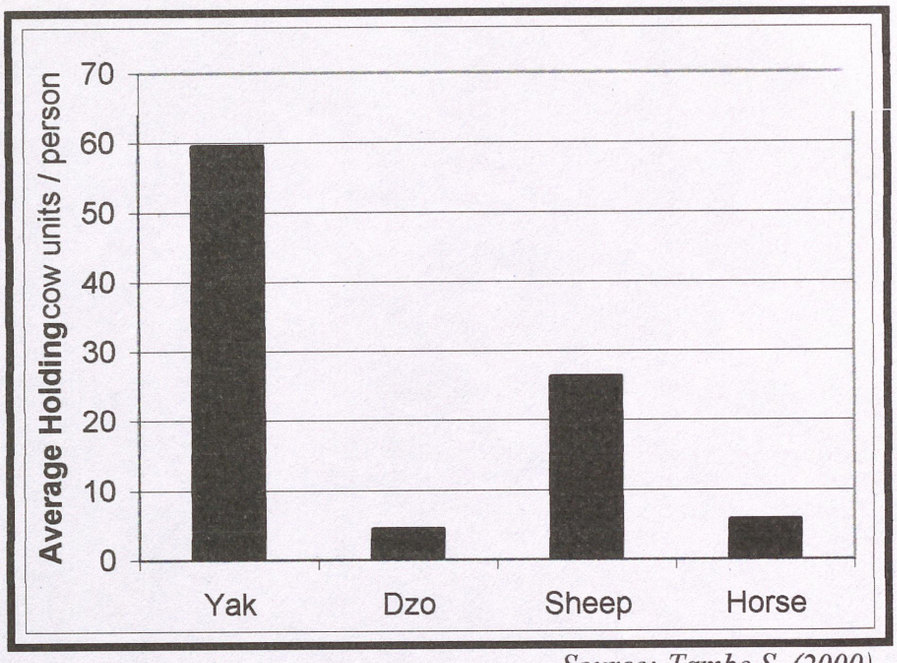
Also the graziers, especially the sheep graziers indulge in trapping of the pheasants for meat. The sheep dogs which are of immense utility to the graziers in rounding up the livestock, are let loose during the night. They cause depredation of the pheasants and other ground nesting birds and their nestlings. Even small mammals are not spared. This has resulted in the wildlife becoming very shy, and as a result sightings are rare. Hence though grazing *per se* is not damaging, the allied activities that it involves has a deleterious impact on the biodiversity values of Khangchendzonga National Park.

Chart 4: Comparison of Livestock Profitability



Source: Tambe S. (2000)

Chart 5: Livestock Average Holding



Source: Tambe S. (2000)

Hence it can be concluded that Dzo rearing is ecologically least degrading, economically most remunerative and results in an equitable sharing of benefits. This principal can be infact generalized in most cases as, "**Activities that are ecologically sound make good business sense, and result in maximum benefit to a larger section of society.** "

9.3 Inter Sectoral Integration of Biodiversity concerns

9.3.1 Greening Developmental Projects

Most of the developmental projects adversely impact biodiversity. The Forest Conservation Act 1980 specifies the ways and means for compensating for this damage. This usually involves afforestation in the adjoining reserve forests. However the actual project implementation site and the adjoining land also needs to be rehabilitated. Hence over and above the compensatory afforestation under Forest Conservation Act 1980, a certain percentage of the developmental funds should be earmarked for greening the particular developmental project.

For example, carpeting of roads involves large amounts of firewood, need to shift to alternative models. Environment friendly construction practices need to be adopted, and alternatives to firewood should be explored like use of self-setting bitumen, using kerosene etc. With the construction of new roads, the forests also get opened up. Hence the proposal for checkpost and avenue plantation along the new road should be a part of the road construction scheme itself. Atleast 1% of the budget for road construction should be earmarked for greening the developmental scheme. This "*greening contingency*" (e.g. 1%) budget may be handled by the concerned user department, to rehabilitate the degradation caused by it. This strategy would take care of most of the negative impacts of construction activities, without putting any additional strain on the already fund starved Forest Departments.

9.3.2 Independent Environment Impact Assessment (EIA) of developmental projects

The EIA of developmental projects is usually funded by the user agency itself. This hampers the transparency and objectivity of the whole exercise. It would be appropriate to have a central pool under MoEF, to which all user agencies would contribute. MoEF would then fund all EIA's from this budget. EIA's carried out in this manner would be more independent and reflect the real concerns.

9.3.3 Wildlife orientation for afforestation schemes of GoI

In the various schemes of MoEF, GoI emphasis is laid on afforestation, for the benefit of the local community. Like fuelwood and fodder plantation scheme and raising NTFP, including medicinal plants. Degraded forests rehabilitated with these schemes hardly provide any feeding habitat for wildlife. Considering that about 50% of India's wildlife lies outside protected areas, it would be worthwhile to do some planning for them. One of the chief reasons for crop depredation is that now the percentage of wildlife amenable plants are reducing day by day, hence the wild animals are forced to come out of the forests in search of food. It would be pragmatic to include atleast 5% trees amenable to wildlife in all plantation schemes of MoEF. Considering that the remaining 95% of the trees are planted as per the objective of the particular scheme, the focus will not be diluted. Also this will be a more long term

solution towards solving man animal conflict compared to the current trend of handing out compensations. Hence the guidelines of all plantation schemes under MoEF including AOFFP, NTFP, NAEB, IWDP, FDA etc needs to modified to this extent.

9.4 Synergistic Relationship between GO, NGO and Local Community

In order to institutionalize the partnership between the GO and NGO, in Community Conserved Areas, the state government could nominate the key person as Honorary Wildlife Warden, this would give him/her legal powers to deal with development and commercial threats. Similarly in JFM areas, like RF, PF etc, we could have a similar post, like say Honorary Forest Warden, along the same lines as Wildlife Warden in PA's. However this needs to be incorporated as an amendment to the Indian Forest Act 1927. Till that time, state governments could implement this, through amendment in their respective State Forest Acts or JFM / FDA notifications which could be faster and state specific too.

