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Acknowledgements

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

Funding Agency: United Nations Development Programme / Global Environment Facility

Technical Implementing Agency: State Level Planning Committee and Working Group coordinated by Foundation for Revitalization of Local Health Traditions

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Special Acknowledgement: Shri T. R. Sharma IFS, Principal CCF cum Secretary, Mr. G. A Kinhal (FRLHT), Mr S. B. S. Bhadauria IFS, CCF (LUE & E), Mr. Hari Pradhan IFS, DFO NTFP and State Medicinal Plants Board, Mr. Renzino Lepcha (ECOSS), Ms Uden Tshering (KCC), Mr Gokul Rai (SPSS), Mr Santosh Rai (ATREE)

Photo Credits: Mr Hari Pradhan, State Medicinal Plants Board, Mrs. Usha Lachungpa, Sr. Research Officer (WL), Mr Sandeep Tambe, DFO Working Plan

Layout and Design: Mr Sandeep Tambe, DFO Working Plan

Citation: Tambe, S., Lachungpa, U., Swaroop, B. and Arrawatia, M. L. 2003. Plan for Medicinal Plants Conservation and Sustainable Utilization. Sikkim 2003. Department of Forest, Environment and Wildlife, Government of Sikkim, Gangtok.

Executive Summary

The Conservation and Sustainable Utilization of Medicinal Plants is a project of the Ministry of Environment & Forests, Government of India executed by the Foundation for Revitalization of Local Health Tradition (FRLHT), a NGO based in Bangalore, India.

The Government of Sikkim approved this project in December 2002 and since January 2003, the Department of Forest, Environment & Wildlife, Government of Sikkim tried to reach out to all sections of people in a massive effort to formulate the plan involving the full participation of maximum number of people from all walks of life in a participatory and gender sensitive way.

From these public hearings, consultations and workshops the basic strategy that has emerged for the conservation of medicinal plants involves the creation of a Medicinal Plants Conservation Network for Sikkim. For the first five years this network would focus on *In-situ* conservation, *Ex-situ* Conservation, local use and meeting the demands of the local markets. The priority would be on conservation security, local health culture revitalization, health security and livelihood security. Only after this has been done successfully the state would plan in terms of meeting the demands of national and international markets.

This network would contain at the base *in-situ* conservation of wild medicinal plants diversity by creating about 25 Medicinal Plant Conservation Areas (MPCAs) representing all the four ecoregions extending to about 5500 ha. This amounts to only 0.8% of the total geographical area of the state. These would be then linked to 30 Medicinal Plant Development Areas (MPDAs). The existing 14 medicinal plant cultivation initiatives would be extended and developed as MPDAs. However MPDAs need to be created in the Trans Himalayan ecoregion since none exist, at Hilley, West Sikkim for the Temperate ecoregion and in the Tropical Ecoregion.

To make it a people's programme, medicinal plants need to be made available to every mother in every home, for this a Network of about 250 Decentralized Nurseries (NDNs), wherever possible existing, need to be linked with these MPDAs. The existing 32 community nurseries and the proposed Panchayat nurseries and Panchayat Herbal Gardens need to be brought under the aegis of the NDN by strengthening them. For making this a people's programme a NDN should exist in each of the 170 Gram Panchayat Units (GPU) and Dzumsa. A further 80 NDNs will be required to cater to the needs of the urban population. To ensure that the medicinal plant finally reaches to each mother a network of about 25,000 Home Herbal Gardens need to be created throughout the state. To bridge the lack of traditional primary health care knowledge amongst the mothers, training and capacity building programmes need to be organized in association with the traditional healers, Panchayats, local NGO's and CBO's.

Amongst the local health cultures, the Tibetan system of medicine still has a presence and a few clinics do exist both in the government and private sector. Tibetan Medical institutes at Dharamsala and Darjeeling provide the necessary support to aspiring students from the state. However this system of medicine is in urgent need of strengthening by creating a Tibetan Medical College in collaboration with the Deorali *Sheda* followed by the opening of

Amji Training Centres in association and collaboration with the *Shedas* (monastery schools) and the above institutes.

Comparatively the Nepali system of medicine which has a wider base is fast eroding. It is in a critical need of being revived by organizing the practitioners and linking them up with reputed medical institutes like the Baidya Pakhrin Chikitshalaya, Algarah, Darjeeling, West Bengal where *Baidya* Chewang has been serving the rural masses in healing bone fracture with herbal medicines for over the last forty years with dedication and distinction. He could be requested to strengthen this system of medicine in Sikkim. The *Baidyas* of Sikkim could also be linked to the Pakhrin hospital to gain necessary expertise and valuable experience.

Lastly the Lepcha system of medicine, which is fast disappearing, is in a critical need of being revived by organizing the practitioners and unfortunately there are no known reputed medical training institutes or renowned practitioners for this system of medicine.

The tentative budgetary requirements to meet the ambitious objectives of this plan amounts to about Rs. 57 crores for five to seven years provided this programme is implemented in mission mode. Then Sikkim could truly boast of being an herbal state with traditional primary health care security for all.

Abbreviations Used

4D	Discovery, Dream, Design and Delivery Technique for Microplanning
APPA	Appreciative Participatory Planning and Appraisal
BRO	Border Road Organization
BSI	Botanical Survey of India, Sikkim Circle
CBO	Community Based Organization
CDRI	Central Drug Research Institute, Lucknow
CFP	Call for Participation
CIC	Community Information Center, Department of Information Technology, GoS
CIMAP	Central Institute for Medicinal and Aromatic Plants, Lucknow
CSAP	SAP made by the community only CSAP = FSAP + MSAP
CTMI	Chagpori Tibetan Medical Institute, Darjeeling, West Bengal
ECOSS	Ecotourism & Conservation Society of Sikkim, NGO based in Gangtok
EDC	Ecodevelopment Committee
FEWD	Forest, Environment and Wildlife Department, Government of Sikkim
FSAP	SAP made by the Female participants of the community only
GBPIHED	G. B. Pant Institute for Himalayan Environment and Development
GC	Green Circle, NGO based in Gangtok
GoS	Government of Sikkim
GPU	Gram Panchayat Unit
GREF	Garrison Reserve Engineering Force
GSAP	SAP made by the government departments only
HMI	Himalayan Mountaineering Institute, Darjeeling, West Bengal
HWLW	Honorary Wildlife Warden under the Wildlife (Protection) Act 1972
ICAR	Indian Council for Agriculture Research
ICIMOD	International Center for Integrated Mountain Development, Kathmandu, Nepal
IWDP	Integrated Wasteland Development Project
JFMC	Joint Forest Management Committee
KCC	Khangchendzonga Conservation Committee, NGO based in West Sikkim
KBR	Khangchendzonga Biosphere Reserve
KNP	Khangchendzonga National Park
LHC	Local Health Culture
MoEF	Ministry of Environment and Forests, Government of India
MUSS	Manav Uthan Seva Samiti, NGO based in West Sikkim
MSAP	SAP made by the Male participants of the community only
NBRI	National Botanical Research Institute, Lucknow
NBSAP	National Biodiversity Strategy and Action Plan, MoEF, Government of India
NHHG	Network of Home Herbal Gardens
NHPC	National Hydroelectric Power Corporation
PHC	Primary Health Center
PHSC	Primary Health Sub Center
PRA	Participatory Rural Appraisal
SAP	Strategy and Action Plan SAP = CSAP + GSAP
SHG	Self Help Group
SPSS	Sikkim Paryavaran Samrakshan Sangh, NGO based in South Sikkim
TAAS	Travel Agents Association of Sikkim
TMAI	Tibetan Medical and Astro Institute, Dharamsala, Himachal Pradesh
TMI	The Mountain Institute, Sikkim Office, Gangtok
WC	Watershed Committee of Integrated Wasteland Development Project
WG	Working Group constituted for this project

Glossary of Local Terms

Amji	Traditional healer of the Tibetan Community
Baidya	Traditional healer of the Nepali Community
Banmara	*Eupatorium* spp., a naturalized exotic weed
Bongthing	Faith healer of the Lepcha Community
Bhairung Pate	*Juniperus recurva* used as incense in monasteries
Chogyal	King of Sikkim
Chorten	Stupa
Chu	River
Churpi	Cheese
Danra	Hill
Dhara	Stream
Dhoop	Incense offered in monasteries
Dhoopi	*Cryptomeria japonica*, an exotic naturalized conifer
Dzo	High altitude pack animal, which is a cross between a yak and cow
Dzumsa	Traditional Local Government at Lachen and Lachung, North Sikkim
Ghee	Butter
Goth	Permanent Cattle Shed
Gothala	*Goth* owner
Goucharan	Government Protected Forests
Gumpa	Monastery
Guransh	Rhododendron spp.
Himal	Snow clad mountain
Jhankri	Faith healer of the Nepali community
Kattus	Chestnut Tree
Khola	River / Stream
Lama	Monk
Lekh	Temperate Region
Mantra	Sacred hymns
Mela	Village Fair
Paha	Frog
Pokhri	Pond
Salla	Conifer
Sunpate	*Rhododendron setosum* used as an incense in monasteries
Supari	Hard Cheese
Tatopani	Hot Spring

Chapter 1 Introduction

Sikkim harbors an enormous biodiversity of medicinal plants that occur right from the humid river valleys to the cold trans-Himalayan desert. Also we have a vast repository of local health traditions and practitioners (*Baidya, Amji, Bongthing, Jhankri,* etc).

Bongthing at Panglabsol festival, Tsunthang

This biodiversity of medicinal plants and its sustainable utilization sustains the health, medicinal, spiritual and other needs of most of us. This biodiversity is the treasure house from which future food needs, cures for deadly diseases and elements for knowledge and technology will be found.

This biodiversity is seriously threatened by human activities such as destructive harvesting, loss of habitat or degradation in its quality, leading to extinction of medicinal plants and also resultant dying out of our local traditional practices.

There is a need to prepare a detailed action plan to conserve and sustainably use medicinal plants to protect the cultural, scientific, spiritual traditions and innovations related to it, and to equitably share the benefits arising from sustainable use.

The participation of women and men from all walks of life, both within and outside the government, rural and urban, is essential for preparing an implement able action plan.

The value of medicinal plants

Medicinal plants play an important role in supporting healthcare in India. According to the World Health Organization (WHO), 80% of the rural population in developing countries utilizes locally available medicinal plants for their primary healthcare needs. About 8000 species of medicinal plants are in current use by local communities all over India.

Nardostachys grandiflora

About 90% of the country's medicinal plants are found in forest habitats. Only 10% of the medicinal plants are distributed among other landscape elements like open grasslands, agricultural pastures and in and around fresh water bodies, etc. There is consequently an urgent need to conserve the wild populations of medicinal plant diversity in prioritized forest regions of India.

It may be noted that India is one amongst those nations, which possess a historical track record of having made a significant global contribution by virtue of its traditional knowledge of the properties of plants. In the 21st century, given the global resurgence of the consumer interest in natural products, India's rich medicinal

plant heritage of 8000 species and an estimated 40,000 herbal formulations, if conserved and sustainably utilized, certainly has global relevance. For India's own health needs, conservation of her medicinal plants will contribute to self-reliance of millions on primary healthcare.

The demand for medicinal plants is growing. In 1947, the annual turnover of the herbal industry was Rs. 2,000 million. The Indian herbal industry's annual turnover was expected to touch Rs. 40,000 million by the end of 2000. This is why India supplies 12% of the world's requirements of medicinal plants. Today, 90% of the medicinal plants consumed domestically and exported are collected from the wild, and only 70 out of around 700 species in the trade are obtained purely from cultivated sources.

Background

UNDP with the Global Environment Facility has provided project preparatory support to Ministry of Environment and Forests to develop a full-fledged project for the conservation and sustainable use of medicinal plants in seven states in India. The project will cover Jammu and Kashmir, Himachal Pradesh, Uttaranchal, Chattisgarh, Sikkim, Meghalaya and Arunachal Pradesh.

This proposed project would involve an innovative people-centered approach through the revitalization of traditional practices and indigenous knowledge bases, both formal and non-formal, for primary health care and livelihoods. The main focus will be on capacity building and networking for a lasting people-centered approach.

In the full-scale project, all the above state governments will establish and manage Medicinal Plant Conservation Areas (MPCAs). The project will also focus on creating people's Biodiversity Registers of medicinal plant uses and knowledge, an approach that recognizes the centrality of communities as custodians of traditional knowledge and intellectual property. Hence the detailed action plans are proposed to be prepared with people's participation for this purpose

Process for Preparing the Action Plan

The Ministry of Environment and Forests, Government of India is overall in charge of this process. The Foundation for Revitalization of Local Health Tradition (FRLHT), a NGO based in Bangalore, India, in coordination with the Sikkim State Forest Department will be preparing the project after developing detailed action plans. The process of developing this action plan will be highly participatory in nature, reaching out to a large number of village level organizations and movements, NGO's, academicians and scientists, government officials, the private sector, the armed forces, traditional health practitioners, politicians and others who have a stake in medicinal plants conservation. Through such a participatory process a much wider ownership of the process is attempted.

In particular the following were attempted:

a) ***Public Hearings*** in selected villages and towns seeking inputs from farmers, traditional health practitioners and other communities

b) ***Consultation*** with various political decision makers at various levels

c) ***Inputs*** from a range of expert and experienced individuals and organizations working on medicinal plants including scientists, traditional health practitioners, social activists,

academicians, students, industrialists, cultural leaders etc

Scope of the Action Plan

The action plan was prepared by March 2003, covering:

- Conservation and sustainable utilization of medicinal plants biodiversity of Sikkim through participatory approaches
- Conservation of the associated local health traditions and the social, economic, ethical, cultural and scientific dimensions including gender relations and equity

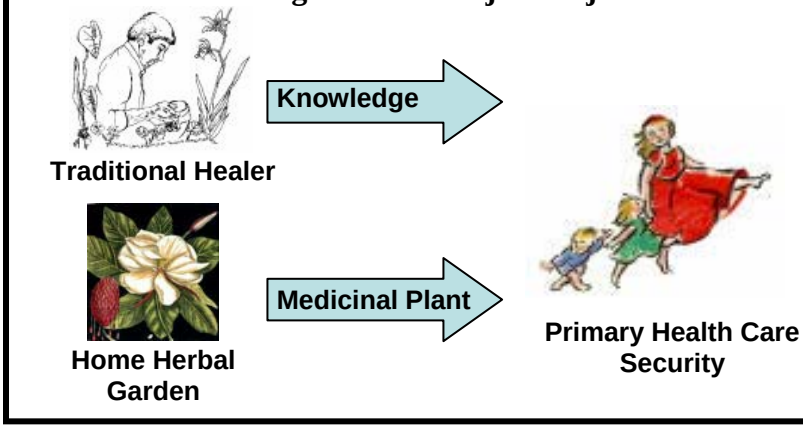
A Call for Participation

Participation in this process was invited through contributions in:

- Assisting in organizing local workshops and public hearings
- Holding an inter-departmental meeting
- Pointing out and/or sending material/documents
- Contributing new information/material in writing
- Sending us the contact details of traditional health practitioners (*Baidya, Amji,* etc.)
- Sending us the contact details of knowledgeable cultivators of medicinal plants
- Coordinating the preparation of the action plan for my region
- Anything else

For this purpose, citizens, Government Officials and agencies, NGOs, CBOs, Panchayats, women organizations, students and teachers, farmers, experts, industrialists, business persons, the armed forces, politicians, artists and others were contacted.

Figure 1: Project Objectives



Chapter 2 Profile of the Area

Sikkim is a small mountainous State in the Eastern Himalayan region extending approximately 114 km from North to South and 64 km from East to West, having a total geographical area 7096 sq. km. only. The State is situated between 88^0 00' 58" and 88^0 55' 25" East longitudes and 27^0 04' and 28^0 07' 48" North latitudes. It is surrounded by vast stretches of Tibetan plateau in North; Chumbi valley and Kingdom of Bhutan in the East; Darjeeling district of West Bengal in South and Kingdom of Nepal in West. The State has four districts namely East, West, North and South. The Chola ridge towards the East, the Singhalila ridge towards the west and the mighty Himalayan axis at the north bound it. These ranges enclose Sikkim in a titanic horseshoe, which traps the moisture-laden winds from the Bay of Bengal, causing heavy precipitation. This land is drained by the mighty Tista, which flows north south. The most astonishing aspect of this region is the enormous altitudinal gradient ranging from 300 meters to 8585 meters. This creates a range of climatic zones, right from the tropics to the tundra. This in turn fosters a bewildering diversity of flora and fauna.

> This abrupt telescoping of the terrain from the hot steamy foothill valleys to the artic cold of the snow capped peaks, which has produced the marked altitudinal zonation in the rainfall, humidity, climate and vegetation is also responsible for the great variety and numerical abundance of the resident bird life, making Sikkim perhaps the richest area of its size anywhere in the world. *(Ali, Salim 1962)*

The State is bestowed with abundant natural resources. Covering just 0.2% of the geographical of the country, it has tremendous biodiversity and has been identified as one of the Hot Spots for biodiversity. The Sikkim Himalayas that spread over Sikkim and the hill region of Darjeeling harbor more than 26 % of the flowering plants reported in the country and known to be an important phyto-geographical reserve of the country. Species wise, it has approx. 5000 Flowering plants, 515 Orchids, 36 Rhododendrons, 16 Conifers, 23 Bamboos, 362 Ferns and Ferns allies, 8 Tree Ferns, 60 Primulas, 11 Oaks, over 424 medicinal plants, 150 Mammals, 552 Birds, 48 Fishes and over 690 Butterflies and also 28 Mountain Peaks, 21 Glaciers, 227 High altitude lakes and wetlands and over 104 rivers and streams. With its unique traditions, art, culture and perfect harmony and being one of the most peaceful states in the country, the Sikkim Himalayas have excellent scope for value added eco-tourism.

Climate

For most of the periods in a year, the climate is cold and humid as rainfall occurs in each month. The area experiences a heavy rainfall due to its proximity with the Bay of Bengal. The rainfall in North District is comparatively less than that of the other Districts. The general trend of decrease in temperature with increase in altitude holds good everywhere. Pre-monsoon rain occurs in April-May and monsoon (South-West) operates normally from the month of May and continues up to early October. The temperature varies with altitudes and slope. While in lower altitudinal zones the mean temperature varies between 4.5^0C to 9.5^0 C. The maximum temperature is recorded usually during the month of July and August and minimum during December and January. During the period from May to September fog becomes a common feature in this area. Also during winter snowfall is common in high

altitude places. The mean temperature in the lower altitudinal zones varies from 4.5 degree centigrade to 18.5 degree centigrade, whereas at higher altitudinal zones, it varies from 1.5 degree centigrade to 9.5 degree centigrade. Temperature varies with altitude and slope. The maximum temperature is recorded usually during July and August, and minimum during December and January. Fog is a common feature in the entire State from May to September. Biting cold is experience at high altitude places in the winter months and snowfall is also not uncommon during this period.

Physiography

Physiographically, Sikkim can be said to have its feet in the ocean and its head in the sky. The altitudes vary from 300 meters to 8500 meters above mean sea level. The entire state is a young mountain system with highly folded and faulted rock strata at many places. It encompasses the lesser Himalayas, Central Himalayas and the Tethys Himalayas. Great Mountain ranging from 3000 meters to 8500 meters in height separates the state from surroundings. In fact, it has no flat piece of land good size anywhere. Major portion is covered by the pre-Cambrian rock and is much younger in age. The rock type consists of phyllites and schists and therefore, the slopes are highly susceptible to weathering and prone to erosion and landslides. The trend of the mountain system is in general east-west direction. The mountains rise in elevation northward. The northern portion of the state is deeply cut into steep escarpments, and except in the Lachen and Lachung valleys, is not populated. Southern Sikkim is lower, more open, and fairly well cultivated. This configuration of the state is partly due to the direction of the main drainage which is southern. The Rangit and the Tista which form the main channels of drainage, run nearly North-South. The valleys cut by these rivers and their chief feeders are very deep. The valleys are rather open towards the top, but usually attain a steep gorge like structure as we approach the bed of the rivers. There are 227 perennial lakes / wetlands at different altitudes. Many hot water springs i.e. Phur sachu, Ralang Sachu, Yumthang, Yumesamdong, etc are also found in the State. The perpetual snow line in Sikkim is approximately at 6000 meters.

Soil of the region being the nutrient medium, is indispensable in vegetations. Soil moisture, mostly depending upon the soil thickness has an explicit impact on forest type and coverage in an area. The entire state primarily consists of gneissose rocks and half-schistose rocks. The soil developed from the gneissic group of rocks is brown clay, generally shallow and poor. They are typically coarse, often with ferric concentrations, neutral to acidic with poor organic/mineral nutrients. They tend to carry most of the evergreen and deciduous forests. The high intensity of rainfall in the state often causes extensive soil erosion and heavy loss of nutrients of land by leaching.

Human Development Scenario

Sikkim is a multi-ethnic state. Broadly, the population can be divided into Tribal and Non-Tribal groups. The people from the plain mostly involved in Trade and services represented a marginal group. There are 166 Panchayats and 453 Revenue Blocks, which comprise of 32 Assembly Constituencies. As per the 2001 census of India, the total population of the state is 5, 40,493, whereas in 1991 it was 4, 06,457 only. Decadal population growth has gone up for 1991-01 to 32.98% as in 1981-91 it was only 28.47%. The overall density of population in the

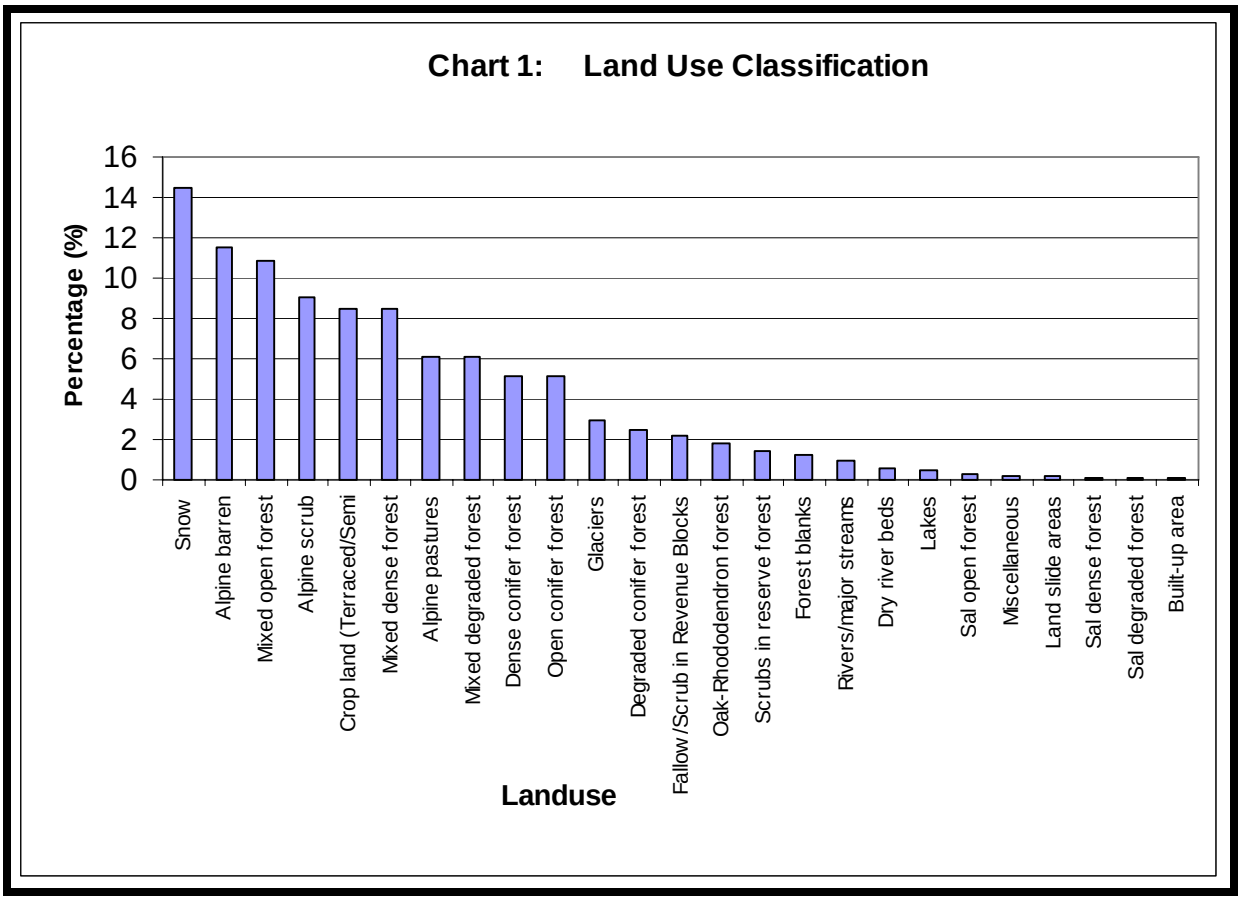
state is 76 per sq. km. East district is the most populated as North's density only 7, is least populated. Sex ratio (Females per thousand Male) is 875. The State (at National Level) has the literacy rate 69.68% (16th), Fertility rate 2.75 (12th), Infant Mortality rate 52 (13th), Index of Social & economic infrastructure 108.99 (9th), Plan expenditure in social sector 45.38% (4th), access to safe drinking water in percentage of households 73.19 (6th), Per capita consumption of electricity 182 KwH (25th) and per capita income is Rs.11,356 (14th).