Also the Sikkim Financial Rules need to be amended so as to have the provision of government funding to NGO's directly.

9.5 Strengthening Legislation and its implementation

9.5.1 Green Bench in high courts

Since most of the forest and wildlife offences take place within forests, substantive evidence to prosecute the offenders is usually difficult to collect. Hence a Green Bench in the high court of Sikkim is of utmost importance.

9.5.2 Biodiversity legislation

Inconspicuous plants and animals are not directly protected under the current forest and wildlife legislations. The Forest Department is currently collecting feedback from various agencies on the Sikkim Biological Diversity Bill 2001. Once notified this legislation will help conserve biodiversity, sustainable use of its components and equitable sharing of the benefits arising out of the use.

9.5.3 Training of field level forest officers

For successful prosecution in forest and wildlife offences it is necessary that the procedure be strictly as per the provisions laid down under law. There is an urgent need to train forest personnel and wildlife wardens on the implementation of various forest and wildlife acts.

9.5.4 Incentive to local community for conservation

The Supreme Court ruling banning sharing of forest produce from protected areas has adversely affected conservation initiatives in some areas. Usufruct sharing with the local community as long as it is within sustainable limits, helps in garnering support for conservation.

Chapter 10

Follow Up

10.1 Feedback from Key Community Members

The draft strategy and action plan prepared was forwarded to the various key community members. Only after obtaining their approval, it was incorporated into the final report.

10.2 Panchayat Resolution

Today dated 7/7/2001, the Area MLA of Yuksam constituency Hon'ble Smt Kalavathi Subba along with the Panchayat of Yuksam Dubdi organized a gram panchayat meeting in the Panchayat Bhavan. While discussing on the future development of the place, the following resolution was passed.

1. Foreign nationals (Holungpas) who have come from Nepal, should be evicted from Yuksam. The government should initiate legal proceedings against them.

2. The government should ban these foreign nationals from rearing of cattle, horse, yak, dzo and other livestock since they destroy our forests and harm the environment

3. These foreign nationals collect various herbs and medicinal plants and sell them outside. Also they make and sell liquor in large quantities and resulting in addiction of our youth and other villagers.

4. Also when the foreign tourists come here for trekking in our mountains, these people take the lead and steal the jobs of guide, cook, porter etc from us, resulting in loss in employment opportunities for us.

5. The foreign nationals have also slyly influenced the village simpletons by giving them liquor, and illegally made houses on their land.

6. These foreign nationals are primarily responsible for the destruction of the forests in this area since they own large quantities of cattle and yak herds who graze freely in the alpine meadows in the monsoons and come to the temperate forests below in winter. Also the construction and demand of firewood due to these cattle sheds (*Goths*) results in large scale destruction of these forests. Our demand to the government is to remove these cattle and cattle sheds (*Goths*) as quickly as possible.

Signatories:

1. All the panchayats of Yuksam Dubdi Gram Panchayat Unit
2. Upa Adhayaksha, West District Zilla Panchayat, West Sikkim
3. 70 villagers who constituted the Gram Sabha

Copy forwarded to:

1. Hon'ble Chief Minister of Sikkim
2. Hon'ble MLA, Yuksam constituency
3. Respected Chief Secretary, Government of Sikkim
4. Respected District Magistrate, West Sikkim

10.3 Publicity of the Rathong Chu Valley Report

1. **Update given to Chief Secretary and Forest Secretary:** During the Second State Level Meeting of the Sikkim State NBSAP on 7th Dec, 2001 at Gangtok a presentation of the Rathong Chu Valley NBSAP was made before various state and central government agencies including the Chief Secretary, who happened to the chief guest of the function.

2. **Update given to DGP Sikkim and SP West:** During the West Sikkim tour of the DGP Sikkim, the NBSAP team organized a presentation cum slide show. The main issues of NBSAP were made known to him, and also the issues were the Police Department had a major role to play were (e.g. eviction of foreign nationals) highlighted. Action has already been initiated by the Police Department in this direction.

3. **Report to be forwarded to all the stakeholders and implementing agencies:** Once this report is officially approved and released, copies will be forwarded to all the stakeholders and the implementing agencies.
4. **Khangchendzonga - A biodiversity handbook:** With the assistance received from the EOSE programme of Minstry of Human Resource Development, Government of India the details of this report was published by KCC in coordination with CEE-NE. This has ensured wider circulation of this report.

10.4 Legislation

The Department of Forest, Environment and Wildlife, Government of Sikkim after obtaining feedback from various agencies has almost completed these notifications:

1. Sikkim Ecodevelopment Notification, 2002 (finalized and notified in March 2002)
2. Sikkim Biological Diversity Bill, 2002 (last phase of finalization)

10.5 Proposal for World Heritage Site

Once this report is approved and released, the team members plan to get in touch with Dr. P. S. Ramakrishnan and under his guidance try to submit a proposal to UNESCO for the declaration of the sacred landscape of Rathong Chu Valley as a "World Heritage Site".

10.6 Institutionalization of LAC members in decision making

Ms Tshering Uden Bhutia was elected uncontested as the Panchayat form Yuksam Dubdi Gram Panchayat Unit in the Sikkim Panchayat Elections 2002. Also later on in February 2003 she was selected as the President of the Yuksam Dubdi Joint Forest Management Committee. All Birkhaman Subba was selected as the Vice President of this JFMC. This has helped in institutionalizing the role of the LAC members in the decision making process at the village level.

Chapter 11

References

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Appendix

Appendix 1: Bird-checklist of Rathong Chu Valley

Status: R = Resident, S = Summer visitors, W = Winter visitors, AS = Accidental or casual sighting

Common name	Scientific Name	Status
Snow Partridge	*Lerwa lerwa*	R1
Himalayan Snow Cock	*Tetraogallus himalayansis*	AS1
Tibetan Snowcock	*Tetraogallus tibetanus*	AS1
Blood Pheasant	*Ithaginis cruentus affinis*	R2
Satyr Tragopan	*Tragopan satyra*	R1
Himalayan Monal	*Lophophorus impejanus*	R1
Kalij Pheasant	*Lophura leucomelana*	R2
Bar-headed Goose	*Anser indicus*	W1
Rudy Shelduck	*Tadorna ferruginea*	W1
Common Teal	*Anas crecca*	W1
Mallard	*Anas platyrhynchos*	W1
Baer's Pochard	*Aythya baeri*	W1
Common Merganser	*Mergus merganser*	W1
Bay Woodpecker	*Blythipicus pyrrhotis*	AS1
Crimson-breasted Woodpecker	*Dendrocopos cathparius*	R1
Darjeeling Woodpecker	*Dendrocopos darjellensis*	R3
Greater Yellownaped Woodpecker	*Picus flavinucha*	R1
Himalayan Flameback	*Dinopium shorii*	AS1
Great Slaty Woodpecker	*Mulleripicus pulverulentus*	AS1
Great Barbet	*Megalaima virens*	R1
Golden-throated Barbet	*Megalaima franklinii*	R1
Blue-throated Barbet	*Megalaima asiatica*	R1
Eurasian Hoopoe	*Upupa epops*	AS1
Red Headed Trogon	*Harpactes erythrocephalus*	AS1
Large Hawk Cuckoo	*Cuculus sparverioides*	S3
Indian Cuckoo	*Cuculus micropterus*	AS2
Oriental Cuckoo	*Cuculus saturatus*	S2

Common Cuckoo	*Cuculus canorus*	S2
House Swifts	*Apus affinis*	S3
Himalayan Swiftlet	*Collocalia brevirostris*	R2
Oriental Bay Owl	*Phodilus badius*	AS1
Hodgson's Frogmouth	*Batrachostomus hodgsoni*	AS1
Oriental Turtle Dove	*Stroptopelia orientalis*	S2
Spotted Dove	*Stroptopelia chinensis*	S3
Snow Pigeon	*Columba leuconota*	R2
Speckled Wood-Pigeon	*Columba hodgsonii*	R2
Ashy Wood Pigeon	*Columba pulchricollis*	R1
Wedge-tailed Green Pigeon	*Treron sphenura*	R1
Mountain Imperial-Pigeon	*Ducula badia*	R1
Eurasian Woodcock	*Scolopax rusticola*	R2
Solitary Snipe	*Gallinago solitaria*	AS1
Black Kite	*Milvus migrans*	S1
Lammergeier	*Gypaetus barbatus*	AS1
Himalayan Griffon	*Gyps himalayensis*	AS1
Crested Serpent-Eagle	*Spilornis cheela*	R1
Eurasian Sparrowhawk	*Accipiter niscus*	AS1
Black Eagle	*Ictinaetus malayensis*	R1
Bonelli's Eagle	*Hieraaetus fasciatus*	AS1
Mountain Hawk Eagle	*Spizaetus nipalensis*	R1
Common Kestrel	*Falco tinnunculus*	R2
Black-necked Grebe	*Podiceps nigricollis*	W1
Great Cormorant	*Phalacrocorax carbo*	W1
Blue-napped Pitta	*Pitta nipalensis*	AS1
Brown Shrikes	*Lanius cristatus*	W2
Long-tailed Shrike	*Lanius schach*	AS
Grey-backed Shrike	*Lanius tephronotus*	R2
Yellow-billed Blue-Magpie	*Urocissa flavirostris*	R3
Green Magpie	*Cissa chinensis*	R3
Grey Treepie	*Dendrocitta formosae*	R3
Collared Treepie	*Dendrocitta frontalis*	R2
Black-billed Magpie	*Pica pica*	AS1

Spotted Nutcracker	*Nucifraga caryocatactes*	AS1
Red-billed Chough	*Pyrrhocorax pyrrhocorax*	AS1
Yellow-billed Chough	*Pyrrhocorax graculus*	AS1
House Crow	*Corvus splendens*	R3
Large-billed Crow	*Corvus macrorhynchos*	R3
Common Ravens	*Corvus corax*	R1
Eurasian Golden-Oriole	*Oriolus oriolus*	AS1
Maroon Oriole	*Oriolus traillii*	R1
Black-winged Cuckooshrike	*Coracina melaschistos*	AS1
Grey-chinned Minivet	*Pricrocotus solaris*	R2
Short-billed Minivet	*Pricrocotus brevirostris*	R2
Scarlet Minivet	*Pricrocotus flammeus*	R1
Yellow-bellied Fantail	*Rhiphidura hypoxantha*	R1
White-throated Fantail	*Rhipidura albicollis*	R3
Black Drongo	*Dicrurus macrocercus*	R3
Ashy Drongo	*Dicrurus leucophaeus*	R2
Crow-billed Drongo	*Dicrurus annectans*	S2
Spangled Drongo	*Dicrurus hottentottus*	AS1
Brown Dipper	*Cinclus pallasii*	R2
White-throated Dipper	*Cinclus cinclus*	R1
Blue Rock Thrush	*Monticola solitarius*	AS1
Chestnut-bellied Rock Thrush	*Monticola rufiventris*	R2
Blue Whistling Thrush	*Myiophonus caeruleus*	R3
Plain-backed Thrush	*Zoothera mollissima*	R2
Long-billed Thrush	*Zoothera monticola*	R1
Dark-sided Thrush	*Zoothera marginata*	R2
Scaly Thrush	*Zoothera dauma*	R
Dark-throated Thrush	*Turdus ruficollis*	AS2
White-collared Blackbird	*Turdus albocinctus*	R2
Grey-winged Blackbird	*Turdus boulboul*	R2
Dark-throated Thrush	*Turdus ruficollis*	W1
Indian Grey Thrush	*Turdus unicolor*	R1
Dark-sided Flycatcher	*Muscicapa sibrica*	S2