Landuse Classification

The State has four districts namely East, West, North & South, Nine sub-divisions, eight towns and 170 Gram Panchayat Units and the Dzumsa. More than 82% of the total land area is classified as the Forests land. Out of which about 38% area is under the National Parks and Sanctuaries for flora and fauna both to protect and conserve the rich bio-diversity. As per the Remote Sensing data of Forest Survey of India, there has been progressive increase in total tree cover in the state in 1991, 1993, 1995, 1997 and 2001 and it has gone up from 37 % to 44.1 %.

Table 1: Landuse Classification of Sikkim

S. No.	Class	Reserve forest	Revenue block	Total	% of Total
1	Snow	1018.23	5.41	**1023.64**	**14.43**
2	Alpine barren	815.80	2.35	**818.15**	**11.53**
3	Mixed open forest	433.37	333.38	**766.75**	**10.81**
4	Alpine scrub	611.44	27.72	**639.16**	**9.01**
5	Crop land (Terraced/Semi Terraced)	0.00	604.85	**604.85**	**8.52**
6	Mixed dense forest	464.46	138.88	**603.34**	**8.50**
7	Alpine pastures	431.32	0.00	**431.32**	**6.08**
8	Mixed degraded forest	194.56	235.06	**429.62**	**6.05**
9	Dense conifer forest	351.94	16.14	**368.08**	**5.19**
10	Open conifer forest	340.63	21.55	**362.18**	**5.10**
11	Glaciers	208.23	0.00	**208.23**	**2.93**
12	Degraded conifer forest	156.89	16.30	**173.19**	**2.44**
13	Fallow/Scrub in Revenue Blocks	0.00	155.69	**155.69**	**2.19**
14	Oak-Rhododendron forest	100.34	26.24	**126.58**	**1.78**
15	Scrubs in reserve forest	101.87	0.00	**101.87**	**1.44**
16	Forest blanks	90.56	0.00	**90.56**	**1.28**
17	Rivers/major streams	31.81	32.50	**64.31**	**0.91**
18	Dry river beds	31.49	9.10	**40.59**	**0.57**
19	Lakes	32.30	0.70	**33.00**	**0.47**
20	Sal open forest	15.93	1.54	**17.47**	**0.25**
21	Miscellaneous	6.93	6.30	**13.23**	**0.19**
22	Land slide areas	5.37	5.16	**10.53**	**0.15**
23	Sal dense forest	5.30	0.77	**6.07**	**0.09**
24	Sal degraded forest	3.32	0.71	**4.03**	**0.06**
25	Built-up area	0.30	3.24	**3.54**	**0.05**
	TOTAL	**5452.39**	**1643.59**	**7095.98**	**100.00**



State of Forests:

The recorded forest area in the State is as under:

(Area in sq. kms)

Geographic area	Reserved Forests	Protected Forests (Khasmal)	Protected Forests (Gorucharan)	Recorded Forests of State's Geographic area		Of Country's Forest area
7,096	5,376	285	104	5,765	81.24%	0.8%

Forest Cover in Different Assessments (1987-2001):

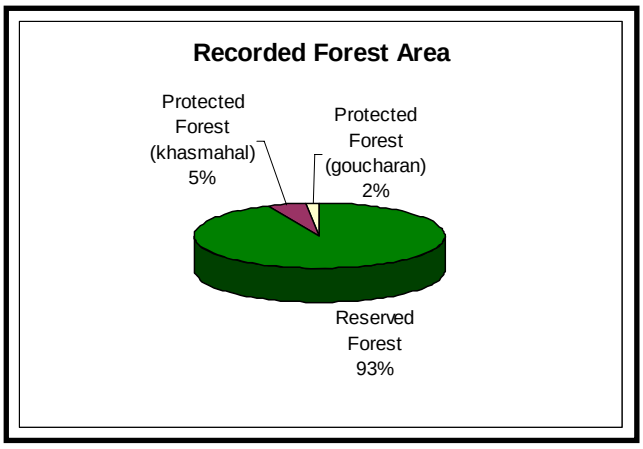
As per the **State of Forest Report** of the Forest Survey of India, Ministry of Environment & Forest, Government of India, the Forest cover assessment status in different reported year is as under:

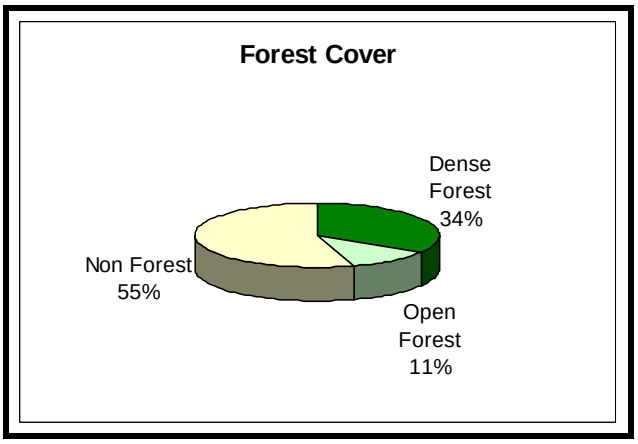
(Area in sq. kms)

Year	1987	1989	1991	1993	1995	1997	1999	2001
Forest Cover Assessment	2,756	3,041	3,041	3,119	3,127	3,129	3,118	3,193
Percentage of Geographical area	38.84%	42.86%	42.86%	43.95%	44.06%	44.1%	44%	45%

The 1999 & 2001, Forest Cover Assessment has been done by employing digital interpretation of satellite data at 1: 50,000 scale. By and large, in the earlier

assessments since 1989, conventional visual interpretation method at 1: 250,000 scales had been used. Thus, the difference between the forest cover as assessed in 1999 from that assessed in 1997 is not entirely due to change on the ground during the intervening period but may include difference due to these technical factors.





Comparison of 1999 and 2001 Assessments of Forest Cover:

(Area in sq. kms.)

1999 Assessment			2001 Assessment			Net Difference
Dense	**Open**	**Total (a)**	**Dense**	**Open**	**Total (b)**	**(b-a)**
2,363	755	3,118	2,391	802	3,193	+75

District –wise Forest Cover (Assessment year 2001):

(Area in sq. kms.)

Districts	Geographical area	Forest Cover				Scrub
		Dense Forest	Open Forest	Total	Percent	
East Sikkim	954	571	99	670	70.23	85
West Sikkim	1,166	570	142	712	61.06	52
North Sikkim	4,226	836	465	1,301	30.79	204
South Sikkim	750	414	96	510	68.00	0
Total	**7,096**	**2,391**	**802**	**3,193**	**45.00**	**341**

Ecoregions

Sikkim is a land of vast variation in altitude within very short distances ranging from around 300m to 8585m. Elevation plays a prime role in fashioning the ecoregions of the state. This is evident from the presence of *sal* forests in the Rangit Valley in the south to the temperate fir forests in the north, beyond which lie the trans-Himalayas and cold desert of the Tibetan plateau. Broadly speaking there are five altitudinal zones of vegetation. They are not clear-cut at their boundaries but merge into one another, often showing considerable local encroachments and recessions above and below the line depending upon physical configuration and exposure of the terrain and the resulting ecological factors.

The Tropical ecoregion extends roughly from the foothills of the outer Himalayas to an altitude of about 1200m. It contains steep sided valleys and gorges with well-drained flanking

slopes. Various species of orchids, *Rhaphidophora*, wild banana, *Pandanus*, Nettles and giant bamboo are characteristic. The Rangit Valley Sal *Shorea robusta* in this region shows a unique association with the Chir Pine *Pinus roxburghii*. In patches of protected forest it is possible to see the weak Sal being slowly dominated by the Pine. These patches are however relatively poor in bird life. Lowland forests of Sikkim are home to several endangered species of birds like the Rufous-necked Hornbill *Aceros nipalensis*, Great Indian Hornbill *Buceros bicornis homrai* locally called '*Hongraio'*, Chestnut-breasted Partridge, Black-breasted Parrotbill, Grey-crowned Prinia and Ward's Trogon. Other lowland fauna includes the introduced Peafowl, Python, Geckos, Porcupine, Assamese Macaque and Barking Deer, a host of butterflies and other invertebrates, riverine fish, frogs and toads. Several species of migratory waterbirds use the river systems during transit. Lantana is a major weed in this region. This ecoregion has not yet been included in the protected area network of the state. Forest fires are generally reported from this zone and there is an occasional problem of illegal removal of the Sal, Teak trees. New hydel projects have also been taken up in this zone. This ecozone is not yet represented in the protected area network. However a representative area of the Kitam Reserve Forests is proposed to be notified as a bird sanctuary. The important medicinal plants of this ecoregion are *Terminalia bellerica, Terminalia chebula, Embellica officinalis, Azadirachta indica, Aegle marmelos, Ocimum sanctum, Oroxylum indicum, Holarrhena antidysenterica* etc.

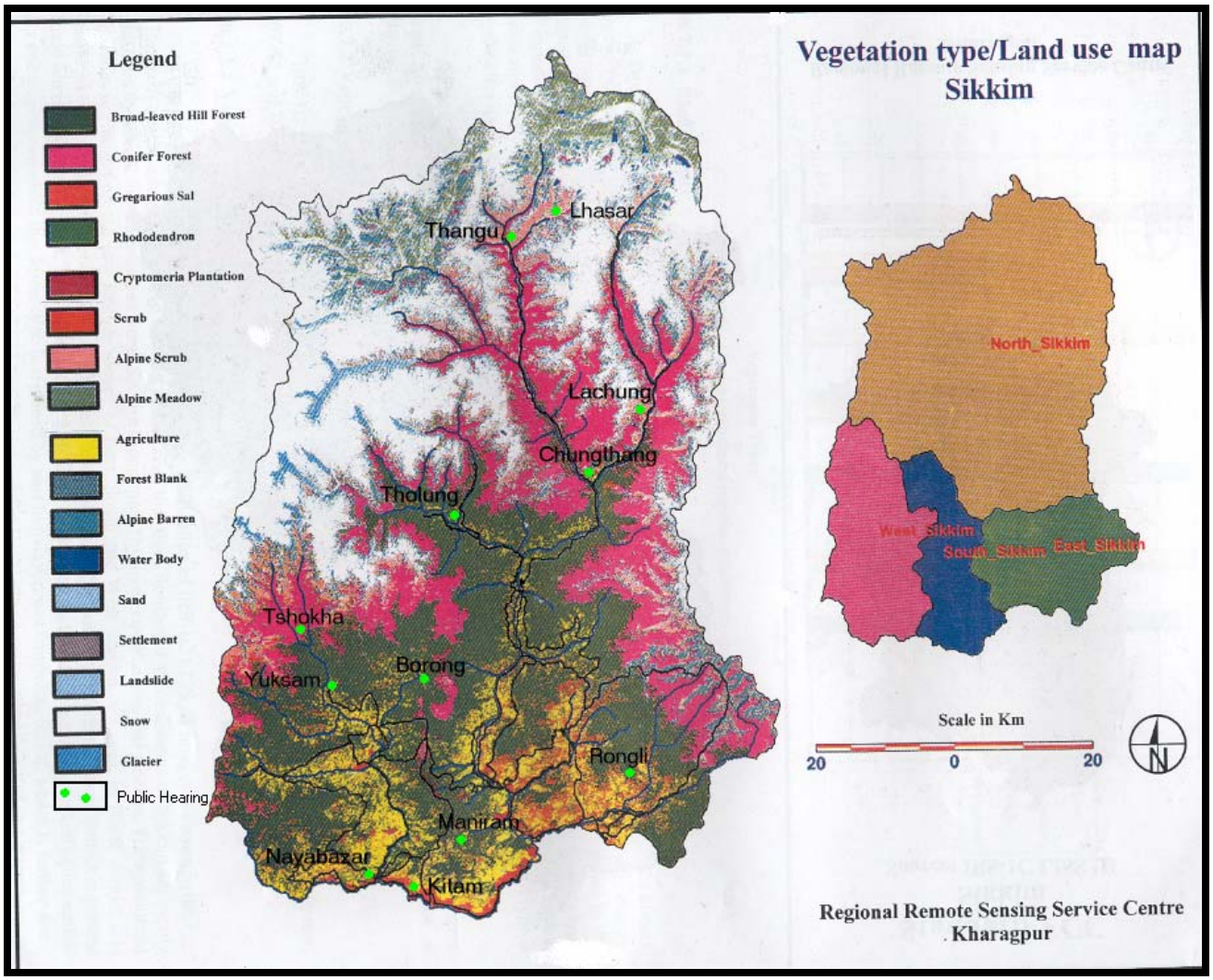
The Sub Tropical ecoregion extends up from about 1200 m to 3000m. The rainfall in this zone is the heaviest and conditions remain humid throughout the year. The crop in the upper storey consists of mainly *Castanopsis hystrix* (Katus), *Machilus* spp. (Kawla), *Rhododendron* spp. (Chimal), *Symplocos spicata* (Kholme), *Symplocos theifolia* (Kharane), *Michelia excelsa* (Rani Champ), *Quercus lamellosa* (Buk), *Quercus lineata* (Phalant), *Leucoseptrum canum* (Ghurpis), *Quercus pachyphylla* (Sungure Katus), etc. The other associates in the upper storey are: *Betula alnoides* (Saur), *Nyssa javanica* (Lekh Chilaune), *Bucklandia populnea* (Pipli), etc. In the underwood, *Engelhardtia spicata* (Mahuwa), *Eurya japonica* (Jhingni), *Rhododendron arboreum* (Guransh), *Vibernum* spp. (Asare) etc. are the main species.


Rhododendron arboreum (Guransh)

In the upper reaches the upper storey consists of *Quercus lamellosa* (Buk), *Q. lineata* (Phalant), *Machilus* spp. (Kaula). The other associates in the upper storey are: *Cinnamomum* spp. (Sissi), *Michelia excelsa* (Rani Champ), *Quercus lancaefolia* (Patle Katus), *Acer campbelli* (Kapasi), *Magnolia campbelli* (Ghoge Champ), *Q. pachyphylla* (Sungure Katus), *Castanopsis hystrix* (Katus), *Elaeocarpus lancaefolius* (Bhadrase) etc. In the middle storey, *Symplocos theifolia* (Kharane) is the main species and *Litsea* spp. (Pahenle), *Rhododendron arboreum* (Guransh), *Bucklandia populnea* (Pipli) etc are other associate species. Dense tall evergreen forests with oaks and Rhododendrons predominate. The undergrowth consists of *Arundinaria maling*, dwarf Rhododendron, ferns, epiphytic mosses and orchids. This area is also rich in birds including the Rusty-bellied and Lesser Shortwings, Kalij and Satyr Tragopan; reptiles like Japalura lizards, Cobra, Krait and Himalayan Pit Viper; Himalayan Bullfrog; butterflies and leeches. *Eupatorium* is a major weed competing out *Artemesia* and

other secondary growth. Large Cardamom under-planted in forest patches and a tea estate at Temi are dominant features of the landscape as much as the naturalized exotic *Cryptomeria japonica* patches. Fambong Lho Wildlife Sanctuary in East Sikkim and Maenam Wildlife Sanctuary in South Sikkim are the two protected areas in this ecoregion.

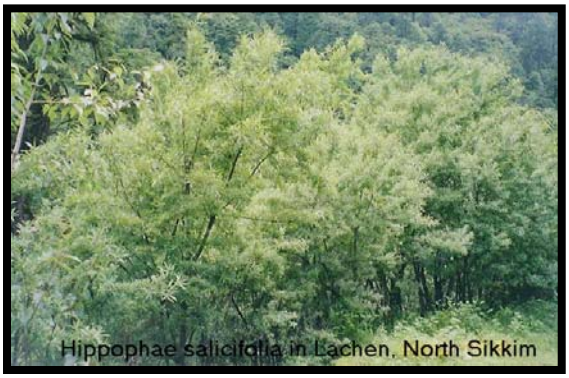
Figure 2: Project Area: Sikkim State



Most of the human population of Sikkim resides in these two zones in an agricultural setting where terrace farmed rice, ginger, orange, cardamom are commercially grown while guava, banana, squash and marigold are common along with vegetables and herbs in homestead gardens. Forest produce like bamboo shoots, ferns and nettles are also collected during season. Soya bean, Millet and cruciferous vegetables are grown and processed into fermented foods like 'Kinema', a specialty of the Subba community; 'Gundruk' and drinks like 'Chang'. Exotic oyster mushroom cultivation is being popularized along with trial commercial cultivation of flowers like hybrid orchids and gladioli. Hybrid stall fed livestock is seen around villages while the local breed of 'Siri' Cow is grazed in the forests. Sericulture is practiced through schemes of the forest department while Apiculture is more of a hobby with

the species *Apis cerana.* The government encourages pisciculture of Common and Grass Carp. The important medicinal plants of this ecoregion are *Swertia chirata,Rubia cordifolia, Astilbe rivularis, Berginia spp, Acorus calamus, Kaempheria rotunda, Costus speciosus, Viscum articulatum, Rhus semialata, Phytolacca acinosa, Litsaea citrata, Drymaria cordata Artemisia vulgaris* etc.

The Temperate ecoregion extends from 3000m to 4500m with mixed coniferous forests of Hemlock, Spruce, Pine, Fir and Junipers with shrubby undergrowth of Rhododendron and *Arundinaria*. Red Panda, Common Langur and Himalayan Black Bear, Lesser cats, Goral, Serow, Monal Pheasant, Firetailed Sunbird, Blue Magpie and few species of reptiles and amphibians are characteristic. Brown Trout *Salmotrutta fario* has been introduced in high altitude lake and river systems. Wild Seabuckthorn *Hippophae* sp. occurs some of which is collected for medicinal properties and as a dye. Potato and cabbage are grown as cash crops. Subsistence farming of wheat, barley and maize is carried out while beans, peas, some apple, peach and pear are grown on homesteads. Some amount of cattle rearing is practiced with stall fed hybrid milch cows and the rest grazed in forest areas. Handloom cottage industry for making blankets, rugs and carpets uses some wool from sheep grazed at higher altitudes.


Hippophae salicifolia in Lachen, North Sikkim

The Alpine forests and scrub extend upto 4500 m with small crooked trees and large shrubs interspersed with fir and pine. The stunted forest is mainly of rhododendron of many species. Dominant wild fauna includes Musk Deer, Himalayan Tahr, Blue Sheep, Blood Pheasant, Ibisbill and a toad. River systems harbour some of the (introduced) trout *Salmo trutta fario*. Most of the flora of this region attracts interest for medicinal purposes. Dwarf rhododendron leaves are used for burning as incense. This region has very little resident human population, mainly Bhutias and mostly pastoral, herding livestock like yak, dzo (cow-yak hybrid) and domestic cattle. Many wild edibles are collected from the forest floor like *Arisaema* sp. Tubers, 'Khendu' and mushrooms.


Ephedra gerardiana, North Sikkim

The Temperate ecoregion is protected in three wildlife sanctuaries at Shingba (North Sikkim), Kyongnosla (East Sikkim) and Barsey (West Sikkim) and one national park namely Khangchendzonga National Park (North and West Sikkim). They harbour representative biodiversity of these ecoregions. The important medicinal plants of this ecoregion are *Aconitum ferox, Aconitum heterophyllum, Heracleum wallichii, Nardostachys grandiflora, Orchis latifolia, Panax pseudo-ginseng, Picrorrhiza kurooa, Podophyllum hexandrum, Ephedra gerardiana, Taxus baccata, Hippophae spp.* etc.


Yumesamdong, Transhimalayas, North Sikkim

The Trans-Himalayan ecoregion extend from 4500 m to 5500m with characteristic cold desert vegetation exclusive restricted to the north of Sikkim. This ecoregion has not yet been included in the protected area network of the state and is perhaps the most threatened as it contains mostly endangered species. Dominant among these are Kiang, Nayan, Tibetan Gazelle, Snow Leopard, Tibetan Wolf, Tibetan Snowcock, Lammergeier, Raven, Golden Eagle and Ruddy Shelduck. The region has a short four-month growing season during which grasses, sedges and medicinal herbs grow abundantly supporting a host of insect fauna as well as the wild and domestic herbivores, larks and finches. There are no permanent settlements. Human population consists of a small number of nomadic Tibetan graziers or 'Dokpas' (who herd yak, sheep and pasmina-type goats) and large number of Defence personnel as the area forms the international border with Tibet (China). Closure of the border to trans-humance over the last three decades has led to intense grazing pressure by both the domestic and wild herbivores on the land. The area also suffers from the presence of landmines causing casualties among Nayan, Kiang and Tibetan wolf. Existence of feral dogs is a major hazard in this region. This ecoregion needs to be represented in the protected area network of the state. The important medicinal plants of this ecoregion are *Aconitum spp., Nardostachys grandiflora, Picrorhiza kurooa,Gentiana spp, Rheum spp.* etc.

Protected Area Network

S. No.	Name of Protected Area	Area in Sq Km	District	Altitude
1	Barsey Rhododendron Sanctuary	104.00	West	2200-4100m
2	Fambonglho Wildlife Sanctuary	51.76	East	1524-2749m
3	Kyongnosla Alpine Sanctuary	31.00	East	3292-4116m
4	Maenam Wildlife Sanctuary	35.34	South	2400-3263m
5	Pangolakha Wildlife Sanctuary	128.00	East	
6	Shingba Rhododendron Sanctuary	43.00	North	3048-4575m
7	Khangchendzonga National Park	1784.00	North/West	
	Total Protected Area	**2177.10**		
	Total Geographical Area	**7096.00**		
8	Khangchendzonga Biosphere Reserve	2620.00	North/West	
	National Park	1784.00	North/West	
	Buffer area	836.00	North/West	

Note: 1. Protected Area Network does not include area under buffer zone of a biosphere reserve.

2. Total area under Protected Area Network of State is 2177.10 sq.km. (i.e.30.68% of the total geographical area)

3. Total area under Protected Area Network and biosphere reserve in State is 3013.10 sq.km. (i.e. 42.46% of the total geographical area).

Traditional Systems of Medicine

There are a large number of traditional healers – *Baidya, Dhami* and *Jhankri* in the Nepali community, *Amji* and *Pow* in the Bhutia community and *Bongthing* in the Lepcha community. For these powerful faith healers, '*jhar phuk'* is the key word and the first step in an interestingly complicated but expensive course of treatment. Earlier the traditional healers were the only medical practitioners in the village. However with the creation of hospitals and improvement in the literacy rate allopathic treatment started getting increasingly accepted by the villagers. This has led to a greater recourse to allopathic government hospitals namely the PHCs and PHSCs.

1. Nepali System Of Traditional Medicine

The Nepali system of herbal medicine survives today as *Jaributi* or simply as *Pahadey dabai*. The practitioners are known as *Baidyas* and can be seen practicing in the local village *haats.* This system is most prevalent in the Tropical and Subtropical villages. Since there is no organized set up, this is fast disappearing under the combined onslaught of modern education and allopathic infrastructure. Amongst the various types of herbal healers in this system of medicine, bone setters are still quite in demand by the villagers. At present the system survives at the peddler level, as there is no existing organized structure or institution supporting this system of traditional medicine within the state. However there is a Pakhrin Herbal hospital at Alagarah, Kalimpong, Darjeeling District of West Bengal, which specializes in bone setting.

2. Lepcha System Of Traditional Medicine

The Lepcha herbal system has almost disappeared. This is in sharp contrast to the fact that they were the world famous plant collectors and possesses a vast knowledge of ethno-botany. Dzongu in North Sikkim is amongst the last strongholds of the Lepcha culture and this system of medicine is still practiced here. BSI, Sikkim Circle and WWF-Sikkim have conducted research on ethno-botany in this region.

3. Tibetan System Of Traditional Medicine

The Tibetan system of medicine, whose practitioner is called an *Amji* is still prevalent in the Temperate ecoregion, thanks to the support from the Tibetan Medicine Training Institutes at Chagpori, Darjeeling and Dharamsala, Himachal Pradesh. In the STNM government hospital at Gangtok two *Amjis* have been posted on a regular basis. Private clinics also exist in Gangtok and are run by trained *Amjis.* According to the State Biodiversity Strategy and Action Plan (2003) in the temperate ecoregion the awareness regarding loss of traditional health systems like *Amji*, *Bonthing*, *Pau*, etc has been acutely felt. The villagers of North Sikkim want to open *Amji* Training Centers in association with the *Shedas* (monastery schools) at Thangu and Lachung headed by a local *Amji.*

Box Item 1: Life and Vision of a Faith Healer

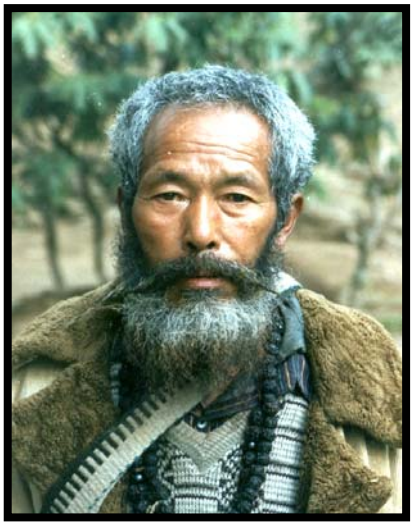
I, Lal Bahaudur Gurung started practicing traditional healing since I was thirteen years old and learnt the trade from my father and from a herbal practitioner based in Nepal. Under the guidance of this herbal practitioner for nine years, I learnt this trade. I combine chanting sacred hymns (*mantras*) with application of herbal medicine. I specialize in removing curse of God (k*apat*) and curing fever, jaundice, urinary tract infection, diabetes, body pain, fracture, diarrhea, blood dysentery, asthma, snake bite, dog bite (rabies) etc.