Ferruginous Flycatcher	*Musicapa ferruginea*	AS1
Little Pied Flycatcher	*Ficedula westermanni*	R1
Rufous-gorgetted Flycatcher	*Ficedula strophiata*	R1
Verditor Flycatcher	*Eumyias thalassina*	S3
Pale Blue Flycatcher	*Cyornis unicolor*	R2
Large Niltava	*Niltava grandis*	R2
Rufous-bellied Niltava	*Niltava sundara*	R3
Grey-headed Canary Flycatcher	*Culicicapa ceylonensis*	R2
Grandala	*Grandala coelicolor*	AS1
Little Forktail	*Enicurus scouleri*	R2
Slaty-backed Forktail	*Enicurus schistaceus*	R1
Spotted Forktail	*Enicurus maculatus*	R3
Green Cochoa	*Cochoa viridis*	R1
White-capped Water Redstart	*Chaimarrornis lecocephalus*	R3
Daurian Redstart	*Phoenicurus auroreus*	S2
Blue-fronted Redstart	*Phoenicurus frontalis*	R1
Black Restart	*Phoenicurus ochruros*	S1
Plumbus Water Redstart	*Rhyacornis fuliginosus*	R2
Common Stonechat	*Saxicola torquata*	R1
Grey Bushchat	*Saxicola ferrea*	R3
Common Myna	*Acridotheres tristis*	R3
Hill Myna	*Gracula religiosa*	R2
White-tailed Nuthatch	*Sitta himalayensis*	R3
Eurasian Tree-creeper	*Certhia familiaris*	R2
Winter Wren	*Troglodytes troglodytes*	R1
Black-throated Tit	*Aegithalos concinnus*	R2
Black-browed Tit	*Aegithalos iouschistos*	R1
Fire-capped Tit	*Cephalopyrus flammiceps*	R1
Yellow-cheeked Tit	*Parus spilonotus*	AS1
Grey-crested Tit	*Parus dichrous*	R2
Cole Tit	*Parus ater*	R2
Green-backed Tit	*Parus monticolus*	R3
Rufous-vented Tit	*Parus rudiventris*	R2

Sultan Tit	*Melanochora sultanea*	AS1
Barn Swallow	*Hirundo rustica*	S1
Goldcrest	*Regulas regulas*	R3
Black Bulbul	*Hypsipetes leucocephalus*	R3
Red-whiskered Bulbul	*Pycnonotus jocosus*	AS1
Red-vented Bulbul	*Pycnonotus cafer*	R3
Straited Bulbul	*Pycnonotus striatus*	R2
Chestnut-headed Flycatcher-Warbler	*Tesia castaneocoronata*	R1
Pale-footed Bush Warbler	*Cettia pallidipes*	R1
Brownish-flanked Bush Warbler	*Cettia fortipes*	R2
Grey-sided Bush-Warbler	*Cettia brunnifrons*	R2
Spotted Bush-Warbler	*Bradypterus thoracicus*	S2
Brown Bush-Warbler	*Bradypterus luteoventris*	S1
Smokey Warbler	*Phylloscopus fuligiventer*	S2
Tickell's Leaf -Warbler	*Phylloscopus affinis*	S1
Buff-barred Warbler	*Phylloscopus pulcher*	R2
Lemmon-rumped Warbler	*Phylloscopus proregulus*	R2
Greenish Warbler	*Phylloscopus trochiloides*	R3
Ashy-throated Warbler	*Phylloscopus maculipennis*	R1
Inornate Warbler	*Phylloscopus inornatus*	W2
Golden-spectacled Warbler	*Seicercus burkii*	R1
White-spectacled Warbler	*Seicercus affinis*	R3
Grey-hooded Warbler	*Seicercus xanthoschitos*	R3
Yellow-bellied Warbler	*Abroscopus superciliaries*	R2
White-throated Laughingthrush	*Garrulax albogularis*	R3
White-crested Laughingthrush	*Garrulax leucolophus*	R3
Greater Necklaced Laughingthrush	*Garrulax pectoralis*	R2
Lesser Necklaced Laughingthrush	*Garrulax monileger*	R2
Striated Laughingthrush	*Garrulax striatus*	R3
Spotted Laughingthrush	*Garrulax ocellatus*	R1
Black-faced Laughingthrush	*Garrulax affinis*	R2
Chestnut-crowned Laughingthrush	*Garrulax erythrocephalus*	R2
Red-faced Liocichla	*Liocichla phoenicea*	R2
Grey-sided Laughingthrush	*Garrulax caerulatus*	R2

Variagated Laughingthrush	*Garrulax variagatus*	R2
Blue-winged Laughingthrush	*Garrulus sqamatus*	R2
Silver-eared Mesia	*Leiothrix argentauris*	R1
Redbilled Leothrix	*Leiothrix lutea*	R3
Cutia	*Cutia nepalensis*	AS1
Green Shrike-Babbler	*Pteruthius xanthoclorus*	R1
White-browed Shrike-Babbler	*Pteruthius flaviscapis*	R1
Rusty-fronted Barwing	*Actinodura egertoni*	R1
Hoary Barwing	*Actinodura nipalensis*	R1
Blue-winged Minla	*Minla cyaneuroptera*	R2
Redtailed Minla	*Minla ignotincta*	R2
Chestnut-tailed Minla	*Minla strigula*	R2
White Browed Tit Babbler	*Alcippe vinipectus*	R2
Rufous-winged Fulvetta	*Alcippe castaneceps*	R3
Nepal Fulvetta	*Alcippe nipalensis*	R1
Rufous Sibia	*Heterophasia capistrata*	R3
Rufous-backed Sibia	*Heterophasia annectens*	AS1
White-naped Yuhina	*Yuhina bekeri*	R3
Whiskered Yuhina	*Yuhina flavicollis*	R2
Stripe-throated Yuhina	*Yuhina gularis*	R2
Rufous-vented Yuhina	*Yuhina occipitalis*	R2
Black-chinned Yuhina	*Yuhina nigrimenta*	R1
White Bellied Yuhina	*Yuhina zantholeuca*	AS1
Fire-tailed Myzornis	*Myzornis pyrrhoura*	AS1
Oriental Skylark	*Alauda gulgula*	S1
Yellow-bellied Flowerpecker	*Dicaeum melanokanthum*	AS1
Fire-breasted Flowerpecker	*Dicaeum ignipectus*	AS1
Mrs Gould's Sunbird	*Aethopyga gouldiae*	R3
Green-tailed Sunbird	*Aethopyga nipalensis*	R2
Black-throated Sunbird	*Aethypyga saturata*	R1
Firetailed Sunbird	*Aethopyga ignicauda*	R3
Little Spider Hunter	*Arachnothera longirostra*	AS1
Streaked Spiderhunter	*Arachnothera magma*	AS1
House Sparrow	*Passer domesticus*	R3

Russet Sparrow	*Passer rutilans*	R2
Eurasian Tree Sparrow	*Passer montanus*	R2
White Wagtail	*Montacilla alba*	R2
Grey Wagtail	*Montacilla cinerea*	S2
Blyth's Pipit	*Anthus godlewskii*	AS
Olive-backed Pipit	*Anthus hodgsonii*	R2
Rufous-breasted Accentor	*Prunella strophiata*	R1
Marroned-backed Accentor	*Prunella immaculata*	AS1
White-rumped Munia	*Lonchura striata*	R1
Yellow-breated Greenfinch	*Carduelis spinoides*	R2
Dark-breasted Rosefinch	*Carpodacus nipalensis*	R2
Pink-browed Rosefinch	*Carpadacus rhodochrous*	R1
Dark-rumped Rosefinch	*Carpodacus edwardsii*	R1
White-browed Rosefinch	*Carpodacus thura*	R2
Red-fronted Rosefinch	*Carpodacus puniceus*	R1
Scarlet Finch	*Haemotospiza sipahi*	AS1
Red-headed Bullfinch	*Pyrrhula erythrocephala*	R1
Grey-headed Bullfinch	*Pyrrhula erythaca*	R1
Black-headed Mountain-Finch	*Leucosticte brandti*	R2
Collared Grosbeak	*Mycerobas affinis*	R2
White-winged Grosbeak	*Mycerobas carnipes*	R2

Source: Chettri, N. (2000b)

Appendix 2: Detailed Information on NTFP's of Rathong Chu Valley

A = abundant, C = common, D = common but declining, R = rare, MR = marketable, NM = non-marketable, NA = data not available)

Species	Vernacular name	Distribution	Marketable/ non marketable	Market rate (Rs)	Uses	Status	Availability
Construction and local handicrafts							
Arundinaria hookeriana	Pareng	1200-2100 m	MR	40 per bundle Tama 10-15 per kg	Mats, house construction, baskets, young shoots as vegetables etc.	D	Whole year
Arundinaria intermedia	Tite nigalo	1200-2100 m	MR	40 per bundle Tama 10-15 per kg	Mats, baskets, house construction etc.	C	Whole year
Arundinaria racemosa	Maling	1850-2750 m	MR	40 per bundle	Mats, baskets, fencing, walking sticks, flute etc.	C	Whole year
Bambusa nutans	Mala bans	300-1550 m	MR	30/individual	House construction, support for prayer flags by Buddhist	D	Whole year
Cephalostachium capitatum	Gopey bans	600-2400 m	NR	30/individual	Fodder, bow and arrow preparation, flutes and straw for drinking local beer.	R	Whole year
Dendrocalamus hamiltoni	Choya bans	Upto 1730 m	MR	30/individual Tama 10-15 per kg	Water pipes, water vessels, young shoots as vegetables, house construction, local handicrafts, fodder for cattle etc.	C	Whole year
Dendrocalamus hookeri	Chilley bans	Upto 1750 m	MR	30/individual	House construction, fencings, baskets, etc.	C	Whole year

Dendrocalamus sikkimensis	Bhalu bans	Upto 1800 m	MR	30/individual	Water vessel, house construction, local handicrafts etc.	R	Whole year
Edible fruits and other product							
Agaricus sivaticus	Kalunge chew	Upto 1300 m	MR	40 per kg	Used as vegetables.	C	April-September
Allium wallichii	Jungli piyaj	2200-4000 m	NM		Edible and aromatic	R	June-October
Bassia butyracea	Chewri	1200-1775 m	MR	2 per 5 pieces	Fruits edible, oil is extracted from thee seeds and used. Leaves are good fodder.	R	June-July
Bauhinia vareigata	Kiorala	Upto 600 m	NM		Flowers are eaten as curry, good fodder.	R	March-April
Castanopsis hystrix	Patle katus	1800-2400 m	MR	15 per kg	Fruits edible, fuelwood, leaves are good ingredients for composts.	A	Feb-April
Castanopsis tribuloides	Musre katus	1700-2300 m	MR	60 per kg	Fruits edible, fuelwood, leaves are good ingredients for composts.	C	Feb-April
Cinnamomum impressinervium	Sisi	1220-1830 m	NR		Seeds edible	A	Whole year
Citrullus colocenthus	Indrenni	Upto 1900 m	MR	5 per piece	Fruits edible	D	Jan-March
Dioscorea hamiltoni	Ban tarul	Upto 2000 m	MR	20 per kg	Used as food.	C	Jan-Feb
Diplazium polypodiodes	Sauney ningro	Upto 2000 m	MR	5 per bundle	Used as vegetables.	C	May-July
Elaeocarpus lanceafolius	Bhadrase	1830-2450 m	MR	18 per kg	Fruits edible	D	April-June
Evodia fraxinifolia	Khanakpa	1200-2100 m	NM		Fruits used as pickles and as medicine for dysentery	C	Aug-Sep