Mode of Functioning

Mostly the patient's family calls me and I go to their house for application of the herbal medicine. Based on the symptoms of the patient I treat the disease with herbal medicine. Based on the kindness of the patients family, I do accept money (on an average Rs 30/-) and local liquor in return for this service. I treats fever, cold and stomach ache most frequently. Earlier I used to even use animal parts, like bile of bear, meat of monkey, intestine of porcupine, bile of snake, horn of ghoral, fur of hare, meat of jackal etc. I visit patients in the village on an average 3-4 times per month. About 8-10 patients come calling at my home per month. I earns about Rs 1200/- to Rs 1500/- per month. I collect medicines mostly from the alpine meadows of West Sikkim. All the important medicines occur here. This trip during the monsoons lasts about 15 days and I come back with 12- 15 kgs of medicinal plants. I collect mostly *Bikhma, Khokim, Mahaguru, Kutki, Jatamanshi, Lasune, Sharmaguru, Homguru, Pakhanbhed, Bikh, Padamchal, Nageshwari, Eklebheer, Bhutkesh* etc.

Plan for Conservation

All the important medicines occur in the alpine meadows. These can be grown in Herbal Gardens and in private holdings. If cultivated in forest, since there is no protection they can be easily stolen by anybody. The main reason for the alpine herbs becoming endangered is the unscientific extraction for commercial purposes. Mostly it is the yak herders and sheep herders who carry out this trade in a big way. They uproot the alpine herbs and dried the same in makeshift ovens (*bhatti)* and then transport the dried herbs on yaks outside Sikkim to Rimbick in Darjeeling district, West Bengal.



Policing of alpine meadows by forest guards is necessary in order to prevent illegal extraction for commercial purposes. Yak sheds and sheep sheds also need to be phased out immediately.

For interested literate persons it will take 4-5 trips to the alpine meadows to learn to identify medicinal plants. It will take another 1-2 years to learn to make medicine from these herbs and apply the same. Sacred hymns (*Mantra*) are much more difficult to learn and require sustained effort

Lal Bahadur Gurung, herbal healer (*Baidya*) from Singling, West Sikkim

Chapter 3 Process or Methodology

The state government of Sikkim approved this project in December 2002 and since January 2003, the Department of Forest, Environment & Wildlife tried to reach out to all sections of people across the length and breadth of the State in a massive effort to formulate the plan involving the full participation of maximum number of people from all walks of life in a participatory and gender sensitive way.

The Sikkim Medicinal Plants Conservation Network (sikkimMPCN@yahoogroups.com) email group was formed in January, 2003. Coordination linkages with CIMAP, NBRI and CDRI were established by WG member Mr Brijendra Swaroop during his visit to Lucknow. Mr Sandeep Tambe and Ms Uden Bhutia also visited FRLHT under the orientation programme organized for WG members. Then Questionnaires (open-ended and Annexure II of operational guidelines) were circulated to various head of departments, R&D institutions, WG members, Planning Committee members and other NGO's. The Call for Participation (CFP) was repeatedly published through the media (Ref: Table 2), and was also circulated through the forty Community Information Centers (CICs). It was also translated into Nepali, Bhutia, Limboo and Lepcha languages for mass consumption.

Subsequently the Project Master Plan, Project Calendar and Training of Trainer's Manual were prepared. This was followed by organizing 12 public hearings deep in rural areas (Ref: Figure 2) covering all the ecoregions by the members of the Working Group including forest officers, NGO's and scientists. Besides these intensive public hearings, two workshops were also organized at SIRD, Jorethang in South Sikkim and Gangtok in the East Sikkim. The first state level multi-stakeholder consultation workshop of various luminaries in the field was held at Gangtok on 7th June 2003. This struck a very positive and hopeful chord among the people of Sikkim. It was heartening to note that everyone was very concerned about the increasing pressure on medicinal plants biodiversity and disappearance of local health culture.

The basic methodology used for Sikkim was preparing Community Strategy and Action Plans (CSAPs), which included organizing public hearings in twelve locations. These CSAPs were tabulated village-wise in their ecoregions, giving the problems and issues, major actors and expectations from them. These were then condensed ecoregion-wise followed by informal brain storming sessions involving all the stakeholders to synergize the CSAP and Government Strategy and Action Plan (GSAP) into one holistic state level Strategy and Action Plan (SAP). CSAP + GSAP led to the draft State SAP which was circulated widely. Based on the review comments obtained, this draft SAP was then finalized.

Box Item 2: 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 the project with its goals and objectives. This was followed by a detailed explanation on the importance of medicinal plants in the day-to-day lives of the villagers. The participants were asked to discover the different medicinal plants 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 medicinal plant and traditional healthcare resources with respect to their relative positions. The participants were then asked to draw a vision of this sector for the future. They were also asked to give their views and ideas on the initiatives that could be taken for the future development and conservation of this sector. 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. 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.

Table 2: Use of Media

S. No	Media	Date	Space	Details of Matter Printed
A) News Papers				
1	Gangtok Times	3-9th March, 2003	1.5 Pages	Call for Participation
2	Sikkim Herald	21st February, 2003	1.5 Pages	Call for Participation
3	Sikkim Herald	24st February, 2003	1.5 Pages	Three paragraphs on Conservation and sustainable utilization of medicinal plants in Hon'ble Chief Minister's Budget Speech
4	Sikkim Herald	24th January, 2003	2/3rd Page	Call for Participation
5	Gangtok Times	17-23rd February, 2003	1/3rd Page	Call for Participation
6	Weekend Review	21st–27th February, 2003	2/3rd Page	Call for Participation
7	Weekend Review	31st–06th February, 2003	1 Page	Call for Participation
8	Gangtok Times	9th–15th June, 2003	1/2 Page	State Level Workshop
9	Now	11th–17th June, 2003	1/2 Page	State Level Workshop
10	Sikkim Herald	12th June, 2003	1/2 Page	State Level Workshop
11	Sikkim Express	12th June, 2003	1/2 Page	State Level Workshop
12	The Statesman	13th June, 2003	1/2 Page	State Level Workshop
13	Weekend Review	13th–19th June, 2003	1/2 Page	State Level Workshop
14	Gangtok Times	16th–23rd June, 2003	1/2 Page	State Level Workshop
B) Radio				
15	All India Radio, Gangtok	22nd March, 2003	10 minutes	Talk of 10 minutes duration in English by the Convenor, Shri M. L. Arrawatia
16	All India Radio, Gangtok	15th February, 2003	10 minutes	Call for Participation in Nepali News for 10 minutes duration
C) Community Information Centers				
17	CIC's in 40 revenue blocks	20th January, 2003		Call for Participation was pasted in these CIC's in all parts of Sikkim
D) Awareness Booklet				
18	Call for Participation booklet	15th March, 2003		Translated in Nepali, Limboo, Lepcha and Bhutia

Table 3: Phases in Implementation

Phase	Details	Methodology
Phase I	Preparation of CSAP	1. Public Hearings in the villages, 2. Consultations with key resource persons, 3. Soliciting inputs through advertisements, letters, distributing CFP in local languages Taking feedback on the CSAP from key community members Male SAP + Female SAP = Community SAP
	Preparation of GSAP	Feedback from various central and state government agencies
Phase II	Preparation of draft SAP	Brainstorming between the key community members, independent experts, NGO's and government officers. Community SAP + Government SAP = Draft SAP
Phase III	Preparation of SAP	Review comments from various sources on the draft SAP Draft SAP + review comments = SAP

Table 4: Location of Public Hearings and Consultations

S. No	Ecoregion	Nos	District	Village	Conducted by
1	**Tropical**	**2**	South Sikkim	Kitam	Brijendra Swaroop, DFO Sandeep Tambe, DFO
			West Sikkim	Nayabazar	Brijendra Swaroop, DFO
2	**Sub Tropical**	**6**	North Sikkim	Dzongu, Chungthang	Renzino Lepcha, ECOSS Usha Lachungpa, GC
			East Sikkim	Rongli	Renzino Lepcha, ECOSS
			South Sikkim	Maniram, Borong	Gokul Rai, SPSS Sandeep Tambe, DFO
			West Sikkim	Yuksam	Tshering Uden, KCC
3	**Temperate**	**3**	North Sikkim	Lachung, Lachen	Usha Lachungpa, GC
			West Sikkim	Tshoka	Tshering Uden, KCC
4	**Trans Himalayas**	**2**	North Sikkim	Thangu, Lashar Valley, Tso Lhamo	Usha Lachungpa, GC
	Total	**13**			

Chart 2: Ecoregion Wise Distribution of Public Hearings

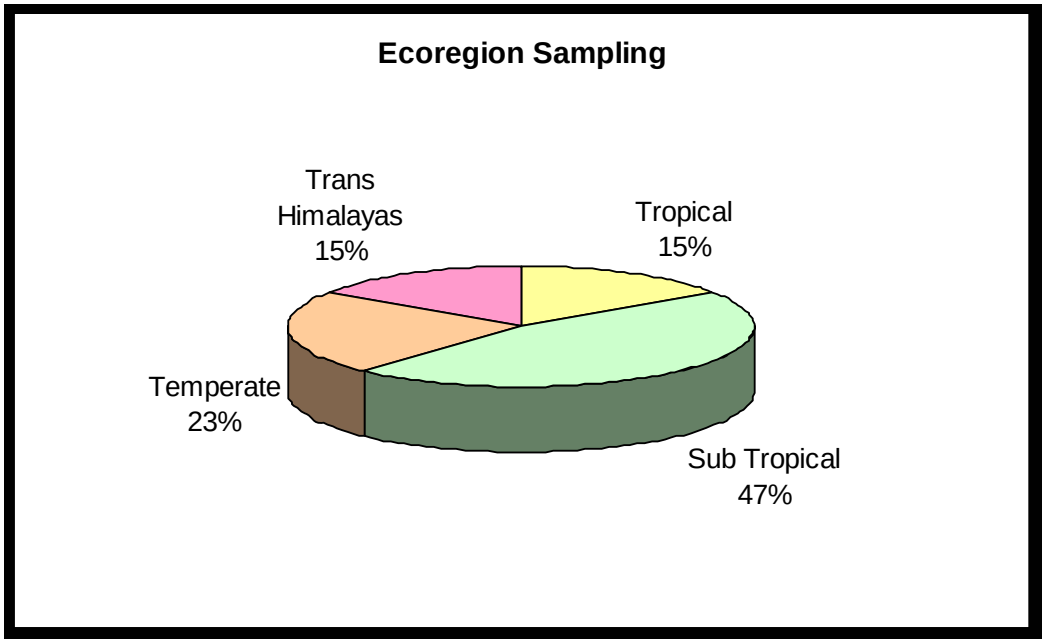
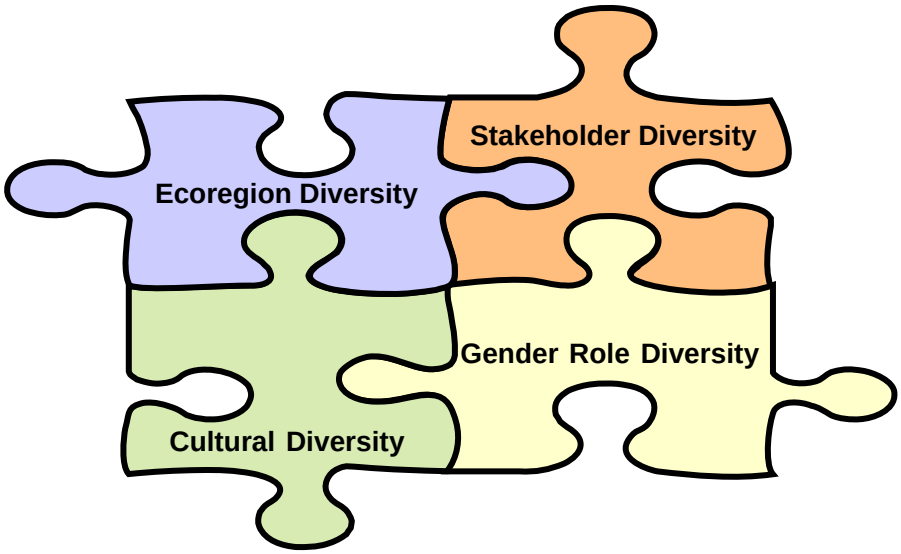


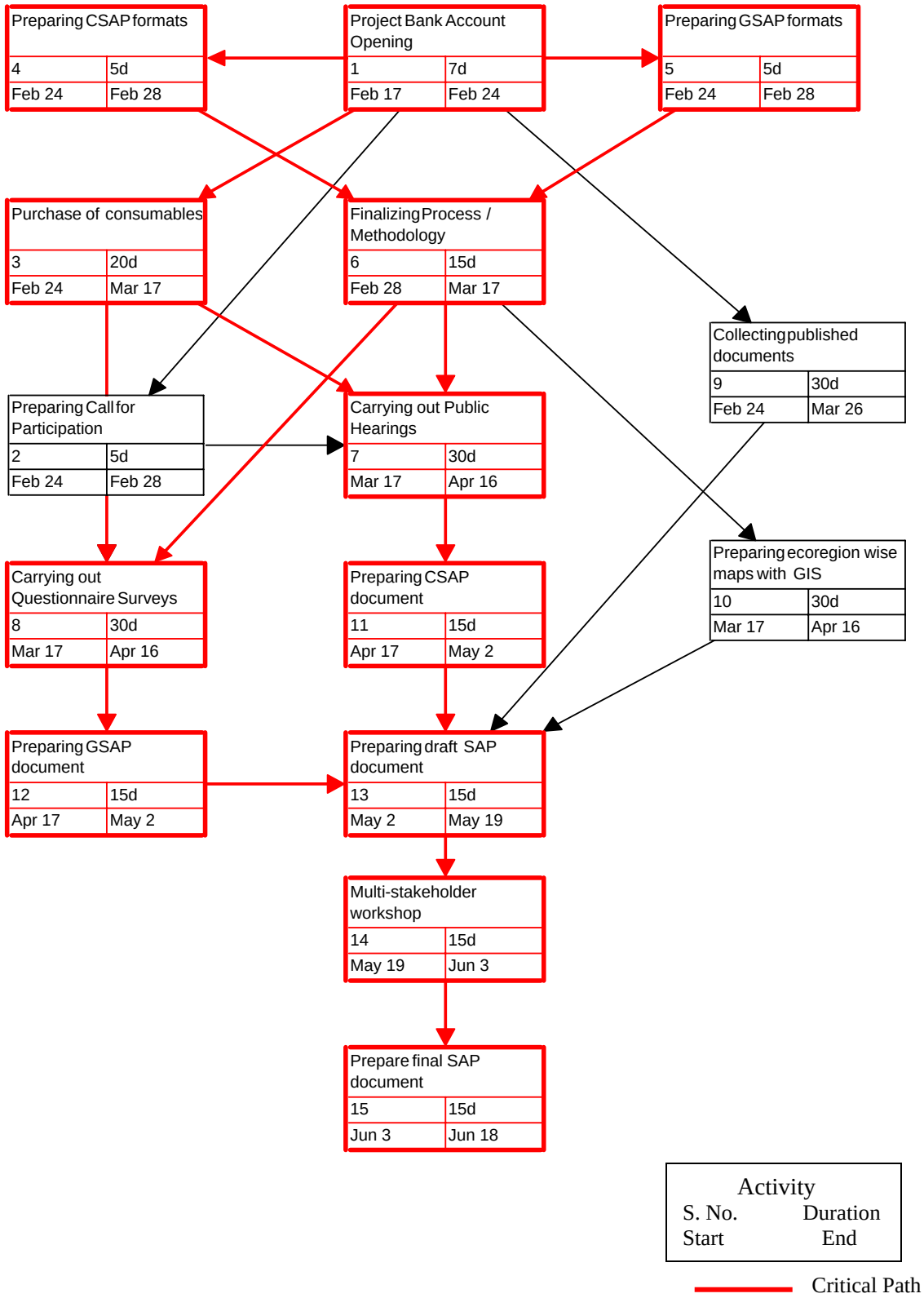
Figure 3: Diversity to be integrated



Mrs Usha Lachungpa, stuck in a snow storm while returning from a public hearing in North Sikkim

Dokpas or the nomadic Tibetan herders of Muguthang and Tso Lhamo (16,000 feet) consulted in the Trans Himalayan Ecoregion, North Sikkim

Figure 4: Proposed Project Calendar used for this Planning Exercise
(PERT / CPM Method)

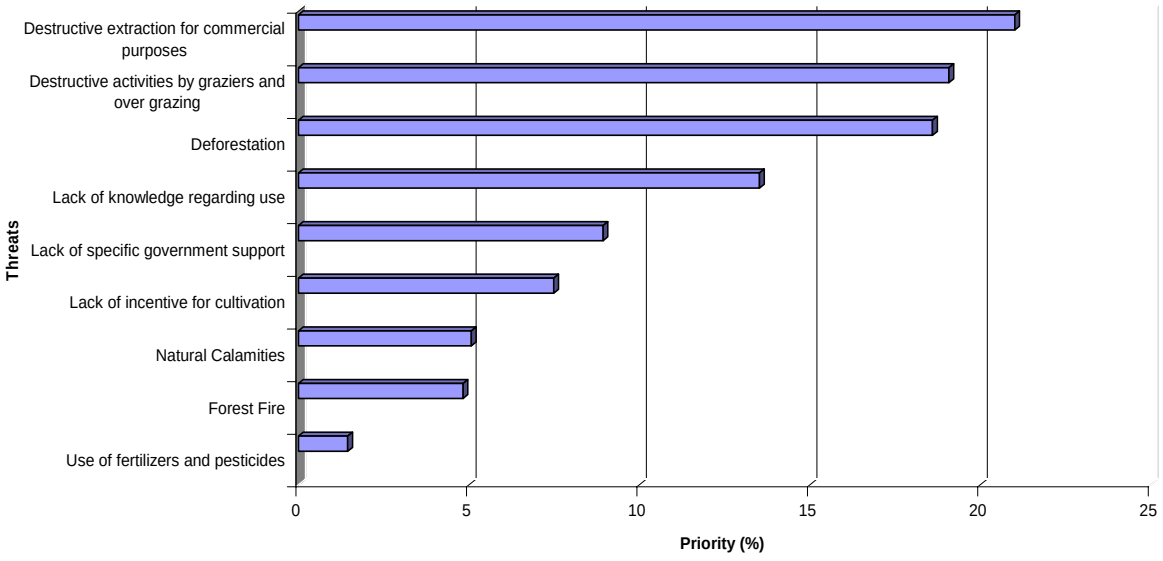


Chapter 4 Statement of Threats Pertaining to Medicinal Plants and Local Health Cultures

What are the Threats to Medicinal Plants?

Priority	Threat	Priority Percentage
1	Destructive extraction for commercial purposes	21
2	Deforestation	19
3	Destructive activities by graziers and over grazing	19
4	Lack of knowledge regarding use	14
5	Lack of specific government support	9
6	Lack of incentive for cultivation	7
7	Forest Fire	5
8	Natural Calamities	5
9	Use of fertilizers and pesticides	1
	Total	**100**

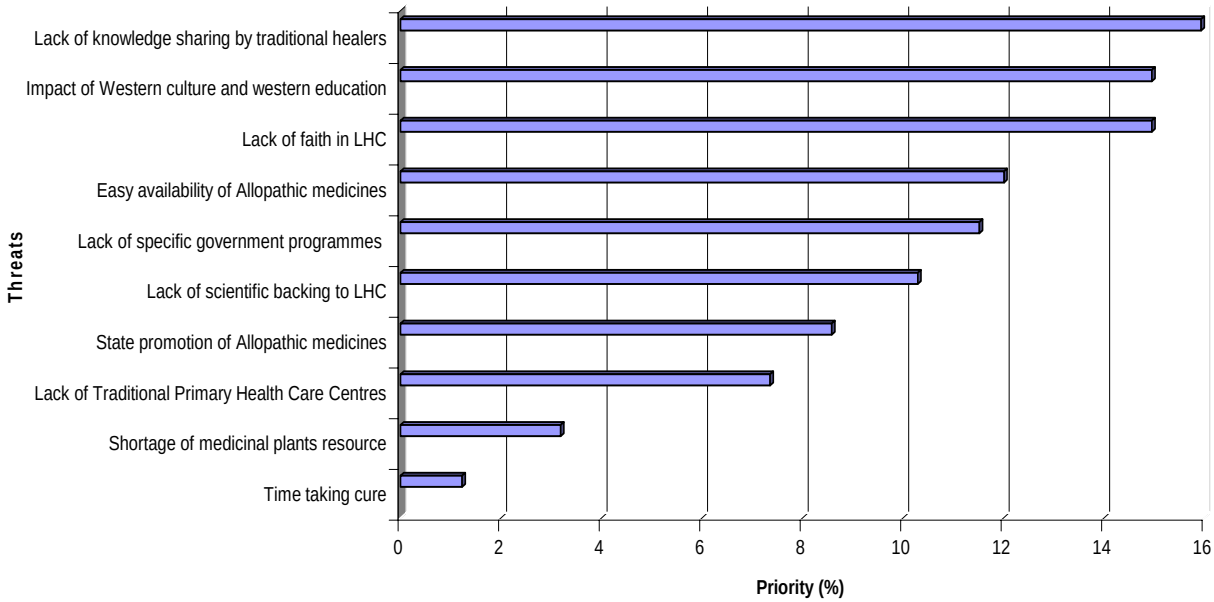
Chart 3: Ranking of Threats to Medicinal Plants



What are the threats to Local Health Cultures (LHC)?

Priority	Threat	Priority
		Percentage
1	Lack of knowledge sharing by traditional healers	16
2	Impact of Western culture and western education	15
3	Lack of faith in LHC	15
4	Lack of specific government programmes	12
5	Easy availability of Allopathic medicines	12
6	Lack of scientific backing to LHC	10
7	State promotion of Allopathic medicines	9
8	Lack of Traditional Primary Health Care Centers	7
9	Shortage of medicinal plants resource	3
10	Time taking cure	1
	Total	**100**

Chart 4: Ranking of Threats to Local Health Cultures (LHC)



Box Item 3: Smuggling of Medicinal Plants by Yak Graziers

In a sensational seizure the DFO (Territorial) West Mr. Pradeep Kumar IFS seized medicinal and aromatic plants from Mr. Phupu Tshering Bhutia, resident of Uttarey. The cache included large quantities of *Rhododendron anthopogon* (*sunpate*), *Juniper spp* (*bhairungpate*), *Picrorrhiza kurrooa* (k*utiki*), *Gentiana spp*. and extracts of various other herbs. On interrogation the accused confessed that he had collected these plants from the alpine meadows of Shingalila Range, West Sikkim which falls under the Khangchendzonga Biosphere Reserve. He owned a Yak Shed (*Goth)* and was planning to sell these plants commercially.

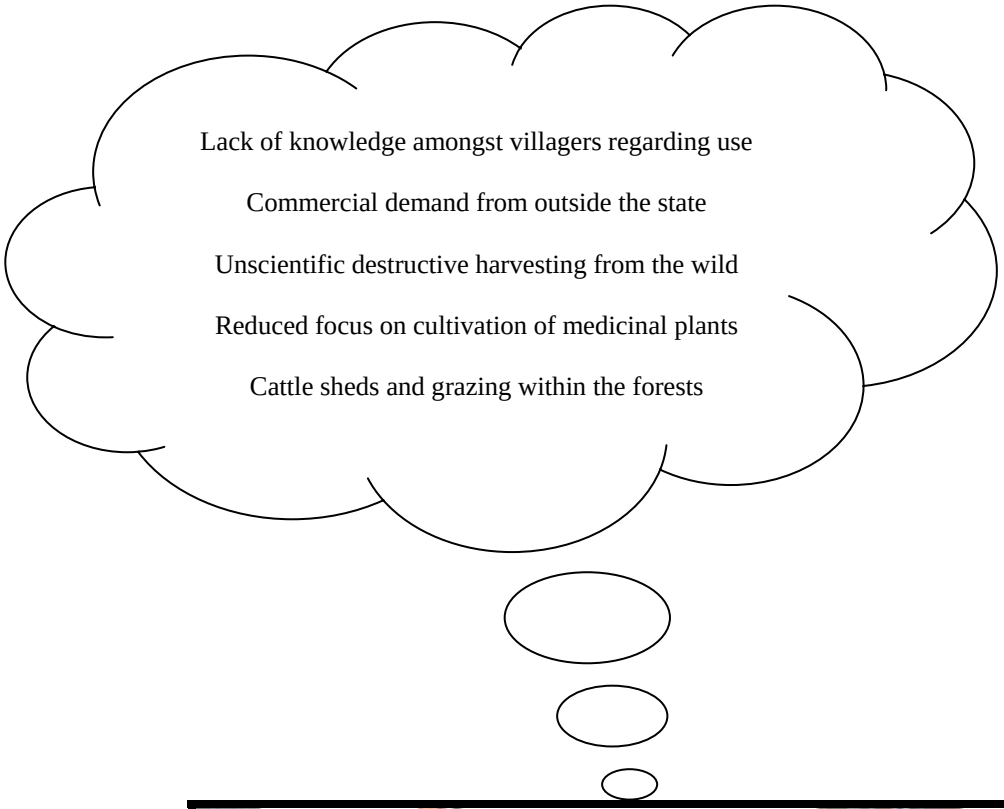
The seizure was made at the Gyalsing Forest Check Post by the forest officer in charge Mr. Pem Dorjee. The seizure also included a mind boggling 200 kgs of Yak *ghee* and 150 kgs of hard cheese (*Churpi*). The government has banned grazing in the Reserve Forests of South and West districts and no grazing permits (*pattas*) had been issued by the Forest Department. The hon'ble High Court of Sikkim has also upheld this government order in its landmark judgement. Consequently a forest case was registered and the accused was booked under Section 20 of the Sikkim Forests, Water Courses and Road Reserve (Preservation and Protection) Act 1988 and Section 27, 28, 29, 30, 31, 32, 51, and 52 of the Wildlife (Protection) Act 1972. The accused was remanded to Judicial Custody in the State Jail, Gangtok up to 12th October, 2001. The DFO (T) West later compounded the case after realizing a fine for Rs 40,000/-.