Ficus infectoria	Kabra	Upto 1700 m	NM		Shoots are edible, good fodder.	C	Feb-March
Garcinia cowa	Kaphal	Upto 1725 m	MR	NA	Fruits edible, gums and resins are extracted for local use.	R	July-Sep
Girardinia palmata	Bhangre sisnu	1000-2500 m	MR	5 per bundle	Young leaves and shoots use as substitute for dal which are good for blood pressure patients.	A	July-Sep
Pentapanax leschenaultii	Chinde	1750-3000 m	MR	10 per kg	Young shots edible, used as fodder.	D	March-April
Juglans regia	Okhar	1000-2000 m	MR	2 per piece	Fruit edible, bark-anthelminthic and detergent, leaves- astringent and tonic, oil of kernel cures skin diseases etc.	D	April-Sep
Laportia terminalis	Patle sisnu	Upto 2700 m	MR	8 per bundle	Young leaves and shoots use as substitute for dal which are good for blood pressure patients.	A	May-Aug
Machilus edulis	Lapche kawla	1220-2400 m	MR	1 per piece	Fruits edible, leaves are good fodder.	C	Nov-Dec
Machilus odoratissima	Lalikaulo	1500-2150 m	NM		Fruits edible, leaves are good fodder.	C	Nov-Dec
Mahonia sikkimensis	Chutro	1300-2700 m	NM		Berries edible	A	July-Aug
Pleurotus astratus	Chamrey	NA	NM		Used as vegetables.	C	NA
Pleurotus sajor	Kanney chew	1500-2450 m	MR	50 per kg	Used as vegetables.	C	Julu-Aug
Prunus nepaulensis	Arupate	1800-above	NM		Fruits edible, fairly good fodder and fuelwood.	C	March-Aug
Pyrularia edulis	Amphi	600-1800 m	MR	NA	Fruits edible, posses wax in kernel and were use this wax for lighting.	D	NA
Pyrus pasia	Mehel	800-2400 m	MR	10 per kg	Fruit extracts used for curing blood dysentery	D	Nov-Dec

Quercus lineata	Phalant	1850-2700 m	NM		Acorns are good food for beer, fuelwood etc.	A	March-May
Quercus pachyphyla	Sungure katus	1830-3000 m	NM		Nuts edible, bark and acorns used as astringent	D	March-May
Rhus semialata	Bhakimlo	900-1850 m	MR	NA	Seeds use as medicine dysentery	A	July-Aug
Rubus ellipticus	Aselu	1000-2200 m	MR	40 per kg	Fruits edible	A	March-May
Rubus niveus	Kalo aselu		MR	40 per kg	Fruits edible	C	March-May
Spondias axillaris	Lapsi	300-1400 m	MR	20 per kg	Fruits edible, pickles are also prepared.	D	May-Oct
Symplocos theifolia	Kharanay	1800-3000 m	NM		In the past, people use to extract oil from the seeds for cooking.	A	July-Aug
Tupistra nutans	Nakima	1800-3000 m	MR	60 per kg	Flower are taken as curry	D	Sep-Oct
Utica spp.	Gharia sisnu	1000-2500 m	MR	5 per bundle	Dried plants are use to prepare paste and applied on minor fractures. Leaves and shoots use as substitute for dal.	A	April-July
	Kali ningro	Above 1750 m	NM		Used dysentery.	C	May-Sep
	Jhari chew	1800-2000 m	NM		Used as vegetables.	C	May-Sep
	Hieun chew	Above 2500 m	NM		Used as vegetables.	C	May-Sep
	Katuse chew	Upto 1800 m	NM		Used as vegetables.	C	May-Sep
	Kalamen uneu	1650-2450 m	NM		Used as vegetables.	C	May-Sep
Medicinal							
Abies densa	Gobrey salla	2550-3700 m	NM		Leaf extracts use in repeated doses for asthma, bronchitis and stomach trouble.	A	Whole year

Aconitum sp.	Bikma	2100-4000 m	MR	NA	High medicinal value, use in diaphoretic, diuretic, expectorant, febrifuge, diabetes,	D	July-Sep
Acorus calamus	Bonjho	1000-2000 m	MR	NA	Paste prepared from rhizome used in skin diseases, powder taken orally for cough, malaria and asthma	D	Whole year
Artemisia vulgaris	Titepate	800-2000 m	NM		Use in different medication as deobstruent, antispasmodic, obstructed menses and hysteria.	A	Whole year
Astilbe rivularis	Buro okhati	1200-2100 m	MR	NA	Rhizomes chewed as areca nut and used as pain relief.	D	July-Aug
Bergenia ligulata	Pakhan bet	Upto 3000 m	MR	75 per kg	Roots use in analgesic, tridosha, piles, heart diseases, spleen enlargement and many other diseases.	D	Whole year
Bergenia purpurascens	Khokim	3400-4200 m	NM		Dried roots use in as substitute for tea and believe to give relief from body ache.		
Clementis buchananiana	Pinasay lahara	1800-2800 m	NM		Fresh roots are mashed and the effluvium is drawn through nose to cure sinusitis and nose-blocks.	D	Whole year
Dichroa febrifuga	Basak	900-2400 m	NM		Dried leaves orally taken in fever	C	July-Aug
Drymaria cordata	Abijalo	1000-2000 m	NM		Used in nose dysentery.	C	Whole year
Eupatorium adenophorum	Banmara, kalijhar	1000-2000 m	NM		Crushed juice from leaves are applied in cuts and bleeding spots immediately	A	Whole year
Heracleum nepalense	Chimphing	1550-3600 m	MR	3 per packet	Fruits are used as pickles, used as anti-typhoid, nausea and vomiting	D	Aug-Oct

Hydrocotyle asiatica	Golpatta	1300-2000 m	NM		Fresh leaves are crushed and administered orally to relieve blood pressure and throat pain.	C	Whole year
Holboellia latifolia		2400-3200 m	R	NA	Fruits edible, stem used to make bangles, which are believe to give relief from orthopedic problems.		Whole year
Kaempfera rotunda	Bhuin champa	1300-2000 m	MR	NA	Tubers used as poultice in fracture, healing fresh woods and removes coagulated bloods from the body.	R	NA
Litsae citrata	Siltimur	Upto-2700 m	MR	NA	Dried fruits are used as medicine for nausea and giddiness, fresh fruits used as pickles.	D	Aug-Sep
Orchis latifolia	Panch aunle	3000-4000 m	MR	4 per piece	Paste made out of the tubers is applied over cuts and bruises. It is also used orally for body ache	R	Aug-Sep
Oroxylum indicum	Totala	Upto 1000 m	MR	10 per garland	Flower edible, root bark improves appetite, use in vomiting, asthma, bronchitis etc.	R	Aug-Dec
Picrorhiza kurrooa	Kutki	3000-5000 m	MR	NA	Dried roots are used orally in malarial fever. It is also used as cathartic, purgative and dyspepsia.	D	Whole year
Piper longum	Pipla	Upto 1700 m	MR	60 per kg	Roots use in anthelminthic, improves appetite, abdominal pain. Fruits use for anti-diarrhoeatic, anti-dysenteric, piles, leprosy etc.	C	Whole year
Plantago major	Isabgol	Upto 1750 m	NM		Plant use as medicine for rheumatism, roots as astringent and fever, and seed in dysentery.	C	Whole year
Polygala arillata	Marcha	600-1800 m	MR	NA	Roots use for preparation of yeasts.	D	NA

Rheum emodi	Padamchal	3600-4500 m	D		Dried roots use as tea.	D	July-Sep
Rheum nobile	Kenjo	3600-4500 m	NM		Whole plant eaten used for pickles, have medicinal value.	R	July-Sep
Rhododendron arboreum	Lali guras	1500-3300 m	NM		Dried flowers use for curing dysentery	A	Jan-March
Rubia cordifolia	Majhito	1000-2000 m	MR	650 per ton	Color extracts are used in dying. Roots have medicinal value.	C	Whole year
Rumex nepalensis	Halhalay	1800-3000 m	NM		Dried root is use in preparation of paste and taken orally in hepatistis. It is also applied during loss of hairs.	A	Whole year
Solanum xanthocarpum	Jungli bihin	Upto 1800 m	NM		Root use in bronchitis, asthma, fever, pains. Piles etc. Fruits increase appetite and good for heart diseases and fever. Fruits are burnt and use its smoke for relief from toothache.	C	Whole year
Swertia chirata	Chirato	1225-3000 m	MR	NA	Medicinal use for anthelmintic, antipyretic, antiperiodic, laxative, leucoderma, inflammation, ulcer, asthma piles etc.	D	March-Sep
Viscum articulatum	Harchur	300-2000 m	MR	80 per kg	Dried plants are use to prepare paste and applied on minor fractures.	R	Whole year
Zanthoxylum acanthopodium	Boke timur	Upto-2250 m	D	40 per kg	Medicine for ear diseases, headache, leucoderma, asthma and good appetizer	D	May-Sep
Natural decorative							
Anaphalis contorta	Bukiphul	1700-2750 m	NM		Dried flowers are decorative and also used for preparation of pillow	A	July-Sep
Anaphalis triplinervis	Bukiphul	1850-2750 m	NM		Dried flowers are decorative and also used for preparation of pillow.	A	July-Sep

Lycopodeum clavatum	Nagbelli	1850-2750 m	NM		Entire plant is decorative and pollen is used as gunpowder.	C	Whole year
Pollinia mollis	Memkesh	1550-2450 m	NM		Flowers spikes are decorative	R	Whole year
Raphidophora sp.	Kanchirna	Upto-2000 m	NM		Planted as decorative, leaves good fodder, stems used as feed for pig and cattle.	A	Whole year
Fiber and broom species							
Daphne cannabina	Kagatay	1850-3000 m	MR	NA	Bark is used as ropes but also have potential for preparation of paper.	C	Whole year
Edgeworthia gardneri	Argeli	Upto 1850 m	MR	NA	Bark is used for preparation of paper, making ropes and even tying cattle.	C	Whole year
Thysanolaena maxima	Amliso	Upto-2000 m	MR	Broom 1000 per ton.	Broom are prepared from the inflorescence,, fodder, soil binder and fuelwood after drying the sticks.	A	Whole year
Incense							
Juniperus recurva	Bhairun patay	3600 m above	MR	NA	Local Buddhist uses leaves as incense.	C	Whole year
Rhododendron setosum	Sunpatay	3600 m above	MR	NA	Local Buddhist uses leaves as incense.	C	Whole year

Source: Chettri, N. (2000a).

Appendix 3: Preferred firewood, fodder and timber species of Rathong Chu Valley

A. Temperate Region

Species (local name)	Firewood	Fodder	Timber
Acer laevigatum (Putli)	-	+	+
Alnus nepalensis (Uttis)	+	-	+
Amoora wallichii (Laali)	-	+	-
Artemesia vulgaris (Teteypaty)	-	++	-
Arundinellan nepalensis (Kharuki)	-	+++	-
Beilschmiedia sikkimensis (Tarsing)	+	-	+
Betula cylidrostachys (Saur)	-	+	+
Castanopsis hystrix (Patle katus)	+	-	++
Cedrela toona (Tooni)	-	++	++
Cryptomeria japonica (Dhuppi)	+	-	-
Dendrocalamus spp (Bans)	-	+	+
Edgeworthia gardneri (Argeli)	+	-	-
Elatostemma sessile (Gagleto)	-	+++	-
Eurya acuminata (Jhinguni)	++	+	-
Ficus nemoralis (Dudhilo)	-	+++	-
Ficus roxburghi (Nebara)	-	+++	-
Imperata cylindrical (Seeru)	-	+++	-
Machilus edulis (Kaulo)	++	+	++
Machilus odoratissima (Lali kaulo)	++	-	+
Juglans regia (Okhar)	+	-	++
Michelia exelsa (Chanp)	+	+	+++
Pauzolzia viminea (Chiple)	-	+++	-
Paveta indica (Kanyu)	-	+++	-
Prunus cerosoides (Panyun)	++	+++	-
Prunus nepaulensis (Arupate)	+	-	+
Quercus lamellose (Bajrant)	++	+++	+
Rhaphidophora sp (Kanchirna)	-	++	-
Rubia manjith (Majhito)	-	+	-
Saurauia nepaulensis (Gagoon)	-	+++	++
Schima wallichi (Chilaune)	++	-	++
Symingtonia populnea (Pipli)	-	+	++
Thysanolaena maxima (Amliso)	-	+++	-
Viburnum cordifolia (Asare)	++	+	-
Weigtia gigantia (Bauni kat)	-	+	+

Source: Chettri, N. (2000a).