The DFO Wildlife, South and West, Mr. Sandeep Tambe IFS informed that, since it gets very cold in these altitudes, the graziers use huge amounts of firewood, and the construction of their yak sheds result in a wide ranging degradation to the alpine meadows. This fragile ecosystem gets damaged mainly due to the indiscriminate collection of Rhododendron and Juniper for firewood since they have the capacity of burning green. It is also alleged that the graziers are involved in large scale smuggling of medicinal plants to Nepal and Rimbick, West Bengal.

Thanks to the sustained efforts of the State Government and the FEWD, more than 150 cattle sheds (g*oths)* have been phased out in a participatory manner from within the forests of South and West districts of Sikkim over the last few years.

Aromatic and Medicinal plants (*Picrorrhiza kurrooa*) being smuggled out by Yak graziers

Figure 5: Threats to Medicinal Plants Conservation



Public Hearing at Borong, South Sikkim

Chapter 5 Ongoing Initiatives related to Medicinal Plants and Local Health Cultures

State Government: Overall Policy and Programmes

1. Encouragement and establishment of Eco- friendly industries only in the state.

2. Launched "*Smriti Van*" program in all the districts and panchayats to bring people close to the Forests & Environment by bringing it to each panchayat / block / village level in a phased manner.

3. Banned grazing in reserved forests areas, plantation areas and water sources. Fodder collection for bona fide use is allowed on sustainable basis.

4. Compulsory environmental education for school children including forest, wildlife, cultural heritage etc. Extension and training programs for the same.

5. The state shall not promote use of agrochemicals (fertilizers and pesticides), organic farming to be promoted.

6. A Network of National Parks, Sanctuaries and Bio-sphere Reserve for conservation of bio-diversity. The six sanctuaries and the Khangchendzonga National Park have been notified, bringing the total protected area cover to over 31% of the geographical area, which is the highest for the country.

7. The Government has viewed with concern the depletion of medicinal plants and non-timber forest produce excluding bamboos, grasses, plants used as food and cardamom from the forest areas of Sikkim. With a view to encourage regeneration of areas that are facing depletion of these resources it was notified for the information of all concerned that the Government banned the collection of all medicinal plants for commercial purposed, for a period of five years vide order No. 13/F/Evn & WL. Dated the 6th Sept, 2001.

8. For reducing the dependence of villagers on firewood collected from forests, the LPG connection programme was launched for below poverty line and economically weaker section of society on 15th August 2002.

9. Manifesto for Panchayat Elections October 2002

   Para 37 Panchayat will open registers to register every species in their area – as to the kind and the usage especially of the medicinal variety. This way they will also undertake to protect the biodiversity – our flora and fauna as well our traditional knowledge base. All this will be done on a war footing.

State Government: Specific Programmes related to Medicinal Plants

A. State Medicinal Plants Board (SMPB)

For overall conservation and development of medicinal plants a State Medicinal Plants Board was established in June 2002. This board is the nodal agency for the development of medicinal plants sector in the state. This newly created board is carrying out the following activities in the state:

a) Creation of 13 Herbal Gardens of 10 ha each on degraded forest land for *insitu* and *exsitu* conservation of the gene pool of indigenous medicinal plants of the state. The total funds allotted for each herbal garden is about Rs 20.00 lakhs for three years. Creation of a raw drug museum at Forest Secretariat, Deorali, Gangtok. This is a 100% Centrally Sponsored Scheme of the National Medicinal Plants Board, Department of Indian System of Medicines & Homeopathy, Government of India.


Aconitum ferox in Kyongnosla Herbal Garden

b) Registration of medicinal plant farmers, collectors, traders and manufacturers
c) Creation and establishment of "*Jadi Booti Chetna Kendras*" in all the four districts
d) Distributing Panchayat Biodiversity Registers to be managed by the Gram Panchayats

2. Forest Development Agency (FDA)

This is a 100% Centrally Sponsored Scheme under the National Afforestation Plan of the National Afforestation and Ecodevelopment Board of the Ministry of Environment and Forests, Government of India. Under this programme also the Joint Forest Management Committees and Ecodevlopment Committees shall take up plantation of medicinal plants. A total of six FDA's have been registered in Sikkim to implement this five year programme during the 10th five year plan.

3. Integrated Wasteland Development Project (IWDP)

This is a Centrally Sponsored Scheme of the Department of Land Resources, Ministry of Rural Development, Government of India. This scheme is being implemented by the Forest, Environment and Wildlife Department under the guidance of the Zilla Panchayat. This scheme is being implemented on a watershed basis under the common guidelines of watershed development. This programme is expected to promote the generation of employment in the rural areas besides enhancing people's participation at all stages in the development of wastelands leading to sustainable development and equitable sharing of the benefits. Under the Tista Rangit IWDP during 2002 – 2003

Integrated Community Nurseries have been created on private land in the nine Gram Panchayat Units of South Sikkim and are being managed by a self help group under the guidance of the concerned JFMC / WC. Most of these nurseries already have a medicinal plants section. These nurseries have good infrastructure including a germination chamber, hardening chamber, bio-composting, vermi-composting, nursery beds etc and can be brought under the network of decentralized nurseries.

4. Development of Sanctuaries and National Parks

This is a 100% Centrally Sponsored Scheme for the development and ecodevelopment in sanctuaries and national parks under the Ministry of Environment and Forests, Government of India. Under this scheme integrated community nurseries were created on private land around all the six sanctuaries of the state during 2002 –2003. These nurseries are being managed by a self help group under the guidance of the concerned EDC. A medicinal plants section is being initiated in these nurseries. These nurseries have good infrastructure including a germination chamber, bio-composting, nursery beds etc and can be brought under the network of decentralized nurseries.

5. Community Biodiversity Conservation, North East Council

This is a 100% Centrally Sponsored Scheme of the North East Council, Shillong for the conservation of biodiversity including medicinal plants through people's participation. This scheme has been recently initiated in the state and shall be implemented by the State Medicinal Plants Board.

6. Panchayat Nurseries

The Rural Development Department, Government of Sikkim is in the process of opening decentralized nurseries to be owned by the Panchayats in every Gram Panchayat Unit of Sikkim. Once these nurseries are created they can also be brought under the network of decentralized nurseries.

7. Panchayat Herbal Gardens

The Rural Development Department, Government of Sikkim is in the process of creating herbal gardens to be owned by the Panchayats in every Gram Panchayat Unit of Sikkim. Once these herbal gardens are created they can also be brought under the network of decentralized nurseries.

Research Initiatives in the Medicinal Plants Sector

A) State Government Agencies

1. STNM Hospital, Gangtok

The hospital has been conducting research in herbal medicines in conjunction with the GBPIHED, Sikkim unit.

2. Sikkim Manipal Institute of Medical Sciences and Central Referral Hospital

This institute based in Tadong, Gangtok has the facilities for pharmacological research in herbal medicine.

3. Department of Health

During the past decade and half, the state of Sikkim's Directorate of health have sponsored and set up Tibetan medicine clinics. Since then the clinics have helped thousands of people.

4. Department of Horticulture

The Department of Horticulture, Government of Sikkim, had initiated a trial plantation of *Panax pseudo-ginseng* at Lachung (3000m) for a detailed study of the plant under cultural conditions. Cultivation of high altitude endangered medicinal plants like *Picrorrhiza kurrooa* and Orch*is latifolia* has also been initiated.

5. Department of Science and Technology

This department has promoted research and documentation in the field of medicinal herbs in the past

6. Department of Information Technology

The Department of Information Technology has forty Community Information Centers (CICs) all over Sikkim. The Director, Shri Rajesh Verma had taken special care to ensure that the Call for Participation (CFP) reached the remotest corners of Sikkim by circulating it to all these CICs. These CICs can be used to disseminate information to the villagers.

B) Central Government Agencies

1. G.B. Pant Institute of Himalayan Environment and Development (GBPIHED)

G.B. Pant Institute of Himalayan Environment and Development, Sikkim Unit at Tadong Gangtok, has been a lead agency in conducting research on biodiversity, including medicinal plants of Sikkim.

2. Botanical Survey of India (BSI)
The Sikkim office of BSI at Zero point, Gangtok in Sikkim has been involved in floristic and ethno botanical studies.

3. Indian Council of Agricultural Research (ICAR)
The ICAR office at Tadong, Gangtok has been involved with natural resources including medicinal plants research in the state of Sikkim.

4. Regional Research Centre of Ayurvedic Medicine
The Regional Research Institute (Ayurveda) at Tadong, Gangtok has the capacity and mandate to conduct herbal medicine research.

5. Other institutes outside the state
(Refer to Appendix III)

C) Private Sector

1. Himalayan Pharmacy Institute (HPI)
This research and training institute recognized by AICTE is based in Majhitar, East Sikkim since 1990. It conducts B. Pharma degree course and D. Pharma diploma course. The mandate of this institute overlapping with the objectives of this project include:

a. Research, standardization and phytochemical investigation of the medicinal plants of Sikkim
b. Estimation, extraction and isolation of chemical ingredients of the medicinal plant of Sikkim
c. Pharmocological evaluation of the isolated chemical constituents
d. Structure elucidation of the chemical constituents and search for novel drugs
e. Formulation of herbal medicinal products
f. Survey of ethnomedicinal plants of Sikkim

The infrastructure of this institute includes instruments and facilities related to instrumentation, pharmacological instruments, microbiology, pharmaceutics, biochemistry and medicinal chemistry. They also have research collaboration with reputed research institutes based in Calcutta like the Indian Institute of Chemical Biology for structure elucidation, Association for Cultivation of Science for Instrumentation and Literature and Department of Pharmacy, Jadavpur University. The students of this institute carry out their practical training at Dabur Pharmaceuticals Ltd, Ghaziabad, Zandu Pharmaceuticals Works Ltd, Mumbai, Himalaya Drugs Company, Bangalore etc.

The biggest strength of this institute is that unlike other research institutes of the region it is located within the state of Sikkim and has

good collaboration linkages with premier research institutes based in Calcutta.

Contact Person: Dr. A. Sengupta, B Pharma, PhD Jadavpur University
Principal, Himalayan Pharmacy Institute
Majhitar, Sikkim 737132
Phone: 03592 – 240862 (o), 240483 (r)
E-mail: asghpi_sikkim@yahoo.com

Initiatives by NGO's in the Medicinal Plants Sector

1. **Pragya NGO**
   Pragya is a Gurgaon, Haryana based NGO conducting projects in the Indian Himalayas. Their objective is to conserve the natural and cultural heritage; develop rural livelihood options, enhance incomes, and building capacity in the indigenous communities. Their activities in Sikkim as mentioned in their website (www.pragya.org) are as under: Management of the Herbal Wealth in the Biodiversity Hotspot of the Eastern Indian Himalayas The project is being implemented in the far-flung valleys of Lachen and Lachung - in the North District of Sikkim - which have very recently been opened for outsiders. Pragya members have been working on medicinal plant mapping in the different zones, and assisting the small farmers with training on appropriate cultivation techniques. Pragya members have been working closely with the Dzumsa - the democratically elected village governing body, unique to the indigenous communities of the region, for planning and implementation of the project. A few pilot plantations have been set up in the target area. These have followed the community plantation form, with four to five farmers with contiguous plots collaborating in plantation establishment and management. Plantations range from 11,000 ft. (Lachen) to 15,000 ft. (Thangu and Byamjey). Community Nurseries - Towards the raising of saplings for select species of medicinal plants, the project has recently set up a polyhouse in Lachen village, which is being managed by the community. A similar facility for Lachung is under way.

2. **KCC, West Sikkim**
   KCC is a community-based organization in Yuksam, West Sikkim, comprising of energetic, active and dedicated members who help to mitigate tourism impacts on biodiversity of the area, conserve natural and cultural resources and provide training to community stakeholders through capacity building processes, educate visitors through awareness and Code of

Conduct, monitor resources with a participatory approach and advocate for appropriate policy changes. The Thrust areas include:

1. **Conservation Education**: Generating awareness among the rural masses through workshops, fairs and other village activities. 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 and pack animal operators.
3. **Advocacy with Government agencies**: Advocating and lobbying with the government for appropriate policy which would benefit the local people of our community and conserve the resources on which tourism depends.
4. **Monitoring**: Monitoring the use of resources in and around the Khangchendzonga National Park and around Yuksam area. Monitoring the trekkers going up into the mountains and checking illegal extraction of herbs, incense and other medicinal plants.

Their work experience in medicinal plants field include:

1. Promoted fuelwood saving activities through the purchase and hire of kerosene stoves for use by local support staff and trekkers.
2. Developed and promoted the adoption of a Code of Conduct for conservation for Khangchendzonga National Park and surrounding forests.
3. Worked hand in hand with the Forest Department in the preparation of the National Biodiversity Strategy and Action Plan (NBSAP) for the sub state site of Rathong Chu Valley, West Sikkim which was funded by GEF during 2001 – 2002.
4. Worked jointly with Forest Department for the formation, capacity building and microplanning of the Ecodevelopment Committees of Barsey Rhododendron Sanctuary and Maenam Wildlife Sanctuary during 2001 - 2002.
5. Assisted in the formation and capacity building of the watershed committees for the Tista Rangit Integrated Wasteland Development Project in South Sikkim during 2001 - 2002.

Non Governmental Organization (NGO)
Registered Society, **Registration No**: 938 **Dated** 04/06/97,
Place: Department of Land Revenue, Government of Sikkim, Gangtok, Sikkim

Contact Person: Shri Pema Gyalsten Bhutia
General Secretary
Khangchendzonga Conservation Committee [KCC]
PO: Yuksam, West Sikkim – 737113, Sikkim
Phone: 03595 – 241211
E-mail: kcc_sikkim@hotmail.com
kccyuksam@yahoo.com

4. SPSS, South Sikkim

Sikkim Paryavaran Samrakshan Sangh (SPSS) is a community based organization located in Bikmat, South Sikkim. This organization was the outcome of sustained efforts since early 1990's for conservation of the Tendong Nature Reserve. SPSS is an action oriented NGO lobbying for conservation of the Tendong forests which provide water and food security. This can be achieved by banning of illicit felling, encroachment and grazing within Tendong. For sustainable livelihoods SPSS has been promoting alternative technology in agriculture, horticulture and animal husbandry to reduce the dependence on forests and forest resources.

Working Experience

1. Awareness programs at grassroot level to convince the villagers regarding long term benefits of conserving the Tendong Forests
2. Branches of SPSS have been opened in the adjoining villagers also by strengthening the local NGO's and active youth.
3. Lobbying to ban illicit felling of trees, encroachment and fire within the Tendong Forests
4. Formation of 10 Pani-panchayats and 34 branches of SPSS and mobilization of the villagers towards conservation under the Small Grant Programme of UNDP/GEF
5. **Survey of Non Timber Forest Produce of Tendong** The NTFP Survey of South Sikkim has jointly organized by the Sikkim Paryavaran Samrakshan Sangh, Chuba-Bikmat, South Sikkim and Regional Centre NAEB, Jadavpur University, Calcutta from 13th April to 10th June 2001. We found on our Survey that South Sikkim is endowed with a long and old traditional medicinal heritage with a huge number of NTFP species providing remedies for a wide range of health conditions. Also the Non Timber Forest Produce is an important source of supplementary income for the people of South Sikkim as well as whole Sikkim.

   They are keen to carry out promotional activities including cultivation, harvesting, value addition and marketing of these medicinal plants in private holdings. This would not only help in reducing collection from the wild but would also result in additional supplementary income for the villagers.

Non Governmental Organization (NGO)
Registered Society, **Registration No**: 830 **Dated** 03/06/97,
Place: Department of Land Revenue, Government of Sikkim, Gangtok, Sikkim
Contact Person: Shri Gokul Rai, General Secretary
Sikkim Paryavaran Samrakshan Sangh [SPSS]
PO Bikmat, South Sikkim – 737126, Sikkim
Phone: 094341 – 27154 (mobile)
E-mail: spss_sikkim@rediffmail.com
spss_sikkim@lycos.com

4. The Mountain Institute, Sikkim Office

The Mountain Institute's mission is to advance mountain cultures and preserve mountain environments. Founded in 1971, The Mountain Institute has offices and community-based programs in the Andean, Appalachian and Himalayan mountain ranges, partnering with local people to strengthen their communities and to conserve their natural resources and cultural heritage. The Mountain Institute also supports three global initiatives: the Mountain Forum, Sacred Mountains, and Sustainable Living Systems.

The objectives are to:

- Conserve high priority mountain eco-systems,
- Increase environmentally and culturally sustainable livelihoods for mountain communities,
- Promote support for mountain issues through advocacy, education and outreach.

The Mountain Institute's community-based conservation and development approach empowers communities living in some of the world's most remote and rugged regions to protect their living environment while enhancing their own livelihoods. The Mountain Institute is led by its President and CEO and a 12-member Board of Trustees. The Mountain Institute employs nearly 60 professionals and associates within the U.S. and abroad and supports over 50 project personnel. The annual budget was approximately $3 million in FY 2000.

Under the Countries, Communities and Conservation: Building Cooperation in Khangchendzonga project funded by the MacArthur Foundation TMI has already opened a project office in Gangtok, Sikkim. Conservation and development of aromatic and medicinal plants is an important component of the project. Also it has another project in the pipeline namely Mountains, Markets and Biodiversity in the Sikkim Himalayas under the UNDP-GEF / PDF-A stage.

Non Governmental Organization (NGO)
Registered Society
Contact Person:

Project Manager
TMI – Sikkim Office
'Abilasha', Jewan Theeng Marg
Development Area, Gangtok – 737101, Sikkim
Phone: 03592 – 227942 (o)
E-mail: stambe@mountain.org, mvsmanian@mountain.org
Web: www.mountain.org

D) Private Initiatives in the Medicinal Plants Sector

1. **Maenam Nursery at Damthang, South Sikkim**: Hon'ble Chief Minister Shri Pawan Chamling and his wife Mrs. Tika Chamling have keen interest in conservation and propagation of medicinal plants. They have developed an excellent nursery and botanical garden in their own ancestral land in South Sikkim. B. M. Rai alias *Bada* (Phone No: 03595 – 267216) who retired from BSI-Calcutta after working there for more than thirty years as a collector supervises this garden. The medicinal plants section of this garden already boasts of more than 240 species of indigenous medicinal plants most of which have been successfully domesticated including those of the temperate ecoregion like *Picrorrhiza kurrooa*, *Nardostachys grandiflora*, *Aconitum ferox*, etc.


Hon'ble Chief Minister Planting a Tree

2. **"Hidden Forest" Nursery, Gangtok**:
   This nursery which is the pride of Gangtok is owned and managed by Shri S. T. Lachungpa IFS, CCF who is currently the Chairman of the State Pollution Control Board. Though this nursery hosts mostly garden plants it has a tissue culture facility and can be used for mass propagation of endangered medicinal plants.

3. **Mr. Bejoy Gurung**, Joint Director, Research, Department of Forest, Environment and Wildlife has recently authored the book "The Medicinal Plants of the Sikkim Himalayas".

Initiatives in Local Health Culture Conservation

A) State Government

1. **STNM Hospital, Gangtok**
   This government hospital has a separate Amji clinic and has employed two Amjis on a regular basis since long. The head Amji is Mr. Sonam Tshering who is amongst the very few sikkimese healers trained at Tibetan Medical and Astro Institute, Gangchen Kyishong, Dharamsala 176216, Himachal Pradesh. The other *Amji* Nyidon is on deputation from this institute at Dharamsala. This is the only government hospital in Sikkim where there is a regular Amji Clinic visited by scores of people.

2. **Roll of Honour** was given to Lachung *Amji* Tshering Thendup of Lachung, North Sikkim, by the Government of Sikkim for his work and knowledge of medicinal plants and traditional medicine on the occasion of the Independence Day 2002.

B) Private Initiatives

1. **Men-Tse-Khang or Amji Hospital, Namnang, Gangtok**
   This is a charitable clinic under HH Dalai Lama run by *amji* Kelsang Dorjee. He also mentioned a scholarship instituted by HH Dalai Lama for two Trans-Himalayan students at regular intervals.

2. **Tashi Namgyal Private Clinic, Namnang, Gangtok**
   This is a private clinic run by the father of *amji* Sonam Tshering.

3. **Chagpori Tibetan Medical Institute**
   The Chagpori Tibetan Medical Institute, CTMI at Darjeeling, West Bengal is one of the two major institutions in the country for the development of Tibetan medicine system, the other being the Tibetan Medical and Astro Institute, TMAI at Dharamsala, Himachal Pradesh. The CTMI herb collection team makes botanical expedition to Sikkim, Bhutan and Nepal for herb collection and field data collection. The address of the institute is:

   Chagpori Tibetan Medical Institute
   Trogawa House
   North Point, Darjeeling
   Phone: 0394 – 2270266 (o)

4. **Pakhrin Herbal Hospital, Algarah, Darjeeling, West Bengal**
   Baidhya Chewang Pakhrin is perhaps one amongst a few Indian herbalists who have been serving the rural masses with dedication and distinction. Thus, he has been healing bone fracture with herbal medicines for over the last forty years. This knowledge of treatment has been inherited from his forefather and is being successfully applied by the forth generation. The system of the secret knowledge of healing is said to have come to the first Baidya of the family as a blessing in his dream. Be that as it may from small beginning in a house clinic, Baidhya Pakhrin is able to institute a twenty bedded hospitals with cabin as of now. The hospital, constructed from donation and public contribution was inaugurated on the 27th February 1995.

   According to Baidhya Pakhrin, different diseases, *viz*. arthritis, gout, leukemia, piles, rheumatism, sciatica, spondilitis, urinary tract infection, can also be treated in his hospital, in addition bone fracture in which he is specialized.

   The hospital has two broad divisions:
   1. Pharmaceutical: Concerned with collection and preparation of medicines.
   2. Medical: Concerned with treatment and nursing of patients.

For bone fracture, the healing process is carried out successively in the following manner:

a) Medicinal plants and other related items are collected fresh from forests and private farmlands.
b) Collections are dried.
c) Dried samples are processed into pastes or dust by various method as applicable.
d) As preservation technique is lacking, the medicines used are all freshly prepared.
e) The patient in question is examined. X-Ray examination in his clinic.
f) Local anesthesia is given to patients. The anesthetic material is a mixture of nine different herbal powders processed after boiling.
g) Bone setting is carried out; the prepared paste of medicine is applied, framed in bamboo chips and carefully tightened by plastering.
h) Complete bed rest for 15 days is advised.
i) The frame is opened after 15 days to examine the progress.
j) Medicine is applied and reframing done after examination as before and bed rest for another 15 days is advised.
k) Finally, the frame is removed after 30 days. In all successful cases the patient is fit to go home after 45-60 days. A third framing is done whenever necessary.

During the entire period of treatment oral form of powdered are prepared from 21 different ethnic medicines, is carried out. In case of other diseases, oral administration of the formulation oil message, physiotherapy, and acupuncture are practiced.

In the last 50 years, Baidhya Chewang Pakhrin has healed more than 30,000 patients. And the cases of ailments are increasing every year. The patients normally come from different parts of Darjeeling and Jalpaiguri districts, Assam, Sikkim, Bhutan and Nepal and occasionally from other parts of the country. Baidhya Pakhrin has been felicitated with the Jibak Memorial Award by the Council of Alternative Systems of Medicines, Calcutta in 1995. (Ref Bhujel, R.B. 1996.)