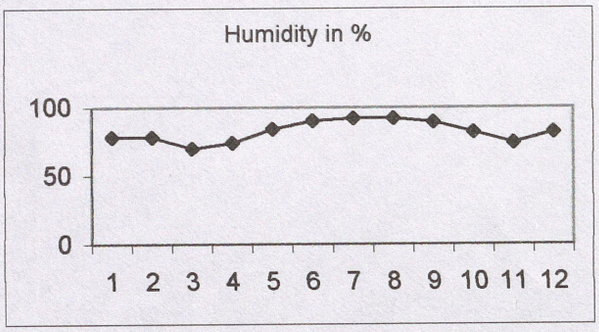
B. Sub Alpine Region

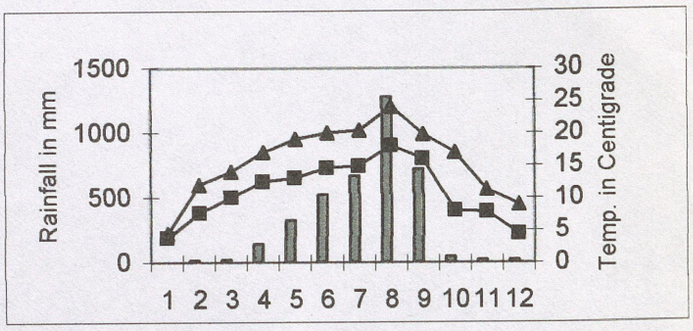
Species (local name)	Firewood	Fodder	Timber
Abies densa (Gobre salla)	+	-	+++
Acer oblongum (Phirphire)	+	+	++
Acer papilio (Kapase)	+	+	-
Arundanaria sp. (Parang)	++	+++	-
Betula alnoides (Saur)	+++	++	++
Cyperus sp. (Bukki)	-	+++	-
Dendrocalamus sp.(Bans)	+	+++	-
Litsae elongata (Pahenli)	+	+++	-
Magnolia campbellii (Ghoge chanp)	++	-	++
Magnolia sp. (Phusre chanp)	++	+	-
Prunus rufa (Lekh panyun)	-	++	-
Quercus lamellosa (Bajrant)	+++	++	++
Quercus lineata (Phalant)	+++	-	++
Rhododendron arboreum (Lali guras)	++	-	-
Rhododendron barbatum (Curling)	++	-	-
Rhododendron falconeri (Curling)	++	-	-
Sorbus sp. (Pansi)	+	-	-
Symplocos ramisissima (Kharane)	+	+	-

Source: Chettri, N. (2000a).

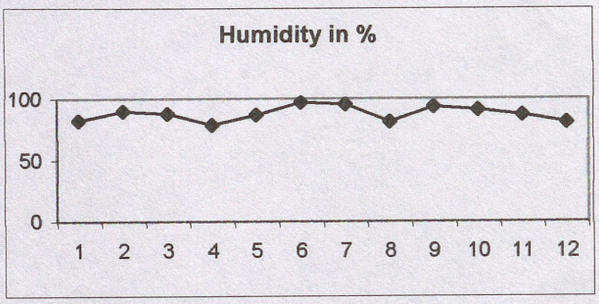
Appendix 4: Temporal variation of humidity, rainfall and temperature in the three major halting places

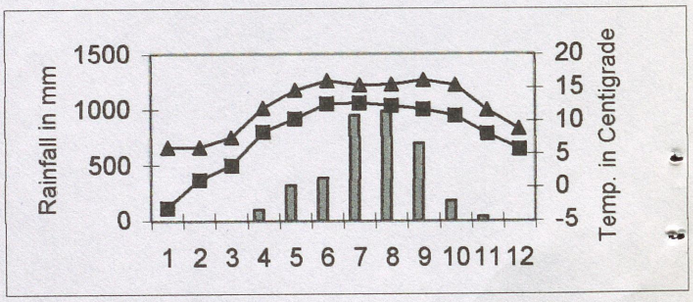
(a) Yuksam



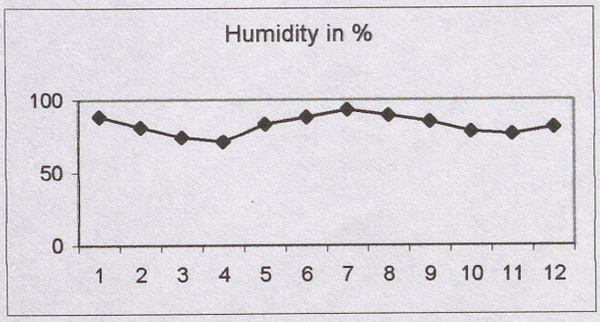


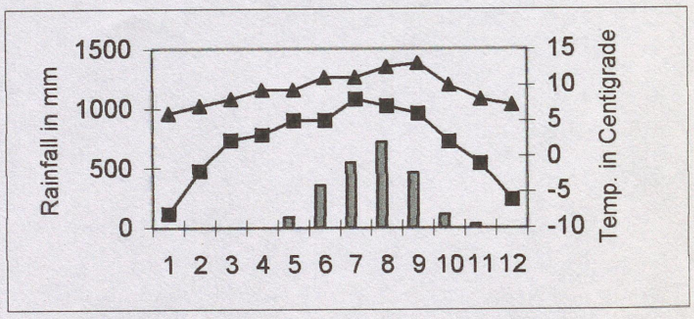
(b) Chokha





(c) Dzongri





Source: Chettri, N. (2000a).

Appendix 5: Suggested Readings

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