Contact Person:

Baidya Pakhrin Chikitshalaya
Herbal Medicine Practitioner
16th Mile, Paiyong Busty
Algarah, PO: Pagang Gumpa, Kalimpong
District: Darjeeling, West Bengal
PIN: 734314
Registration No: S/54074 of 86-87

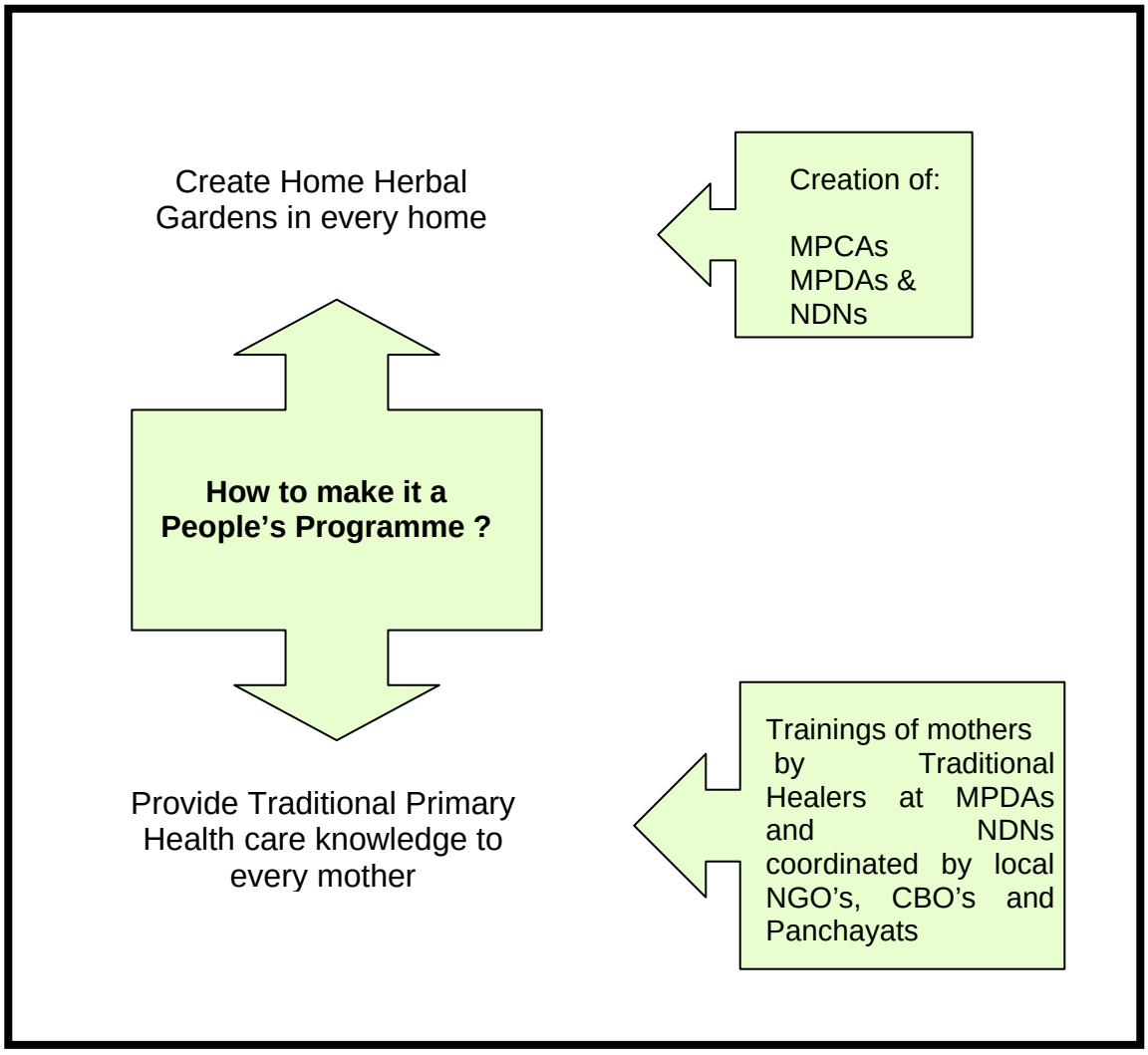
5. ***Amji* Tshering Thendup Lachungpa** was given the Roll of Honour by the Government of Sikkim on the occasion of the Independence Day 2002 by the state government for his vast knowledge on medicinal herbs and plants. One of his sons Tsewang Genchen has also picked up lot of his father's knowledge. They have successfully domesticated two species of Poppies (*Meconopsis grandis, M. paniculata*) at their farm. As local farmers they have also availed training facilities at Himachal Pradesh, Bhutan and at ICIMOD Kathmandu.

6. ***Amji* Sonam Tshering** from STNM is one of the few amongst Sikkim's trained persons having completed his training from Tibetan Medical and Astro Institute. STNM is the only hospital where there is a regular Amji Clinic visited by scores of people.

7. ***Amji* Tenzin Phelgye** (age 32 years) son of Lama Dorjee completed the Amji Training course of five years at Chagpori Tibetan Medical Institute in 1996. He has also been trained at the Tibetan Medical and Astro Institute. After completing a two year stint at Benaras Hindu University he is now a practicing doctor at the Chagpori Tibetan Medical Institute over the last five years. He is another of the local talents who could be tapped for this project. He can be contacted at the email address tphelgye@yahoo.co.in and phone no: 098320 – 91397 (mobile)

Chapter 6 Strategy for Conservation of Medicinal Plants and Local Health Cultures

Figure 6: Making it a People's Programme



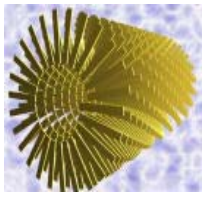
Box Item 4: Hydel Power Model for Harnessing Herbal Power

Hydel Power Generation		**Herbal Power Generation**
Flowing Water	=	Medicinal Plant Diversity
Dam	=	MPCA
Turbine	=	MPDA
Power sub station	=	Network of Decentralized Nurseries
Distribution	=	Traditional Healer and NGO / CBO
Bulb	=	Home Herbal Garden
Home lighting	=	Primary Health Care Security

A dam is constructed to store the energy of flowing water. Similarly to conserve the value of medicinal plant diversity an MPCA is necessary. Then as a turbine converts kinetic energy into electrical energy, similarly it is the MPDA that shall convert the medicinal plant diversity values of the MPCA into economic value. Before the common man can use this electricity a substation (transformer) is necessary to step down the voltage. Similarly a network of decentralized nurseries (NDN) is necessary to disseminate the economic value generated by the MPDA to the Home Herbal Gardens. From the substation transmission lines are needed to distribute this electricity to every home for lighting. Similarly the knowledge of the traditional healers along with the assistance of the local NGOs / CBO's is necessary to disseminate the knowledge regarding herbal healing to every mother in every home through her Home Herbal Garden resulting in primary health care security for all.


Flowing Water


Dam


Turbine


Sub station


Transmission


Home Lighting


Medicinal Plants Diversity


MPCA


MPDA


NDN


Traditional Healer + NGOs


Primary Health Care

Other than the MPDA, the NDN is **also** required since this would ensure easy availability of medicinal plant planting material to the Home Herbal Gardens. The MPDA would be more of a research nursery located inside forest, to experiment on the propagation techniques of endangered medicinal plants and serve as a seed and seedling source for the NDNs. The NDN would be more like a community nursery located on private land and owned by a self help group. The cultivation techniques finalized in the MPDAs would be transferred to the NDNs. The NDNs would also serve as training centers for transferring primary health care knowledge from the traditional healers to the village mother through her Home Herbal Garden.

Medicinal Plants Conservation Strategy:

The basic strategy that has emerged for the conservation of medicinal plants involves the creation of a Medicinal Plants Conservation Network for Sikkim. In the first phase this network would focus on Insitu conservation, Exsitu Conservation, local use and meeting the demands of the local markets. The priority would be on conservation security, local health culture revitalization, health security and livelihood security. Only after this has been done successfully and there is a surplus of medicinal plants, the state would plan in terms of meeting the demands of national and international markets.

Figure 7: Medicinal Plants Conservation Strategy

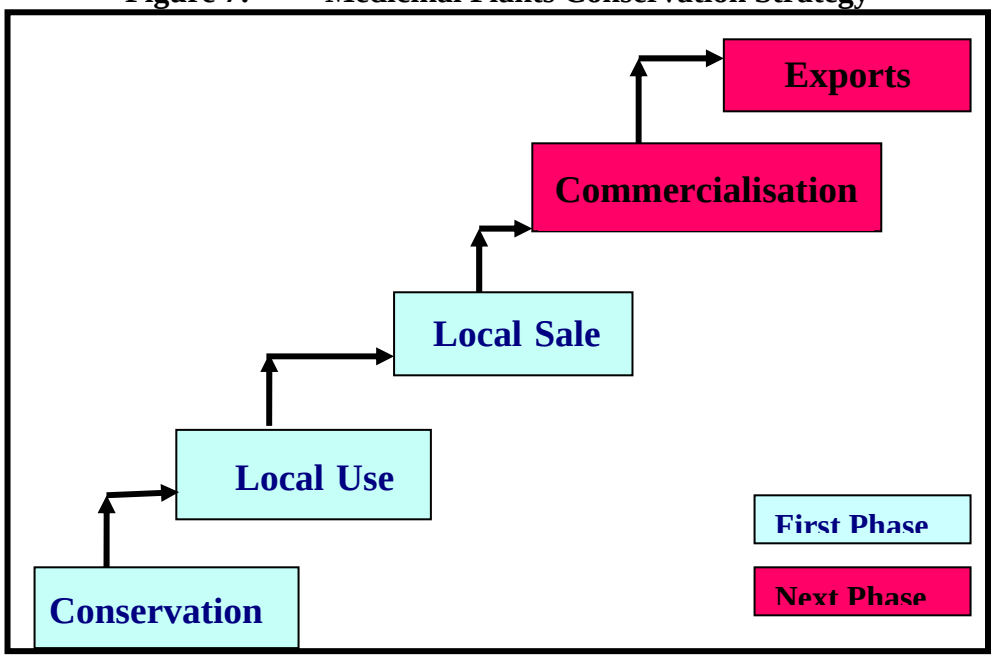


Figure 8: Sikkim Medicinal Plants Conservation Network

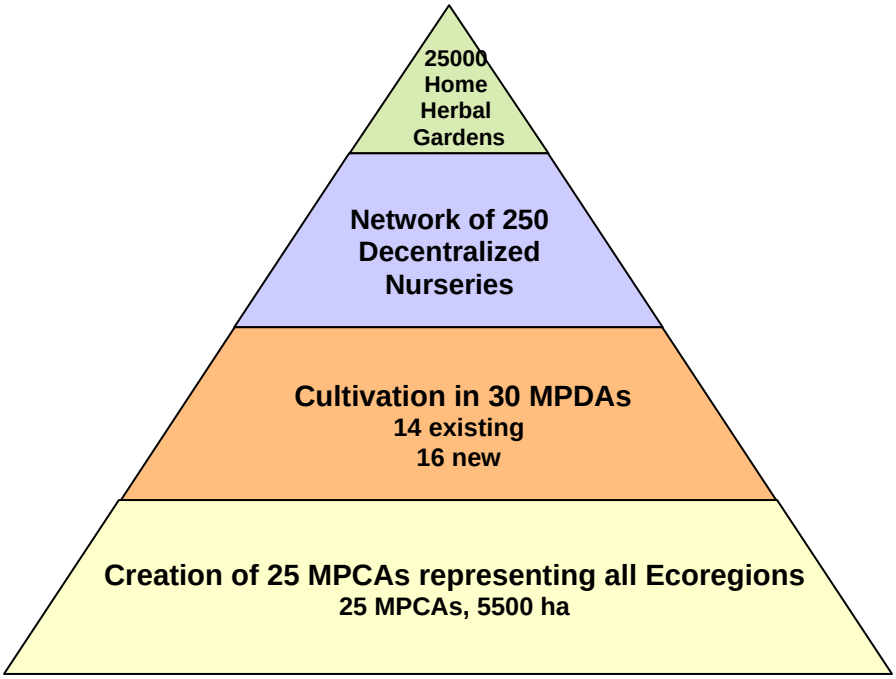


Figure 9: Design of Medicinal Plant Conservation Areas's (MPCAs)

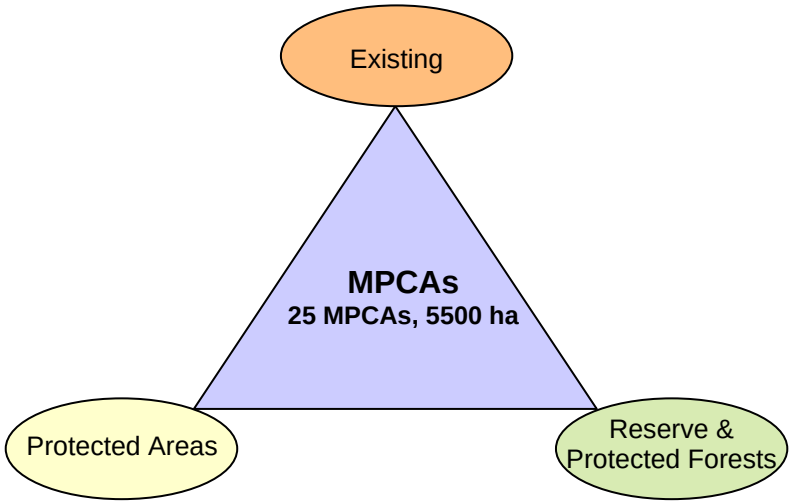


Figure 10: Design of Medicinal Plant Development Areas's (MPDAs)

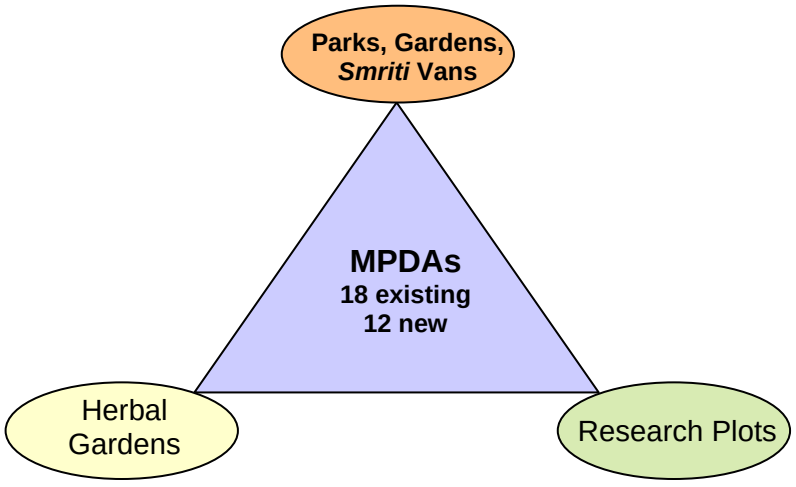


Figure 11: Design of Network of Decentralized Nurseries (NDNs)

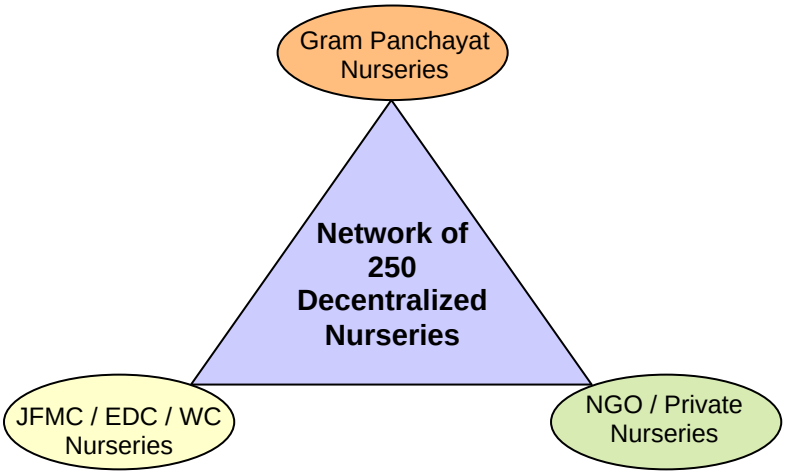


Figure 12: Design of Network of Home Herbal Gardens (NHHG's)

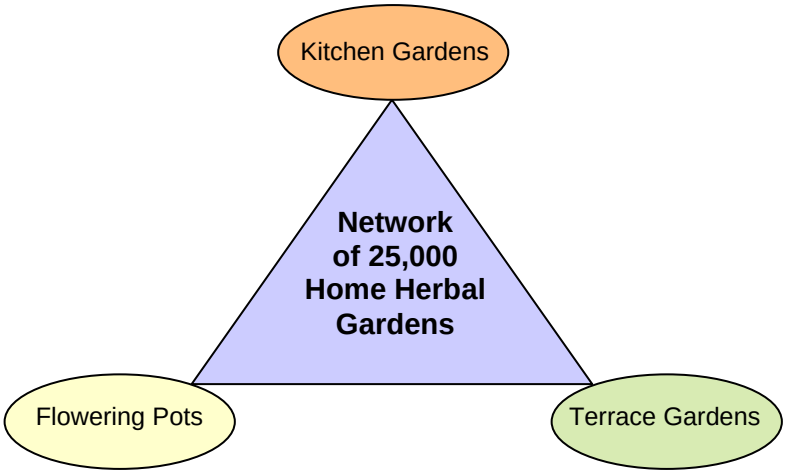
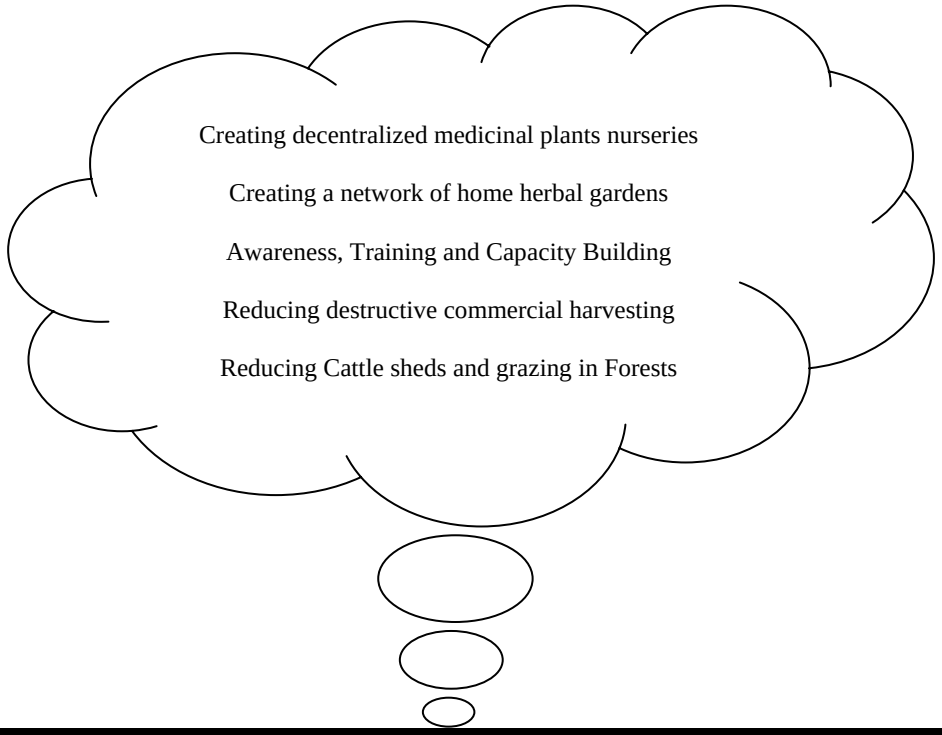


Table 5: Medicinal Plant Conservation Network (MPCN) for Sikkim

S. No	Model	Network		Total	Existing	Reason
		Rural	Urban			
		(nos)	(nos)	(nos)		
1	**MPCA**			**25**	**0**	25 (Medicinal Plant Conservation Areas (MPCAs) representing all the four ecoregions extending to about 5000 ha amounting to only 0.8% of the total geographical area of the state
2	**MPDA**			**30**	**18**	These would be then linked to the 25 medicinal plant conservation areas
3	**NDN**	**170**	**80**	**250**	**32** + proposed 170 panchayat nurseries + proposed 170 panchayat herbal gardens + existing government nurseries, private nurseries, gardens, parks etc	There are a total of 170 Gram Panchayat Units (GPU) and Dzumsa in Sikkim. Atleast one NDN is needed in each GPU. So the rural network of NDNs would total to 170. Also to cover the urban towns where there is a shortage of land availability, existing parks, private nurseries and gardens can be utilized. For this a total of about 80 NDNs are needed
4	**NHHG**	**17,000**	**8,000**	**25,000**	The people of the hills in general and the Sikkimese people in particular are very fond of raising flowering plants in their homes. Every home already has a small section where flowering plants like Dahlias, Begonias, Orchids etc are planted. Even in urban homes potted plants are maintained. These existing kitchen gardens, potted plants and terrace gardens need to be linked to the NHHG's	Each NDN shall be supporting atleast about a 100 Home Herbal Gardens (NHHG). So the 250 NDNs would be linked to a total of about 25,000 NHHG's

Figure 13: Program Components for Medicinal Plants Conservation



Consultation with stakeholders at SIRD, Karfectar, South Sikkim

Box Item 5: Community Policing as a Conservation Tool

On 15th January, 2002 the Ecodevelopment Committee (EDC) of Borong literally stopped the jeep smuggling medicinal plants for sale at Siliguri, West Bengal and informed Shri D. B. Gurung, Forest Guard. The Range Officer, Maenam Wildlife Range, Shri L. P. Pradhan in a midnight raid, seized ten sacks (more than 120 kgs) of dried *Chirayto* (*Swertia chirata*) and one sack of Majhito (*Rubia cordifolia*) from Mr. Om Prakash Patel, resident of Muzzafarpur, Bihar who has been staying in Ravangala Bazaar since more than twenty years. He later confessed that he did not have the necessary collection and transit permits for this forest produce. Also he had purchased these medicinal plants at throwaway prices from the villagers of Karjee Magnam, West Sikkim which falls under the Khangchendzonga Biosphere Reserve to be sold at astronomical rates at Siliguri. Om Prakash Patel was arrested for violation of Sections 29 and 35 of the Wildlife (Protection) Act 1972 and Sections 20, 24 and 42 of the Sikkim Forests, Water Courses and Road Reserve (Protection and Preservation) Act 1988. On being produced before the magistrate, he was remanded to judicial custody at Rongek Jail, Gangtok. After being released on bail, the case was later compounded by the DFO Wildlife South and West, Mr. Sandeep Tambe IFS after realizing a fine of Rs. 18,000/- under Section 34 of the Wildlife (Protection) Act 1972. The seized produce was then put on open public auction and fetched about Rs 6,000/-. This case helped in reducing smuggling of medicinal plants and other forest produce and is an ideal example as to how the local community and the enforcing agencies can work together to reduce the threat of commercial extraction of medicinal plants from the wild.

A medicinal herbs smuggler nabbed red handed by the Ecodevelopment Committee (EDC) of Borong

Table 6: Strategy for Conservation of Medicinal Plants

S. No	Ecoregion	People's Participation	Medicinal Plants	Local Health Cultures	Strategy
1	**Tropical Ecoregion** (300m – 1200m) West, South and East District	Most of the big towns namely Jorethang, Singtam and Rangpo are located along the hot and humid river valleys in this ecoregion. The villages are sparsely populated. About 20% of the 190 JFMC's exist here People's participation is easy in the rural areas. Need to link up with existing local NGO's to penetrate the urban areas	Major threat to medicinal plants here is forest fire. Most of the medicinal plants are fast growing and can be easily domesticated and propagated. MPDAs and NDNs already exist	The Nepali system of medicine is prevalent here and survives at the peddler level, and the practitioners known as *Baidyas* practice in the local village *haats.*	People's participation through the existing JFMC's and local NGO's in the urban areas Cultivation of medicinal plants in the existing MPDAs and strengthening of the existing NDNs. These nurseries can meet the demand of the rural areas, however to meet the demands of the urban population, linking up with existing private nurseries based in towns is necessary. Also local NGO's / CBO's should be encouraged to start new nurseries and to disseminate traditional primary health care knowledge to urban mothers.
2	**Sub Tropical Ecoregion (lower reaches)** (1200m – 2400m) West, South, East and North District	Most of the villages and towns are located in this ecoregion. All the four district headquarters e.g. Gangtok, Namchi, Gyalsing, Mangan etc are located here About 80% of the 190 JFMC's and 100% of the 49 EDC's exist here. People's participation is easy	Major threat to medicinal plants here is the cultivation (monoculture) of large cardamom in the forest areas Most of the medicinal plants are fast growing and can be easily domesticated and propagated. MPDAs and NDNs already exist	In the lower reaches the Nepali system of medicine is prevalent whereas in the upper reaches the Tibetan system of medicine is prevalent	Cultivation of medicinal plants in the existing MPDAs and strengthening of the existing NDNs. Linking up with existing private nurseries in towns to meet the demand of urban population People's participation through the existing JFMC's and EDC's in the rural areas and local NGO's in the urban areas

3	**Sub Tropical Ecoregion (upper reaches)** (2400m – 3000m) West, South, East and North District **Temperate Ecoregion (lower reaches)** (3000m – 4000m) **Conifer Forests** West, East and North District	Very few villages are located in this ecoregion. Very few JFMC's or EDC's exist here People's participation is not easy	Major threat to medicinal plants here is the illegal, destructive collection of medicinal plants by graziers, GREF / BRO labourers and others for commercial purposes and logistic difficulties faced by the law enforcing agencies due to remoteness and high altitude Most of the medicinal plants are slow growing and need special care for domestication. MPDAs and few NDNs already exist	The Tibetan system of medicine is prevalent	Cultivation of medicinal plants in the existing MPDAs and strengthening of the few existing NDNs. The NDNs in the lower reaches of the Sub Tropical Ecoregion need to be utilized for cultivation. Focus should be on the cultivation of those medicinal plants whose roots are used as medicine People's participation through the very few JFMC's, EDC's local NGO's and CBO's
4	**Temperate Ecoregion (upper reaches)** (4000m – 4500m) **Alpine Meadows** West, East and North District **Trans Himalayan Ecoregion** (4500m – 5500m) North District	No villages are located in this ecoregion. Only landuse here being transhumance by nomadic graziers No JFMC's or EDC's exist here People's participation is very difficult	Major threat to medicinal plants here is the illegal, destructive collection of medicinal plants by graziers, GREF / BRO labourers and others for commercial purposes and logistic difficulties faced by the law enforcing agencies due to remoteness and high altitude Quite a few of the endangered medicinal plants occur here and are very slow growing and need special care for domestication MPDAs do **not** exist and **no** NDNs since no villages	The Tibetan system of medicine is prevalent	Creation of **new** MPDAs in association with the nomadic graziers Since there are **no** villages in this ecoregion, the NDNs in the lower reaches of the Temperate Ecoregion need to be utilized for cultivation. Focus should be on the cultivation of those medicinal plants whose roots are used as medicine People's participation through partnerships with the nomadic graziers

Table 7: Strategy for Conservation of Local Health Culture

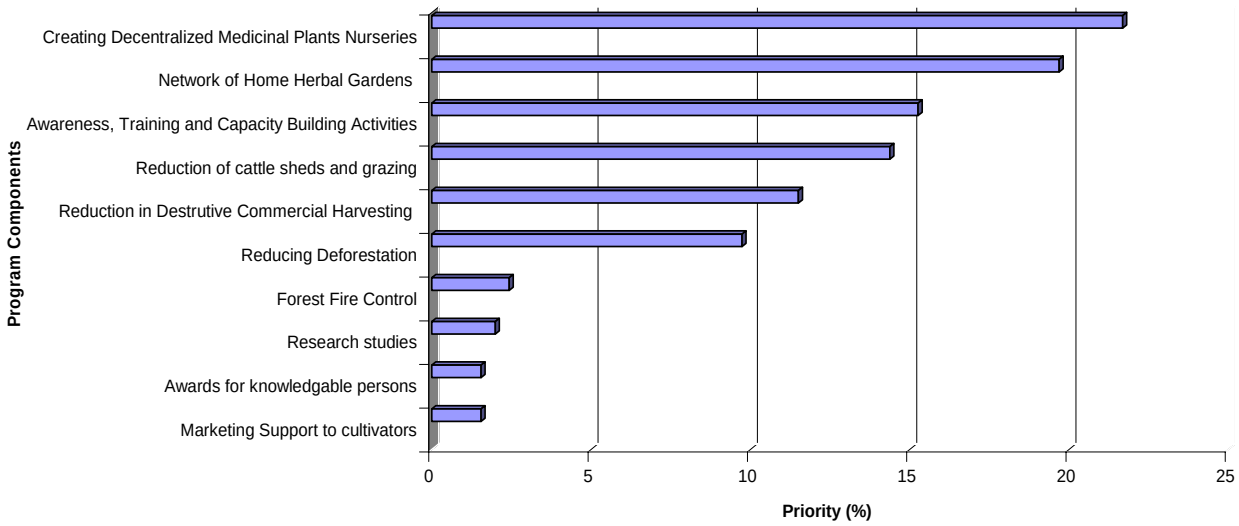
Gap / Threat	Conservation strategy
Western / Modern education which ignores traditional medicine Unfashionable, not trendy	Document ethno-botanic information through Gaon Budhos, Mondals, Karwari system
Allopathic popularity, easy availability; Doctor culture	Rediscover traditional knowledge
Plants not easily available in urban areas	Creating nurseries for distributing plants for home herbal gardens. Those plants of which leaves and flowers are used need not be planted. Priority should be given to those medicinal plants whose roots are used as medicine.
'Educated' people do not rely on unregistered practitioners Lack of respect locally unlike those from outside	Training programmes using Village elders as Resource Persons Educate younger generation
Local Health Culture is not a 'Profession'. Like ginger, cardamom, there is no cultivation technique	Awareness with extension activities
No well defined agency at national and state level in past and even now	Create separate agency at national and state level
Too many hospitals; people go there even if medicines do not work Knowledgeable people now old/ dead Younger generation not trained, so unaware	Amji Training Centre like in Ladakh (Ref: Trans-Himalayan Amchi Medical Education Newsletter, Leh, Ladakh)
Religious conversion, people stopped believing in *Bongthing, Amji, Baidya, Pau, Jhankri*	Motivation through NGOs, find remaining people and convince them
Modernization and faulty development practices	Incentives to Local Health Practitioners Pharmacological validation and revitalization, promotion of Local Health Culture. Studies and documentation
Knowledgeable persons over-secretive	Parents should teach their children
Lack of advertising, marketing	Commercialization, marketing hype, 'Herbal Cafeteria'
No proper dispensaries, *Baidya* sits on footpath, sometimes comes, sometimes not	Organization building for the local health practitioners to strengthen them
Government did not take special initiative for collaboration of local Amjis with Centres in Ladakh, Dharamsala, Dajeeling or take suitable advantage of scholarship facilities given by Dalai Lama for trans-Himalayas	Open Amji Training Centres at Lachung and Thangu through *Shedas* (monastery schools) in collaborative ventures with institutes in Ladakh, Dharamsala and Darjeeling

Chapter 7 Action Plan for Conservation of Medicinal Plants and Local Health Cultures

How can we conserve Medicinal Plants?

Priority	Program Component	Priority Percentage
1	Creating Decentralized Medicinal Plants Nurseries	22
2	Network of Home Herbal Gardens	20
3	Awareness, Training and Capacity Building Activities	15
4	Reduction of cattle sheds and grazing	14
5	Reduction in Destructive Commercial Harvesting	12
6	Reducing Deforestation	10
7	Awards for knowledgeable persons	2
8	Forest Fire Control	2
9	Improved checking in Forest Check Posts	0
10	Marketing Support to cultivators	2
11	Research studies	2
	Total	**100**

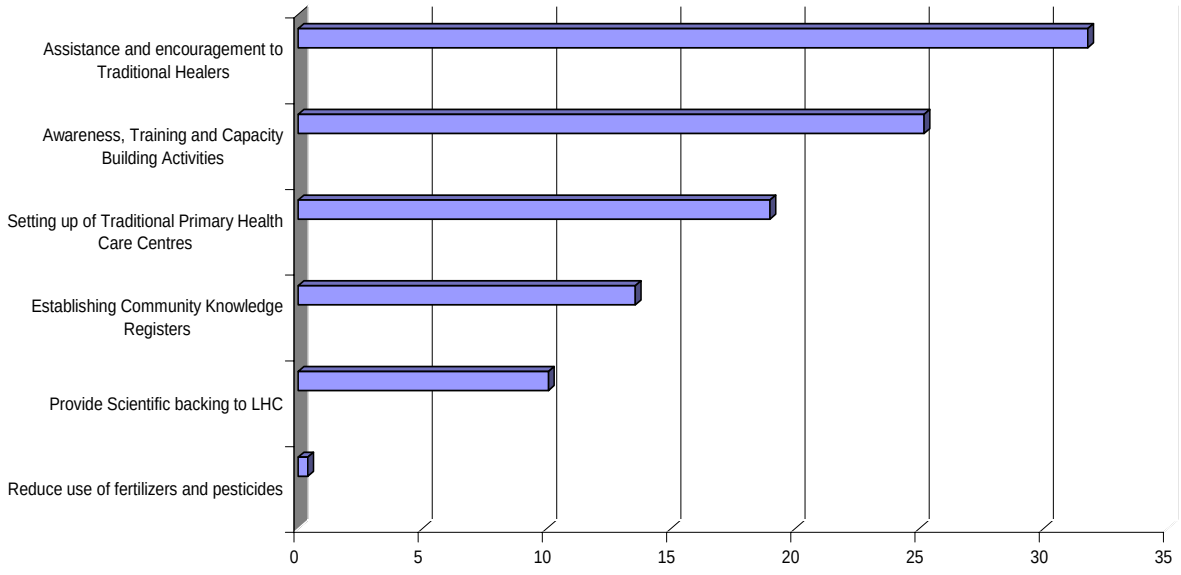
Chart 5: Ranking of Program Components for Conservation of Medicinal Plants



How can we conserve Local Health Cultures?

Priority	Program Component	Priority Percentage
1	Assistance and encouragement to Traditional Healers	32
2	Awareness, Training and Capacity Building Activities	25
3	Setting up of Traditional Primary Health Care Centers	19
4	Establishing Community Knowledge Registers	14
5	Provide Scientific backing to LHC	10
6	Reduce use of fertilizers and pesticides	0
	Total	**100**

Chart 6: Ranking of Program Components for Conserving Local Health Cultures (LHC)



Box Item 6: Dreams of a Traditional Health Practitioner

Setting up of a nursing room in his house for patients

Assistance to cultivate medicinal plants privately

Registration and recognition by the government

Assistance to practice healing in the local *haat*

Provide training to other villagers who are interested

Bhim Bahadur Gurung, Local Health Practitioner (*Baidya*) from Borong, South Sikkim

Action Plan for Conservation of Medicinal Plants

Criteria for Selection of MPCAs

1. It should have a rich insitu germplasm of wild medicinal plants and the indigenous flora should also be well preserved
2. It should be accessible enough to be able to initiate management interventions. i.e. it should not be very remote
3. It should preferably have existing medicinal plant nurseries nearby, which can be used as MPDAs or NDNs
4. The area should have existing infrastructure for protection of its germplasm i.e. network of JFMC's, EDC's, soil and moisture conservation works, fencing etc.
5. It should be representative of the ecoregion to which it belongs
6. The area should be relatively free from biotic interferences

Table 8: Reasons for Selection of MPCAs

S. No	Proposed MPCA	Specific reasons for Selection
1	**Kitam Reserve Forest** Altitude (m) From: 280, To: 740; Area ha: 500	This forest along the Rangit river valley, South Sikkim is a true representative of the Tropical ecoregion and is rich in flora and fauna. It is very accessible by road and the existing Kitam Herbal Garden (MPDA) and the five existing Community Nurseries (NDN) can be linked to it.
2	**Maruni Taar Reserve Forest** Altitude (m) From: 750, To: 1000; Area ha: 100	This forest located near Zoom, West Sikkim is representative of the Tropical ecoregion. It is surrounded by villages and accessible. It has already been protected by creating a network of JFMC's around it
3	**Tayong Reserve Forest** Altitude (m) From: 900, To: 1100; Area ha: 100	This forest located near Gyalisng, West Sikkim is representative of the Tropical ecoregion. It supports a unique patch of *Pinus roxburghii* and is surrounded by villages and accessible. It has already been protected by creating a network of JFMC's around it
4	**Karthok Reserve Forest** Altitude (m) From: 1200, To: 1400; Area ha: 100	This forest located near Pakyong, East Sikkim is representative of the Tropical ecoregion. It is surrounded by villages and accessible. It has already been protected by creating a network of JFMC's around it
5	**Chuba Reserve Forest** Altitude (m) From: 1200, To: 1400; Area ha: 100	This forest located near Parving, South Sikkim is representative of the Tropical ecoregion. It is surrounded by villages and accessible. It has already been protected by creating a network of JFMC's around it

<table>
<tr><td>6</td><td>State Biodiversity Park
<table><tr><th colspan="2">Altitude (m)</th><th>Area</th></tr><tr><th>From</th><th>To</th><td>ha</td></tr><tr><td>1500</td><td>1800</td><td>100</td></tr></table></td><td>This forest near Damthang, South Sikkim is also a true representative of the Sub Tropical ecoregion and is rich in flora and fauna. It has already been protected by creating a network of JFMC’s around it and also by carrying out soil and moisture conservation works and physical angle iron fencing. It is very accessible by road and the existing State Biodiversity Park Herbal Garden (MPDA) and the existing privately owned Damthang Botanical Park (NDNs) can be linked to it.</td></tr>
<tr><td>7</td><td>Dubdi Khasmahal
<table><tr><th colspan="2">Altitude (m)</th><th>Area</th></tr><tr><th>From</th><th>To</th><td>ha</td></tr><tr><td>1700</td><td>2000</td><td>200</td></tr></table></td><td>This forest above Yuksam village, West Sikkim is also a true representative of the Sub Tropical ecoregion and is very rich in flora and fauna. It is also a sacred grove and is a popular tourist destination since it houses Dubdi Monastery which is 0the oldest monastery of Sikkim. It has already been protected by creating a network of JFMC’s and EDC’s around it and also by physical angle iron fencing. It is accessible by road and the existing Tikjuk nursery under the Territoral West Division (MPDA) can be linked to it.</td></tr>
<tr><td>8</td><td>Rabdentse Bird Reserve
<table><tr><th colspan="2">Altitude (m)</th><th>Area</th></tr><tr><th>From</th><th>To</th><td>ha</td></tr><tr><td>1800</td><td>2000</td><td>100</td></tr></table></td><td>This forest near Pelling, West Sikkim is also a true representative of the Sub Tropical ecoregion and is rich in flora and fauna. This reserve also houses the ruins of the Chogyals’ (king’s) palace and is a popular tourist destination. It has already been protected by creating a network of JFMC’s around it and physical angle iron fencing. It is very accessible by road and the existing Tikjuk nursery under the Territorial West Division (MPDA) can be linked to it.</td></tr>
<tr><td>9</td><td>Fambong Lho Sanctuary
<table><tr><th colspan="2">Altitude (m)</th><th>Area</th></tr><tr><th>From</th><th>To</th><td>ha</td></tr><tr><td>1800</td><td>2000</td><td>200</td></tr></table></td><td>This forest near Gangtok town, East Sikkim is a true representative of the Sub Tropical ecoregion and is rich in flora and fauna. It is also a notified sanctuary and a tourist destination. It has already been protected by creating a network of JFMC’s and EDC’s around it and also by physical angle iron fencing at the vulnerable access points. It is accessible by road and the existing Martam community nursery and Samdong Community Nursery (NDNs) in the adjoining villages can be linked to it.</td></tr>
<tr><td>10</td><td>Tendong Nature Reserve
<table><tr><th colspan="2">Altitude (m)</th><th>Area</th></tr><tr><td>From</td><th>To</th><th>ha</th></tr></table></td><td>This forest near Namchi, South Sikkim is a true representative of the Sub Tropical ecoregion and is rich in flora and fauna. It has already been protected by creating a network of JFMC’s around</td></tr>
</table>

	2000 | 2400 | 200	it and also by carrying out soil and moisture conservation works and physical angle iron fencing. It is accessible by road and the existing Samdruptse Herbal Garden (MPDA) and the existing Palum Community Nursery and Singithang Community Nursery (NDNs) can be linked to it.
11	**Maenam Sanctuary** Altitude (m): From 2400, To 2700; Area (ha) 200	This forest above Ravangla town, South Sikkim is a true representative of the Sub Tropical ecoregion and is very rich in flora and fauna. It is also a notified sanctuary and a popular tourist destination. It has already been protected by creating a network of JFMC's and EDC's around it and also by physical angle iron fencing at the vulnerable access points. It is accessible by road and the existing Maenam Herbal Garden (MPDA) and the existing ten community nurseries (NDNs) in the adjoining villages can be linked to it.
12	**Rate Chu Reserve Forest** Altitude (m): From 2500, To 2700; Area (ha) 200	This forest which is the catchment of the drinking water source of Gangtok town, South Sikkim is a true representative of the Sub Tropical ecoregion and is very rich in flora and fauna. It has already been protected by creating a network of JFMC's around it and also by physical angle iron fencing at the vulnerable access points. It is accessible by road and the existing Rate Chu Herbal Garden (MPDA) can be linked to it.
13	**Okhrey to Hilley to Barsey** Altitude (m): From 2500, To 3100; Area (ha) 300	This forests from Okhrey Forest Checkpost to Hilley Potato farm to Barsey in West Sikkim is a true representative of the Temperate ecoregion and is extremely rich in flora and fauna. It is also a notified sanctuary and a popular destination for trekkers. Also it would be worthwhile to create a MPDA at Hilley Potato farm, West Sikkim since it is the only village at 9000 feet which is so easily accessible by road in all seasons. This would be an ideal location for domestication of high altitude medicinal plants of the alpine meadows. By doing so we could also link up with the existing community nurseries (NDNs) in Sombaria and Okhrey. This MPCA can also be linked up with the Barsey Herbal Garden (MPDA) and the Guranshe / Noonthaley Herbal Garden (MPDA) and the eight community nurseries (NDNs) adjoining to it.
14	**Kyishongla (Upper Tholung)** Altitude (m) | Area	This forest above Tholung village, North Sikkim is a true representative of the Temperate ecoregion and is very rich in flora and fauna. It has already

	<table><tr><th>From</th><th>To</th><th>ha</th></tr><tr><td>2700</td><td>3000</td><td>100</td></tr></table>	been protected by creating a network of JFMC's and EDC's around KNP and also this is amongst the last strongholds of the Lepchas and their culture. It can be reached after a tough two days trek from Lingza or Menshithang, and the existing Tholung Herbal Garden (MPDA) can be linked to it.
15	**Pangolakha Sanctuary** <table><tr><th colspan="2">Altitude (m)</th><th>Area</th></tr><tr><th>From</th><th>To</th><th>ha</th></tr><tr><td>3000</td><td>3300</td><td>200</td></tr></table>	This forest above Dholopchen village, East Sikkim is a true representative of the Temperate ecoregion and is extremely rich in flora and fauna. It is also a notified sanctuary. It is not easily accessible and reaching it is a one day uphill trek from the road head. There are hardly any biotic interferences and this is amongst the most biodiversity rich forests of the state. It has already been protected by creating a network of EDC's namely the Dholopchen EDC and the Regu EDC around it.
16	**Shingba Sanctuary** <table><tr><th colspan="2">Altitude (m)</th><th>Area</th></tr><tr><th>From</th><th>To</th><th>ha</th></tr><tr><td>3100</td><td>3500</td><td>200</td></tr></table>	This forest above Lachung village, North Sikkim is a true representative of the Temperate ecoregion and is very rich in flora and fauna. It is also a notified sanctuary and a popular destination for trekkers. It has already been protected by creating a network of JFMC's and EDC's around it and also by physical angle iron fencing at the vulnerable access points. It is accessible by road and the existing Dombang Herbal Garden (MPDA) and the Namnasa Community Nursery (NDN) can be linked to it.
17	**Rachela** <table><tr><th colspan="2">Altitude (m)</th><th>Area</th></tr><tr><th>From</th><th>To</th><th>ha</th></tr><tr><td>3000</td><td>3300</td><td>200</td></tr></table>	This forest on the Bhutan border, East Sikkim is a true representative of the Temperate ecoregion and is extremely rich in flora and fauna. It is also a notified protected area namely the Pangolakha Sanctuary. It is not easily accessible and reaching it is a one day uphill trek from Pangolakha. However managing it in continuity with the Pangolakha MPCA would reduce logistic difficulties. There are hardly any biotic interferences and this is amongst the most biodiversity rich forests of the state.
18	**Tshoka to Dzongri** <table><tr><th colspan="2">Altitude (m)</th><th>Area</th></tr><tr><th>From</th><th>To</th><th>ha</th></tr><tr><td>3300</td><td>4200</td><td>600</td></tr></table>	This forest above Tshoka village, West Sikkim is a true representative of the Temperate ecoregion and is extremely rich in flora and fauna. It is also a notified national park and a popular destination for trekkers. It is not easily accessible and reaching it is a tough one day uphill trek (16 km) from Yuksam. It would not be feasible to create a MPDA here, since it is very remote and logistics

<table>
<tr><td></td><td></td><td>would be difficult to manage. Instead it would be advisable to link up with the existing Khecheopalri Herbal Garden (MPDA). Also it would be worthwhile to create a MPDA at Hilley Potato farm, West Sikkim since it is the only village at 9000 feet, which is accessible by road. This would be an ideal location for domestication of high altitude medicinal plants of the alpine meadows. By doing so we could also link up with the Hilley to Barsey MPCA and the existing community nurseries (NDNs) in Sombaria and Okhrey.</td></tr>
<tr><td>19</td><td>Zema to Thangu<table><tr><th colspan="2">Altitude (m)</th><th>Area</th></tr><tr><th>From</th><th>To</th><td>ha</td></tr><tr><td>3500</td><td>3900</td><td>200</td></tr></table></td><td>This forest above Lachen village, North Sikkim is a true representative of the Temperate ecoregion and is very rich in flora and fauna. It has already been protected by creating a network of JFMC’s and EDC’s around it and also by physical angle iron fencing at the vulnerable access points. It is accessible by road and the existing Zema Herbal Garden (MPDA) and Thangu Herbal Garden (MPDA) can be linked to it.</td></tr>
<tr><td>20</td><td>Kyongnosla Sanctuary<table><tr><th colspan="2">Altitude (m)</th><th>Area</th></tr><tr><th>From</th><th>To</th><td>ha</td></tr><tr><td>3700</td><td>4000</td><td>100</td></tr></table></td><td>This forest near Changu lake, East Sikkim is a true representative of the Temperate ecoregion and is very rich in flora. It is also a notified sanctuary and a popular destination for tourists. It has already been protected by creating a network of EDC’s around it and also by physical angle iron fencing at the vulnerable access points. It is accessible by road and the existing Kyongnosla Herbal Garden (MPDA) can be linked to it.</td></tr>
<tr><td>21</td><td>Dzongri to HMI Base Camp<table><tr><th colspan="2">Altitude (m)</th><th>Area</th></tr><tr><th>From</th><th>To</th><td>ha</td></tr><tr><td>4200</td><td>4800</td><td>600</td></tr></table></td><td>Above Dzongri, the alpine meadows stretch right up to the Rathong glacier. These alpine meadows are true representative of the Temperate ecoregion and are extremely rich in endangered medicinal plants. This is also a notified national park and a popular destination for trekkers and Himalayan Mountaineering Institute Trainees. It is not easily accessible and reaching Dzongri it is a tough two days uphill trek (24 km) from Yuksam. However since this MPCA is contiguous with the Tshoka to Dzongri MPCA, their management can be clubbed. It would not be feasible to create a MPDA here, since it is very remote and logistics would be difficult to manage. Instead it would be worthwhile to create a MPDA at Hilley Potato farm, West Sikkim since it is the only village at 9000 feet which is easily accessible by road in all seasons. This would be an ideal location for domestication</td></tr>
</table>

<table>
<tr><td></td><td></td><td>of high altitude medicinal plants of the alpine meadows. By doing so we could also link up with the Hilley to Barsey MPCA and the existing community nurseries (NDNs) in Sombaria and Okhrey.</td></tr>
<tr><td>22</td><td>Yumesamdong
<table><tr><th colspan="2">Altitude (m)</th><th>Area</th></tr><tr><th>From</th><th>To</th><td>ha</td></tr><tr><td>4000</td><td>4300</td><td>300</td></tr></table></td><td>This alpine region north of Lachung village in North Sikkim is representative of the Trans Himalayan ecoregion and is rich in flora and fauna. It is accessible by road</td></tr>
<tr><td>23</td><td>Lashar Valley
<table><tr><th colspan="2">Altitude (m)</th><th>Area</th></tr><tr><th>From</th><th>To</th><td>ha</td></tr><tr><td>4000</td><td>4200</td><td>300</td></tr></table></td><td>This forest above Lachen in North Sikkim is a true representative of the Trans Himalayan grasslands and is very rich in flora and fauna. It is a half day trek from Thangu. This area has the best alpine grasslands in Sikkim rich in Nardostachys grandiflora, Ephedra gerardiana etc</td></tr>
<tr><td>24</td><td>Muguthang
<table><tr><th colspan="2">Altitude (m)</th><th>Area</th></tr><tr><th>From</th><th>To</th><td>ha</td></tr><tr><td>4200</td><td>4500</td><td>300</td></tr></table></td><td>This reserve forest in Lhonak Valley, North Sikkim is a true representative of the Trans Himalayan ecoregion and is very rich in flora and fauna. It is a one day stiff trek from Thangu across the Lungnakla and has alpine marshes.</td></tr>
</table>

Table 9: Distribution of MPCA's across Ecoregions and Altitudes

S. No	MPCA	Owner	Classification	Division	Location	Ecoregion		Altitude (m)		Area
								From	To	ha
1	Kitam Reserve Forest	GoS	Reserve Forest	South	Kitam	Tropical		280	740	500
2	Maruni Taar Reserve Forest	GoS	Reserve Forest	West	Zoom	Tropical		750	1000	100
3	Tayong Reserve Forest	GoS	Reserve Forest	West	Gyalsing	Tropical		900	1100	100
4	Karthok Reserve Forest	GoS	Reserve Forest	East	Pakyong	Tropical		1200	1400	100
5	Chuba Reserve Forest	GoS	Reserve Forest	South	Chuba	Tropical		1200	1400	100
6	State Biodiversity Park	GoS	Reserve Forest	South	Damthang	Sub Tropical		1500	1800	100
7	Dubdi Khasmahal	GoS	Khasmahal Forest	West	Yuksam	Sub Tropical		1700	2000	200
8	Rabdentse Bird Reserve	GoS	Reserve Forest	West	Tikjuk	Sub Tropical		1800	2000	100
9	Fambong Lho Sanctuary	GoS	Reserve Forest	East	Gangtok	Sub Tropical		1800	2000	200
10	Tendong Nature Reserve	GoS	Reserve Forest	South	Damthang	Sub Tropical		2000	2400	200
11	Maenam Sanctuary	GoS	Reserve Forest and Sanctuary	South	Ravangla	Sub Tropical		2400	2700	200
12	Rate Chu Reserve Forest	GoS	Reserve Forest	East	Gangtok	Sub Tropical		2500	2700	200
13	Okhrey to Hilley to Barsey	GoS	Reserve Forest and Sanctuary	West	Barsey	Temperate		2500	3100	300
14	Kyishongla (Upper Tholung)	GoS	Reserve Forest and National Park	North	Tholung	Temperate		2700	3000	100
15	Pangolakha Sanctuary	GoS	Reserve Forest and Sanctuary	East	Pangolakha	Temperate		3000	3300	200
16	Shingba Sanctuary	GoS	Reserve Forest and Sanctuary	North	Shingba	Temperate		3100	3500	200
17	Rachela	GoS	Reserve Forest and Sanctuary	East	Rachela	Temperate		3300	3500	200
18	Tshoka to Dzongri	GoS	Reserve Forest and National Park	West	Tshoka	Temperate		3300	4200	600
19	Zema to Thangu	GoS	Reserve Forest	North	Zema	Temperate		3500	3900	200
20	Kyongnosla Sanctuary	GoS	Reserve Forest and Sanctuary	East	Kyongnosla	Temperate		3700	4000	100
21	Dzongri to HMI Base Camp	GoS	Reserve Forest and National Park	West	Dzongri	Temperate		4200	4800	600
22	Yumesamdong	GoS	Reserve Forest	North	Yumesamdong	Trans Himalayas		4000	4300	300
23	Lashar Valley	GoS	Reserve Forest	North	Lhasar Valley	Trans Himalayas		4000	4200	300
24	Muguthang	GoS	Reserve Forest	North	Muguthang	Trans Himalayas		4200	4500	300
							Total Area (ha)			**5500**
							% of Geographical Area			**0.775085**

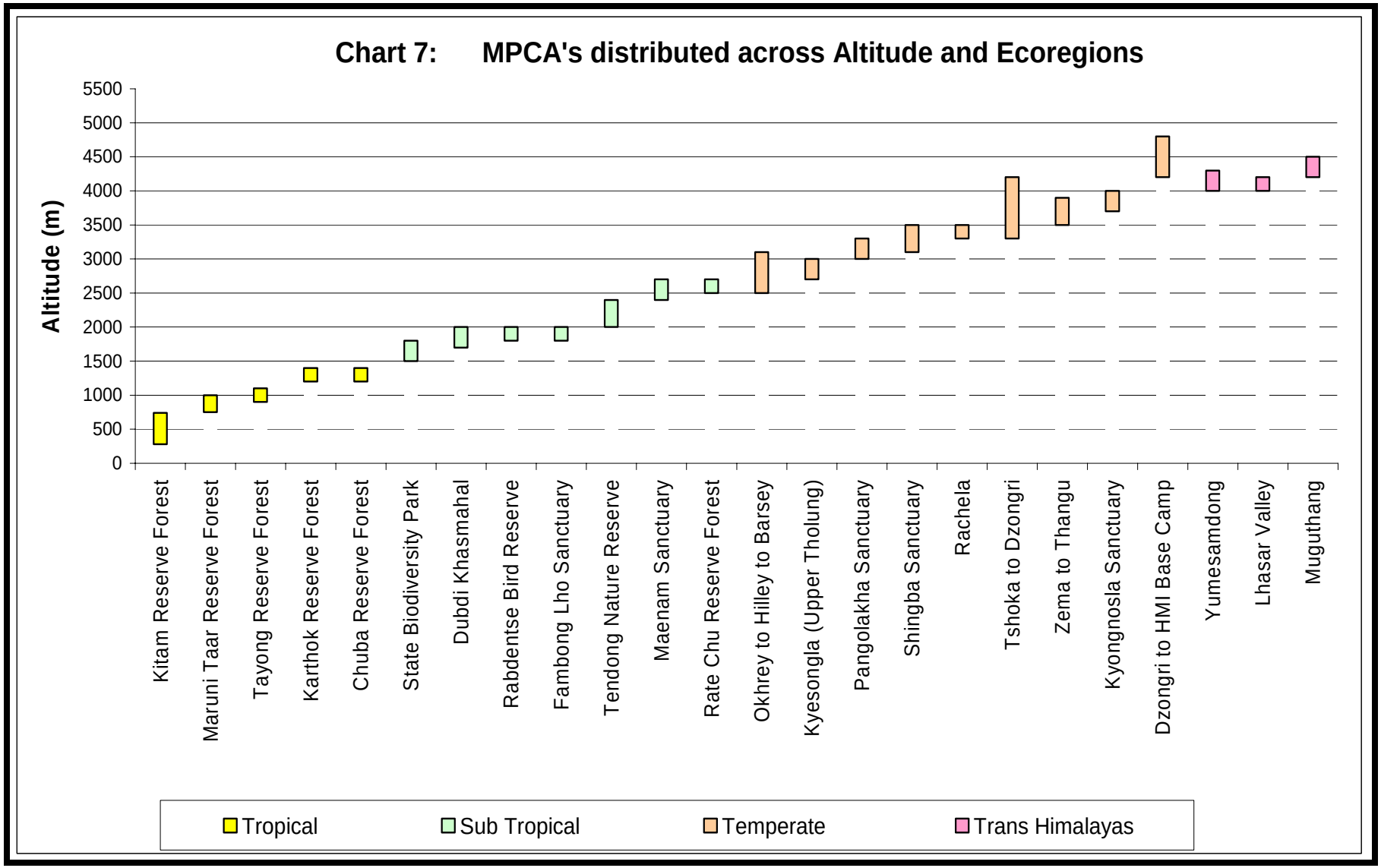


Chart 7: MPCA's distributed across Altitude and Ecoregions
Altitude (m)
5500
5000
4500
4000
3500
3000
2500
2000
1500
1000
500
0
Kitam Reserve Forest
Maruni Taar Reserve Forest
Tayong Reserve Forest
Karthok Reserve Forest
Chuba Reserve Forest
State Biodiversity Park
Dubdi Khasmahal
Rabdentse Bird Reserve
Fambong Lho Sanctuary
Tendong Nature Reserve
Maenam Sanctuary
Rate Chu Reserve Forest
Okhrey to Hilley to Barsey
Kyesongla (Upper Tholung)
Pangolakha Sanctuary
Shingba Sanctuary
Rachela
Tshoka to Dzongri
Zema to Thangu
Kyongnosla Sanctuary
Dzongri to HMI Base Camp
Yumesamdong
Lhasar Valley
Muguthang
Tropical
Sub Tropical
Temperate
Trans Himalayas

Table 10: Extent of MPCAs across Ecoregions

Ecoregion		Total Area (ha)	% of Area
Tropical		900	16
Sub Tropical		1200	22
Temperate		2800	51
Trans Himalayas		600	11
Total		**5500**	**100**

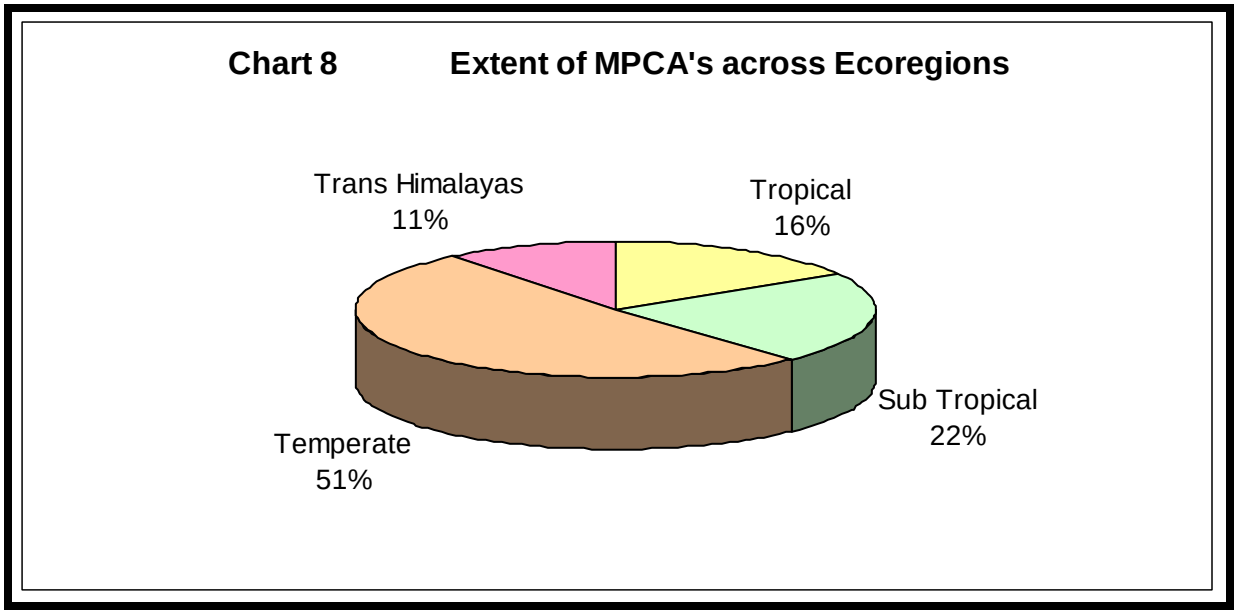


Table 11: Distribution of Existing MPDA's across Ecoregions and Altitudes

S. No	MPDA	Linked to MPCA	Management	Owner	Classification	District	Ecoregion	Altitude	Area
								m	ha
1	Kitam Herbal Garden	Kitam Reserve Forest	SMPB	FEWD/GoS	Reserve Forest	South	Tropical	450	3
2	Aushadhi Ban		MUSS, NGO	NHPC	Reserve Forest	South	Tropical	700	3
		Maruni Taar Reserve Forest							
		Tayong Reserve Forest							
		Karthok Reserve Forest							
		Chuba Reserve Forest							
3	State Biodiversity Park Herbal Garden	State Biodiversity Park	SMPB	FEWD/GoS	Reserve Forest	South	Sub Tropical	2000	3
4	Yuksam Territorial Nursery	Dubdi Khasmahal	Territorial	FEWD/GoS	Khasmahal Forest	West	Sub Tropical	1700	1
5	Tikjuk Territorial Nursery	Rabdentse Bird Reserve	Territorial	FEWD/GoS	Reserve Forest	West	Sub Tropical	1800	1
		Fambong Lho Sanctuary							
6	Samdruptse Herbal Garden	Tendong Nature Reserve	SMPB	FEWD/GoS	Reserve Forest	South	Sub Tropical	1800	3
7	Samdruptse Smriti Van		SMPB	FEWD/GoS	Reserve Forest	South	Sub Tropical	1800	3
8	Maenam Herbal Garden	Maenam Sanctuary	SMPB	FEWD/GoS	Reserve Forest	South	Sub Tropical	2400	3
9	Ratey Chu Herbal Garden	Rate Chu Reserve Forest	SMPB	FEWD/GoS	Reserve Forest	East	Temperate	2000	3
10	Bulbuley Smriti Van		Working Plan	FEWD/GoS	Reserve Forest	East	Temperate	1800	1
11	Guranshe / Noonthaley Herbal Garden	Okhrey to Hilley to Barsey	SMPB	FEWD/GoS	Reserve Forest	West	Sub Tropical	1800	3
12	Barsey Herbal Garden		SMPB	FEWD/GoS	Reserve Forest	West	Sub Tropical	1900	3
13	Tholung Herbal Garden	Kyishongla (Upper Tholung)	SMPB	FEWD/GoS	Reserve Forest	North	Temperate	3000	3
		Pangolakha Sanctuary							
14	Dombang / Zekuphyak Herbal Garden	Shingba Sanctuary	SMPB	FEWD/GoS	Reserve Forest	North	Temperate	4000	3
		Rachela							
15	Khecheopalri Herbal Garden	Tshoka to Dzongri	SMPB	FEWD/GoS	Reserve Forest	West	Sub Tropical	2000	3
16	Zema Herbal Garden	Zema to Thangu	SMPB	FEWD/GoS	Reserve Forest	North	Temperate	3600	3
17	Thangu Herbal Garden		SMPB	FEWD/GoS	Reserve Forest	North	Temperate	4000	3
18	Kyongnosla Herbal Garden	Kyongnosla Sanctuary	SMPB	FEWD/GoS	Reserve Forest	East	Temperate	4000	3
19	Hilley Potato Seed Farm	Dzongri to HMI Base Camp	FEWD	FEWD/GoS	Reserve Forest	West	Temperate	3000	3
		Yumesamdong							
		Muguthang							
		Lashar Valley							
								Total	**51**

Table 12: Extent of MPDAs across Ecoregions

Ecoregion	Total Area (ha)	% of Area
Tropical	6	12
Sub Tropical	18	35
Temperate	27	53
Trans Himalayas	0	0
Total	**51**	**100**

Chart 9: Extent of Existing MPDA's across Ecoregions

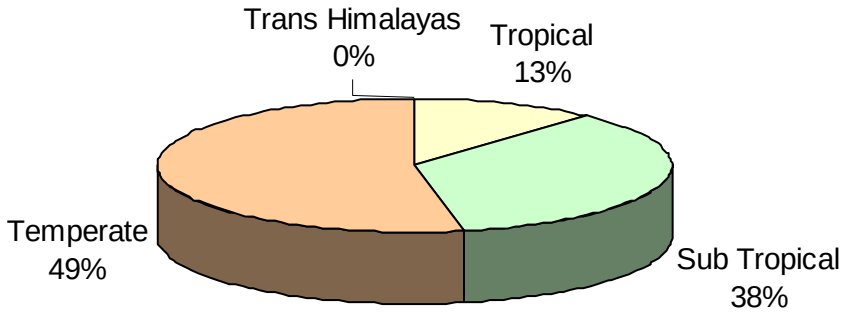
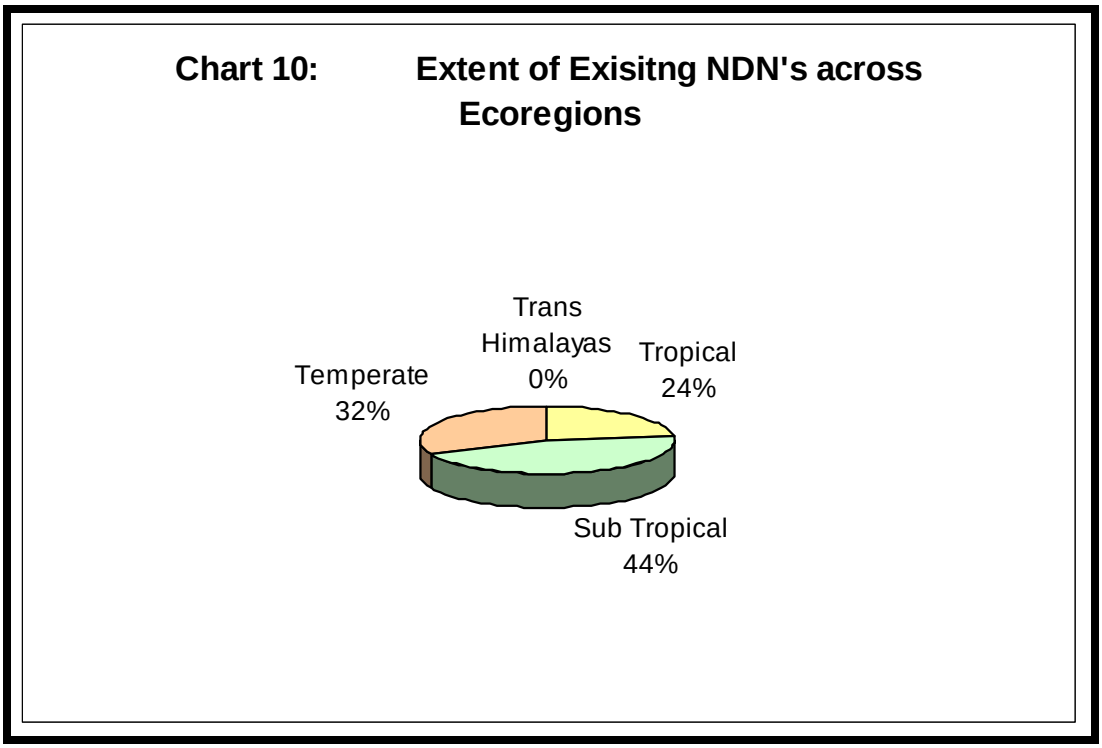


Table 13: Distribution of Existing NDNs across Ecoregions and Altitudes

No	NDN's	Linked to MPDA	Linked to MPCA	Management
1	Lower Kitam Community Nursery	Kitam Herbal Garden Aushadhi Ban	Kitam Reserve Forest	Mikhola Kitam JFMC
2	Sadam Suntaley Community Nursery			Sadam Suntaley JFMC
3	Middle Rateypani Community Nursery			Rateypani JFMC
4	Turuk Community Nursery			Turung Ramabung JFMC
5	Mellidara Paiyong Community Nursery			Mellidara Paiyong JFMC
6	Rangit Private Nursery			Private (Naresh Pradhan)
			Maruni Taar Reserve Forest	
			Tayong Reserve Forest	
			Karthok Reserve Forest	
			Chuba Reserve Forest	
7	Damthang Botanical Park	State Biodiversity Park Herbal Garden	State Biodiversity Park	B. M. Rai, Retired from BSI
		Yuksam Territorial Nursery	Dubdi Khasmahal	
		Tikjuk Territorial Nursery	Rabdentse Bird Reserve	
8	Martam Community Nursery		Fambong Lho Sanctuary	Martam EDC
9	Samdong Community Nursery			Samdong EDC
10	Palum Community Nursery	Samdruptse Herbal Garden	Tendong Nature Reserve	Rong Bull JFMC
11	Singithang Community Nursery			Singithang JFMC
12	Maniram Community Nursery	Samdruptse Smriti Van		Maniram Phalidara JFMC
13	Bikmat Community Nursery			Tangzi Bikmat JFMC
14	Phamtam Community Nursery	Maenam Herbal Garden	Maenam Sanctuary	Sada Phamtam EDC
15	Borong Community Nursery			Borong EDC
16	Polok Community Nursery			Borong EDC
17	Ralang Community Nursery			Ralang EDC
18	Rabongla Community Nursery			Rabongla EDC
19	Dara Gaon Community Nursery			Pathing EDC
20	Pathing Community Nursery			Pathing EDC
21	Yangyang Community Nursery			Yangyang EDC
22	Mangzing Community Nursery			Lingmoo EDC
23	Chaunri Danra Community Nursery			Sokpay EDC
		Ratey Chu Herbal Garden	Rate Chu Reserve Forest	
		Bulbuley Smriti Van		
24	Uttarey Community Nursery	Guranshe / Noonthaley Herbal Garden	Okhrey to Hilley to Barsey	Uttarey EDC
25	Mukurung Community Nursery			Uttarey EDC
26	Khandu Community Nursery			Dentam EDC
27	Hee Patal Community Nursery			Hee Patal EDC
28	Martam Community Nursery			Martam EDC
29	Sribadam Community Nursery	Barsey Herbal Garden		Sribadam EDC
30	Dodok Community Nursery			Soreng EDC
31	Buriakhop Community Nursery			Soreng EDC
		Tholung Herbal Garden	Kyishongla (Upper Tholung)	
			Pangolakha Sanctuary	
32	Namnasa Community Nursery	Dombang / Zekuphyak Herbal Garden	Shingba Sanctuary	Shingba Faka EDC
			Rachela	
		Khecheopalri Herbal Garden	Tshoka to Dzongri	
		Zema Herbal Garden	Zema to Thangu	
		Thangu Herbal Garden		
		Kyongnosla Herbal Garden	Kyongnosla Sanctuary	
33	Sombaria Community Nursery	Hilley Potato Seed Farm	Dzongri to HMI Base Camp	Sombaria EDC
34	Okhery Community Nursery			Ribdi EDC
			Yumesamdong	
			Muguthang	
			Lashar Valley	

Table 14: Extent of NDNs across Ecoregions

Ecoregion	Total Area (ha)	% of Area
Tropical	4.5	24
Sub Tropical	8.5	45
Temperate	6	32
Trans Himalayas	0	0
Total	**19**	**100**



Action Plan for Conservation of Local Health Culture

1. Tibetan System Of Traditional Medicine

Box Item 6: Action Plan to Revitalize the Tibetan System of Medicine

Dear Mrs. Usha Lachungpa,

Its Tenzin, here to send this mail on the idea for Conservation and Sustainable Utilization of Medicinal plants.

A. To Open Pharmacy Department

1. We need permit to collect medicinal plants around East, West, South and north of Sikkim.
2. We need pharmacy factory at Gangtok with, ground floor for machine, 1st floor as store and top open floor for drying medicine and herbs.
3. We need machines for making medicine need (A) Grinding machine (B) Pills making machine and (C) Pills shining machine. These three major machines are needed first.
4. We need five main workers with one instructor as Doctor.

B. To Open Private Clinic

1. Firstly we have to open one clinic at Gangtok, for that we need a minimum four rooms.
   (a) Doctor chamber with a bathroom attached.
   (b) Dispensary
   (c) Store room
   (d) Waiting room with toilet

C. To Open Tibetan Medical College

1. We need Tibetan Medicine to be registered under Government of India so that we can easily open the college and issue graduate certificates to the student.
2. We need a minimum of two Tibetan well qualified teachers / doctors.
3. We have to select ten students maximum for first batch and second batch will be selected after completion of first batch for five year course.
4. Selection of student must be below 25 year of age and for schooling need a 12th standard completion certificate. Monk / Nun need their respective monastic confirmation letter.
5. They have to follow five year theory and one more year practical training / internship.
6. Student must be good in Tibetan Grammar and Composition.
7. Entrance examination, all written and interview will be through Tibetan language.
8. After entrance exam, he / she needs minimum 50% marks to get a seat and there will be selection from top most ten only.

Hope this will give you little idea on how we need to start this project.
If you have any more to ask, feel free. Hope for the best.

With all my regards,

Amchi Tenzin Phelgye (Gonshar)
tphelgye@yahoo.co.in

Most of the *Amjis* met with or referred to are old today, barring a few. Many cannot communicate in other languages (Nepali / Hindi / English). Some are also fearful of being ridiculed or looked down upon as backward. However the Lama *Amji* at Thangu commented that several army officials and staff regularly visit him for herbal remedies and show high respect for Himalayan (Tibetan) herbal treatments, but local people are more reluctant about using '*Jadi-Butis'*. They rather would go to army camp doctors even if they may not get relief or go to Mangan or Gangtok / Siliguri / Kolkata / Delhi.

The most useful and practical solution discussed was the creation of the Amji Training Centers with regular classes, field trips, medicinal plant farms and suitable incentives. A strong link needs to be established at the existing institutions in Leh, Ladakh and Dharamsala. The Lachung *Amji* had the following newsletter:
Trans-Himalayan Amchi Medical Education Newsletter (Scientific Committee)
C/O NOMAD "Health and Education"
Ridzong Labrang, P.O. Box 97
Leh, Ladakh 194101, India
On its committee the following are mentioned: Gurmet Namgyal, Ex-Research Officer ARO, Skalzang Dorjee TMAI Dharamsala, Amji Gyatso Gen Secretary HAA, Tsering Phuntsog Chief Amji Health Department, Thupstan Choszang NOMAD.

The Dokpas in Trans-Himalayan Sikkim also go to Darjeeling *Amjis* for treatment (especially of Tuberculosis) and bring back medicines from the following address:
Tibetan Medical and Astro Institute (TMAI)
Gangchen Kyishong, Dharamsala 176216,
Himachal Pradesh (India)

Amji Kelsang Dorjee at the Tibetan charitable hospital at Namnamg, Gangtok mentioned a scholarship instituted by HH The Dalai Lama for two Trans-Himalayan students at regular intervals. In fact Amji Sonam from STNM is one of the few amongst Sikkim's trained persons. And STNM is the only hospital where there is a regular Amji Clinic visited by scores of people. Such trainings are for several years after which field training in Sikkim for another few years could add upto over ten years.

Amji Tenzin Phelgye (Gonshar) aged 32 years, son of Lama Dorjee completed the Amji Training course of five years at Chagpori Tibetan Medical Institute in 1996. He has also been trained at the Tibetan Medical and Astro Institute. After completing a two year stint at Benaras Hindu University he is now a practicing doctor at the Chagpori Tibetan Medical Institute over the last five year. He is another of the local talents who could be tapped for this project. He can be contacted at the email address tphelgye@yahoo.co.in and phone no: 098320 – 91397 (mobile)

We hence need to open Amji Training Centers at Lachung and Thangu through *Shedas* (monastery schools) and one Tibetan Medical College at the Deorali *Sheda* in a collaborative effort with the a*mjis* and Tibetan Medical Institutes at Dharamsala and Darjeeling for the revitalization of this system of medicine.

2. Nepali System Of Traditional Medicine

The Nepali system of herbal medicine survives today as *Jaributi* or simply as *Pahadey dabai*. The practitioners are known as *Baidyas* and can be seen practicing in the local village *haats* This system is most prevalent in the Tropical and Subtropical villages. Since there is no organized set up, this is fast disappearing under the combined onslaught of modern education and allopathic infrastructure. Amongst the various types of herbal healers in this system of medicine, bone setters are still quite in demand by the villagers. At present this system survives at the peddler level, as there is no existing organized structure or institution supporting this system of traditional medicine.

However there is a Baidya Pakhrin Chikitshalay at Alagarah, Kalimpong, Darjeeling District of West Bengal, which specializes in bone setting. This private hospital has been serving the rural masses in healing bone fracture with herbal medicines for over the last forty years with dedication and distinction. Baidya Chewang could be requested to open a branch of the Pakhrin Hospital in Sikkim. The Baidyas of Sikkim could also be trained in this hospital and gain necessary expertise and valuable experience. Hence there is an urgent need for institution building and organizing the practitioners of this system of medicine. They also need to be linked up with Ayurvedic colleges and training institutes outside the state.

3. Lepcha System Of Traditional Medicine

The Lepcha herbal system has almost disappeared. This is in sharp contrast to the fact that they were the world famous plant collectors and possess a vast knowledge of ethno-botany. Dzongu in North Sikkim is amongst the last strongholds of the Lepcha culture and this system of medicine is still practiced here. BSI, Sikkim Circle and WWF-Sikkim have conducted research on ethno-botany in this region. Unfortunately there are no known reputed medical training institutes or renowned practitioners for this system of medicine.

Chapter 8 Tentative Budgetary Requirement

Duration: 5 to 7 years

A Medicinal Plants Conservation

Rs in Lakhs

S. No	Activity / Budget Head	Unit Cost	Units	Total
1	Creation of MPCAs	30	25	750
2	Creation of MPDAs	15	16	240
3	Strengthening of existing MPDAs	5	14	70
4	Creation of Network of Decentralized Nurseries	2	250	500
5	Creation of Network of Home Herbal Gardens	0.05	25,000	1,250
			Sub Total	**2,810**
6	Capacity Building	30%		843
7	Research	15%		422
8	Project Management	10%		281
			Total	**4,356**

B Local Health Culture Conservation

Rs in Lakhs

S. No	Activity / Budget Head	Unit Cost	Units	Total
1	Creation of Branch of Chagpori Tibetan Medical Institute at Deorali Sheda	100	1	100
2	Creation of decentralized Amji Training Centres with Shedas	10	6	60
3	Creation of Branch of Baidya Pakhrin Chikitshalaya in Gangtok	100	1	100
4	Creation of decentralized Baidya Training Centres in association with renowned Baidyas	10	6	60
5	Linking up Traditional Practitioners at Network of Decentralized Nurseries	2	250	500
			Sub Total	**820**
6	Capacity Building	40%		328
7	Research	10%		82
8	Project Management	10%		82
			Total	**1,312**

	Major Budget Head	Total for 5 years
A	Medicinal Plants Conservation	4,356
B	Local Health Conservation	1,312
	Grand Total	**5,668**

Note: *Chart 5 and Chart 6 indicate the prioritization of these project components*

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Appendix 1: State Level Planning Committee and Working Group

S. No	Name	Designation	Address	Position
1	Mr. T. R. Sharma	PCCF –cum- Forest Secretary	Forest Secretariat, Deorali, Gangtok 737102, Sikkim	Chairman
2	Dr. T. R.Gyatso	Secretary Health	Government of Sikkim, Gangtok, Sikkim	Member
3	Mr. R. S. Shreshta	Secretary DST	Government of Sikkim, Gangtok, Sikkim	Member
4	Mr. G. K. Gurung	Secretary Horticulture	Government of Sikkim, Gangtok, Sikkim	Member
Forestry / State Medicinal Plants Board Group				
5	Mr. D. B. Shreshta	CCF Environment	Forest Secretariat, Deorali, Gangtok 737102, Sikkim	Member
6	Mr. M. L. Arrawatia	CCF (Working Plan)	Forest Secretariat, Deorali, Gangtok 737102, Sikkim	Member Secretary
7	Dr. Anil Mainra	ACCF (LU&E)	Forest Secretariat, Deorali, Gangtok 737102, Sikkim	Member
8	Mr. S. B. S Bhadauria	CF (Working Plan)	Forest Secretariat, Deorali, Gangtok 737102, Sikkim	Member
9	Mr. Hari Pradhan	Member SMPB	Forest Secretariat, Deorali, Gangtok 737102, Sikkim	Member
10	Mr. Sandeep Tambe	DFO Working Plan	Forest Secretariat, Deorali, Gangtok 737102, Sikkim	Member
11	Mr. Brijendra Swaroop	DFO Territorial	Gyalsing, West Sikkim – 737111	Member
12	Mrs. Usha Lachungpa	Sr. Research Officer, Wildlife	Forest Secretariat, Deorali, Gangtok 737102, Sikkim	Member
ISM Group				
13	Ms. Jumuna Pradhan	Practitioner / Vendor	Rhenock Bazaar, East Sikkim	Member
14	Mr. Purna Bahadur Rai	Practitioner	Sang Martam, Lall Bazaar, Gangtok	Member
Research and Academicians Group				
15	Dr. A. S. Chauhan	Director BSI Sikkim Circle	Zero Point, (opposite Nirman Bhavan) Gangtok, Sikkim	Member
16	Dr. A. P. S. Krishna Dr. Lalit Rai	Incharge GBPIHED Scientist	Gangtok, Sikkim	Member
17	Dr. R.S Sengupta	Principal Himalayan Pharmacy Institute	Gangtok, Sikkim	Member
18	Dr. Pushpa Tamang	Deputy Director SIRD	Karfectar, Jorethang, South Sikkim, Sikkim	Member
19	Mr. Bejoy Gurung	Joint Director, Research	Forest Secretariat, Deorali, Gangtok 737102, Sikkim	Member
NGOs Group				
20	Dr Bibhav Talukdar Mr. Santosh Rai	Director, ATREE Scientist	Bunglow No 2, Near Airforce Officer's Enclave, Bhujiapani, Bagdogra, West Bengal PIN: 734422	Member
21	Mr. Renzino Lepcha	Executive Secretary ECOSS	Zero Point, Old Secretariat, (Opposite State Bank of India), Gangtok, Sikkim	Member
22	Ms Raiteemu Monica Gurung	Eastern Himalayan Institute	Gangtok, Sikkim	Member
23	Mr. Chewang Bhutia Ms. Uden Tshering	Khangchendzonga Conservation Committee	PO :Yuksam, West Sikkim 737113, Sikkim	Member
24	Mr. Gokul Rai	General Secretary SPSS NGO, President Tangzi Bikmat JFMC, HWLW South District, Panchayat Secretary	PO: Bikmat, South Sikkim 737102, Sikkim	Member
25	Dr. Ghanshyam Sharma	In charge, WWF Sikkim	Near Forest Secretariat, Deorali, Sikkim 737102	Member
Industries / Traders / Vendors Group				
26	Mr. Menla Ethenpa	General Manager SIMFED	Gangtok, Sikkim	Member

Working Group

S. No	Name	Designation	Address	Position
1	Mr. M. L. Arrawatia	CCF (Working Plan)	Forest Secretariat, Deorali, Gangtok 737102, Sikkim Email: arrawatiaml@yahoo.com Phone: 03592 – 281411 (o), 280254 (r)	Convener
2	Mr. Sandeep Tambe	DFO Working Plan	Forest Secretariat, Deorali, Gangtok 737102, Sikkim Email: sandeep_tambe@lycos.com Phone: 098320 – 94793 (mobile),	Member
3	Mrs. Usha Lachungpa	Senior Research Officer and Green Circle NGO member	Forest Secretariat, Deorali, Gangtok 737102, Sikkim Email: slg_ganden@sancharnet.in Phone: 03592 – 281974 (o), 225273 (r)	Member
4	Mr. Brijendra Swaroop	DFO Territorial	Gyalsing, West Sikkim 737111, Sikkim Email: brijendra_swaroop@lycos.com Phone: 03595 – 250747 (o), 250745 (r)	Member
5	Mr. Renzino Lepcha	Executive Secretary ECOSS NGO	Zero Point, Old Secretariat, (Opposite State Bank of India), Gangtok, Sikkim Email: ecoss@sikkiminfo.net Phone: 03595 – 229154 (o) , 224654 (r)	Member
6	Mr. Gokul Rai	General Secretary SPSS NGO, President Tangzi Bikmat JFMC, HWLW South District, Panchayat Secretary	PO: Bikmat, South Sikkim 737102, Sikkim Email: spss_sikkim@lycos.com spss_sikkim@rediffmail.com Phone: 094341 – 27154 (mobile)	Member
7	Ms. Uden Tshering	Khangchendzonga Conservation Committee, Panchayat Yuksam	PO :Yuksam, West Sikkim 737113, Sikkim www.geocities.com/kcc_sikkim Email: nymgaling@yahoo.com kcc_sikkim@hotmail.com Phone: 03595 – 241211 (o), 241216 (r)	Member

Appendix I1: Medicinal Plants of Sikkim (Source BSI-Sikkim Circle)

S. No	Botanical Name	Family	Altitute of Occurrence in Metres	
			From	To
1	Abrus precatorius L.	Fabaceae	700	1100
2	Abies densa Griffith.	Pinaceae	2700	3420
3	Abroma angusta L.	Sterculiaceae	1400	2700
4	Achyranthes aspera L.	Amaranthaceae	1100	
5	Aconitum ferox Wallich	Ranunculaceae	4100	
6	Acorus calamas L.	Araceae	1100	1820
7	Adhatoda vascica Nees	Acanthaceae	1300	
8	Aegle marmelos Correa	Rutaceae	760	
9	Agrimonia pilosa Ledleb	Saxifragaceae	2400	2900
10	Alstonia scholaris R. Br.	Apocynaceae	2700	
11	Ammi majus L.	Apiaceae	1500	
12	Anaphalis margaritacea (L.) Benth. & Hook. F.	Asteraceae	2700	
13	Angellica cyclocarpa (Norman) Cannon	Apiaceae	2300	2900
14	Artimesia nilagririca (C.B. Clark) Pamp	Asteraceae	1200	2700
15	Astilbe rivularis Buch-Ham ex D.Don.	Saxifragaceae	2500	3000
16	Barleria chitria Lindley.	Acanthaceae	700	
17	Berberis cristata DC.	Berberidaceae	3700	4100
18	Berberis insignis Hook.f. & Thomson.	Berberidaceae	2500	3200
19	Berberis wallichiana DC.	Berberidaceae		3900
20	Bergenia purpurasens Hook.f. & Thomson	Saxifragaceae	2900	3900
21	Bergenia ciliata (Hara) Stenb.	Saxifragaceae	1500	2900
22	Bischofia javanica Blume	Bischofiaceae	1300	2100
23	Bistorta vivipara (L.) S.F. Gray	Polygonaceae	3900	
24	Bridellia retusa Spreng	Euphorbiaceae	1800	
25	Calotropis procera (Aiton) Drynad	Asclepiadaceae	1100	
26	Centella asiatica (L.) Urb.	Apiaceae	2100	
27	Cautleya gracilis (Smith) Dandy	Zingiberaceae	1100	1800
28	Cissampelos pareria var.hirsuta (Buch- Ham. Ex DC.) Torman	Menispermaceae	1300	2100
29	Celastrus paniculatus Willd	Celastraceae	1700	
30	Cinnamomum impressinervium Meissn.	Lauraceae	1400	
31	Clematis munroiana Wallich ex.	Ranunculaceae	1800	
32	C.wightiana Wallich ex Wight & Arn.	Ranunculaceae	1300	1900
33	Clerodendron fragrans Vent.	Verbinaceae	1500	1900
34	Colebrookea oppositifolia Smith	Lamiaceae	1100	1800
35	Costus speciosus (Koenig) Smith	Costaceae	1800	
36	Cuscuta reflexa Roxb.	Cuscutaceae	1700	
37	Dactylorhiza hatagirea (D.Don) Soo.	Orchidaceae	3500	4200
38	Crawfurdia companulaceae Wallich & Grifith	Gentianaceae	1500	
39	Datura innoxia Mill.	Solanaceae	1700	
40	Dicentra scandens (D.Don) Walp.	Fumariaceae	2500	
41	Dichora fabrifuga Lour.	Saxifragaceae	2100	
42	Difflugosa divericata (Ness) Bremek	Acanthaceae	1200	1500
43	Digitalis purpurea L.	Scrophulariaceae	1700	2900

44	Dioscorea bulbifera L.	Dioscoreacea	1400	
45	D.pentaphylla L.	Dioscoreacea	1300	
46	D.Prazari Prian & Burkil	Dioscoreacea	1800	
47	Drymaria cordata Blume	Caryphyllaceae	1300	2100
48	Elatostema platyphyllum Wedd.	Urticaceae	1300	2100
49	Elsholtjia blanda Benth	Lamiaceae	1100	
50	Engelhardia spicata Blume	Juglandaceae	1300	1700
51	Entada pursactha DC. ssp. Sinohimalensis Grierson & Long	Fabaceae	1400	
52	Equisetum diffusum D.Don	Equisetaceae	1300	2100
53	Eria pannea Lindley	Orchidaceae	1700	
54	Eupatorium adenophorum Sprengel	Asteraceae	1000	
55	Evodia tricotoma (D.Don) Hook.f.	Rutaceae	1800	2700
56	Ficus hookeriana Corner	Moraceae	1400	1900
57	Fagopyrum esculentum Moench	Polygonaceae	1100	1900
58	Gentiana kumaonensis Biswas	Gentiniaceae	2200	
59	Guldenstaedtia himalaica Baker	Papilionaceae	4100	
60	Gynocardia odorata R. Br.	Flacourtiaceae	1520	
61	Hauttunia cordata Thumb.	Saurariaceae	1800	
62	Hedychium coronarium Koenig	Zingiberaceae	1700	2100
63	Helica nilagirica Beddome	Proteaceae	2700	
64	Hemiphragma heterophyllum Wallich.	Scrophulariaceae	1800	2300
65	Heteropanax fragrans Seem.	Araliaceae	1820	
66	Hippophae rhamnoides L.	Urticaceae	1460	
67	Huperzia pulcherrima (Wallich ex Hook.& Crev.) Sen & Sen.	Huperziaceae	1400	2100
68	Hypericum choisianum Wallich	Hypericaceae	1800	2900
69	Jasminum multiflorum (Brum.f.)	Oleaceae	1900	2100
70	Andrews.			
71	Kampferia sikkimensis (King & Baker)	Zingiberaceae	1800	
72	Laportea terminalis Wright	Urticaceae	1700	
73	Litsea cubeba (Lour.)Pers.	Lauraceae	1300	2100
74	L. salicifolia	Lauraceae	1700	
75	Mahonia nepalensis DC.	Berberidaceae	1400	2800
76	Mesua ferrua L.	Clusiaceae	900	
77	Nardostachys grandiflora DC.	Valerianceae	3700	4200
78	Nasturtium officinale Brown	Brassicaceae	1900	
79	Oxoxylum indicum (L.) Ham.ex Wallich	Bignoniaceae	1700	
80	Oxalis debils H.B.K var. crymbosa (DC.) Lourt.	Oxalidaceae	900	
81	Panax pseudoginsang Wallich.	Araliaceae	1900	2900
82	Peperomia reflexa A. Dictr.	Piperaceae	1300	1800
83	Phytolacca acinosa Roxb.	Phytolacaceae	1800	
84	Plantago lanceolata L.	Plantaginaceae	1300	2100
85	Pedicularis gracilis Wallich	Scrophulariaceae	2900	
86	Paederia scandens (Lour.) Merr.	Rubiaceae	1300	2200
87	Persea macrantha (Ness) Kost.	Lauraceae	1800	
88	Picrorrhiza scrophulariflora Pennel.	Scrophulariaceae	3400	4100
89	Pleurogyni thomsonii C.B.Clark.	Gentiniaceae	3700	
90	Podophyllum hexandrum Royle	Podophyllaceae	2900	3700
91	Pteris biaurita L.	Pteridaceae	1100	1900
92	Pyrus sikkimensis Hort.ex Dence	Rosaceae	1300	1900

93	Rhododendron antopogon D.Den	Ericaceae	3200	3900
94	Rhododendron arboreum Smith	Ericaceae	2100	2900
95	Rhus semialata Murr.	Anacardiaceae	1800	
96	Rhodiola bupleuroides (Wallich ex Hook. & Thomson) Fu.	Saxifragaceae	3700	
97	Rubia mangith Roxb.ex Flemming	Rubiaceae	1200	2300
98	Rumex dentatus L.	Polygonaceae	2700	
99	Sedum multicauli Wallich	Grassulacue	3800	
100	Semecarpus anacardium L.f.	Anacardiceae	780	
101	Smilacina oleracea (Baker) Hook.f.	Smilacaceae	2700	
102	Smilax asperculis A.DC.	Smilacaceae	2500	
103	Smilax glaucophylla Klotzsch	Smilacaceae	2500	
104	Solanum erienthum D.Don	Solanaceae	1400	
105	Spermadictyon suaveolens Roxb.	Rubiaceae	1800	
106	Stephenia wightii (A.) Dunn	Minispermaceae	1700	
107	Spiranthes sinensis (Per.) Ames.	Orchidaceae	2920	
108	Swertia chirayta (Roxb.ex Fleming) Karsn.	Gentianiaceae	2700	3600
109	Symplocos lucida Wallich	Symplocaceae	2400	
110	Taxus wallichiana (Zucc.) Pilger.	Combretaceae	2920	
111	Terminalia myriocarpa Heurek & Muell. -Arg	Taxaceace	1800	
112	Thunbergia coccinea T. Anderson.	Thunbergiaceae	1800	
113	Trichosanthes tricuspidata Lour.	Cucurbitaceae	2200	
114	Thysanolaena maxima (Roxb.) Kur.	Poaceae	1100	1800
115	Tristeum hirsutum Wallich	Caprifoliaceae	3700	
116	Tupistra nutans Wallich	Lilaceae	1820	
117	Urtica urdens Lamk.	Urticaeae	1300	2100
118	Valeriana hardwickii Wallich	Valerianaceae	3300	
119	Verbausum thepsus Wallich	Scrophulariaceae	2700	
120	Viola pilosa Blume	Violaceae	1800	
121	Viscum articulatum Brum.f.	Lorantaceae	1800	2300
122	Zanthoxylum acanthoipodium DC.	Rutaceae	1900	2500
123	Z. arnatum DC.	Rutaceae	2700	

Appendix III: Summary of Consultative Process

Public Hearing Attendance – Namprikdang, Dzongu, North Sikkim

Dated-11th April 2003

S. No.	Name	Location	Contact No.
1	Nimtso Lepcha	Leek busty	
2	Sherap Lepcha	Tingvong	94341-26961
3	Mika Lepcha	Leek	Email:mikasa_36@hotmail.com
4	Namgyal Lepcha (MLAS)(D)		234816
5	Chyoden Lepcha	Tingvong	223811
6	Chophel Lepcha	Hee-Gyathang	94341-36917
7	Dr .N.T.Lepcha	Mangan	234260(O) 234259(R)
8	Tashi T Lepcha	MLAS (Dzongu)	
9	Chuden Lepcha	Passingdang	234816
10	Ugen Lepcha	Passingdang	234816
11	Jorgba Lepcha	Tingvong	
12	Dupzor Lepcha	Lingdem	
13	Yangching Lepcha	Tingvong	
14	Pema S. Lepcha	Leek	
15	Pema N Lepcha	Leek	234061
16	Passang Namgyal Lepcha	Salim Pakel	234247
17	Tenzing Lepcha	Ramom Ship Gyer	234643,280740,281591
18	Loden Gyamtso Lepcha	Passingdong	
19	Top Tshering Lepcha		
20	Chewang Dorjee Lepcha		
21	Choden Lepcha	Hee-Gyathang	
22	Sanga Dadul Lepcha		
23	N.T.Lepcha		
24	Sangkit Lepcha		
25	Pemamit Lepcha		
26	Pem Dorjee Lepcha		
27	Topchen Lepcha		
28	Dupjor Lepcha		
29	Solomon Rai	ECOSS	
30	Renzino Lepcha	ECOSS	
31	Daniel S. Lepcha	ECOSS	

Public Hearing Attendance at Rongli, East Sikkim

Dated : 12th April, 2003

S. No.	Name	Contact No.
1.	Chandra Bahadur Subedi (L. Sudunglakha)	253553
2.	Bishnu Prasad Sharma (L. Suntala)	253553
3.	Durga Prasad Dewari (M. Dalapchand)	255751
4.	Dal Bahadur Chettri (L. Dalapchand)	255751
5.	Harka Bahadur Gurung (N. Regu)	
6.	Balaram Chettri (Chujachen)	255908
7.	Phurba Dorjee Tamang (Nimachen)	
8.	Chandra Kala Pradhan (Rongli)	255812, 255991
9.	Indra Kri Pradhan (Changlakha)	98320-14758
10.	Menuka Bhutia Rongli (Lamatero)	255884
11.	Tilsa Ram Rai (Khaselakha)	
12.	Kvirna Bahadur Gurung (N. Regu)	55859
13.	Jit Bahadur Gurung (N. Regu)	55859
14.	Sri Maya Rai (N. Regu)	
15.	Kabita Chettri (L. Dalapchand)	255712
16.	Padam Kumari Pradhan (Rongli)	255911
17.	Indra Man Gurung (N. Regu)	
18.	Padma Lall Sharma (Rongli)	
19.	Arjun Kr. Pradhan (Rongli)	255834
20.	Prakash Dhakal (Rongli)	255998
21.	Chandra Maya Pradhan (Rongli)	
22.	Ganesh Bahadur Gurung (Sudunglakha)	253185
23.	Tula Ram Sharma (Changelakha)	
24.	Naina Singh Rai (Changelakha)	
25.	Krishna Bahadur Rai (Changelakha)	
26.	Pal Bahadur Gurung (M. Dalapchand)	255943
27.	Main Kumar Gurung (M. Dalapchand)	255732
28.	Prayash Pradhan (Rongli)	255884
29.	Milan Gurung (Dalapchand)	255987
30.	Durga Gurung (Dalapchand)	255987
31.	Puran Gurung (Dalapchand)	255945
32.	H.N. Pradhan (Rongli)	255974

Public Hearing Attendance at Nayabazaar, West Sikkim

Dated : 12th April, 2003

S No	Name	Address
1	NB Sherpa	Sankhu Dentam, West Sikkim
2	PN Sherpa	Sankhu Dentam, West Sikkim
3	JB Gurung	Malabasey, West Sikkim
4	Kharka Singh Pradhan	Budang, West Sikkim
5	Lok Bhadur Rai	Singling, West Sikkim
6	KB Chettri	Majhitar, South Sikkim
7	TB Subba	Majhitar, South Sikkim
8	Damber Singh Chettri	Budang, West Sikkim
9	Tika Ram Kafaley	Malabasey, West Sikkim
10	IB Kafaley	Dodok, West Sikkim
11	Chabilal Pandey	Malabasey, West Sikkim
12	Man Bahadur Subba	Chakung, West Sikkim
13	TB Gurung	Chakung, West Sikkim
14	CB Gurung	Chakung, West Sikkim
15	Penchu Lepcha	Chakung, West Sikkim
16	Kharka Bhadur Ghimirey	Gangtok, East Sikkim
17	Purna Bhadur Jogi	Dharamdin, West Sikkim
18	Chatur Singh Rai	Zoom, West Sikkim
19	Kul Bhadur Chettri	Gelling, West Sikkim
20	Man Bhadur Chettri	Gelling, West Sikkim
21	Durga Prasad Chettri	Gelling, West Sikkim
22	Hari Bhakta Sharma	Jorethang, West Sikkim

Public Hearing Attendance at Kitam, South Sikkim

Dated : 12th April, 2003

S No	Name	Address
1	Ms Menuka Chettri	Compound, Majhitar, South Sikkim
2	Ms Bhutti Maya Rai	Compound, Majhitar, South Sikkim
3	Ms Pampha Rai	Compound, Majhitar, South Sikkim
4	Ms Dilli Maya Rai	Compound, Majhitar, South Sikkim
5	Ms Ganga Rai	Compound, Majhitar, South Sikkim
6	Ms Ambika Rai	Compound, Majhitar, South Sikkim
7	Ms Bina Tamang	Compound, Majhitar, South Sikkim
8	Ms Bindya Mangar	Compound, Majhitar, South Sikkim
9	Ms Hema Kumari Gurung	Compound, Majhitar, South Sikkim
10	Ms Soma Doma Tamang	Compound, Majhitar, South Sikkim
11	Mr Tej Bhadur Subba	Compound, Majhitar, South Sikkim
12	Mr Kuber Mangar	Compound, Majhitar, South Sikkim
13	Ms Dhan Maya Rasiley	Compound, Majhitar, South Sikkim
14	Ms Icha Maya Bishwkarma	Compound, Majhitar, South Sikkim
15	Ms Kamla Biswkarma	Compound, Majhitar, South Sikkim
16	Mr Sakun Rai	Compound, Majhitar, South Sikkim
17	Mr Man Bhadur Rai	Compound, Majhitar, South Sikkim
18	Ms Kash Maya Rai	Compound, Majhitar, South Sikkim
19	Ms Madhu Mangar	Compound, Majhitar, South Sikkim
20	Ms Kamala Tamang	Compound, Majhitar, South Sikkim
21	Ms Padma Bishwkarma	Compound, Majhitar, South Sikkim
22	Ms Bina Bishwkarma	Compound, Majhitar, South Sikkim
23	Mr Abhi Lal Rai	Compound, Majhitar, South Sikkim
24	Mr Hem Bhadur Rai	Compound, Majhitar, South Sikkim
25	Mr Shanta Rai	Compound, Majhitar, South Sikkim
26	Mr Krishna Chettri	Compound, Majhitar, South Sikkim

Public Hearing Attendance – Yuksam, West Sikkim

Dated-7th May 2003

S.No.	Name	Address
1	Khebo Lal Gurung	Topsing
2	Shiv lal Chauhan	Tsong
3	Om Bahadur Chettri	Topsing
4	S. T. Bhutia	Yuksam
5	Bal Krishana Chauha	Tsong
6	Birkha Man Subba	Yuksam
7	K. B. Gurung	Yuksam
8	Birkhalal Subba	Tsong Dubdi
9	Surbeer Chauhan	Tsong Dubdi
10	B. B. Rai	Yuksam
11	Pushpa Lal Chettri	Tsong Mangsabong
12	Pratiman Basnett	Tingling
13	Karzong Bhutia	Yuksam
14	Karna Bahadur Gurung	Topsing
15	Surbir Gurung	Tsong
16	A. B. Subba	Tsong
17	Dhan Bahadur Chettri	Mangsabong
18	T. N. Chauhan	Tsong
19	Kumar Chettri	Tsong
20	Mohan Sing Gurung	Topsing
21	Kinlay Bhutia	Yuksam
22	Man Bahadur Subba	Tsong
23	Thendup Bhutia	Deythang
24	Buddha Sing Limboo	Mansabong
25	Dhan Maya Subba	Mangsabong
26	Ritu Subba	Mangsabong
27	Garjaman Chettri	Tsong Busty
28	Lok Bahadur	Tsong Busty
29	Jas Bahadur Subba	Mangsabong
30	Tara Moti Subba	Mangsabong
31	Bishnu Maya Subba	Mangsabong
32	T. Gyatso Bhutia	Yuksam

33	Uden Bhutia	Yuksam
34	Dal Bir Chettri	Tsong
35	Man Bahadur Limboo	Tingting
36	Hast Bahadur Gurung	Chong
37	K. B. Chettri	Yuksam
38	I. B. Gurung	Yuksam
39	Diki Sherpa	Yuksam
40	P. G. Bhutia	Yuksam
41	Sonam Tshering Lepcha	Ramgyathang
42	Tashi doma Bhutia	Yuksam
43	Kinzong Sherap	Yuksam

Multi Stakeholder Consultation in East and North Sikkim

Date: April and May 2003
Venue: Gangtok (East), Tholung, Passingdang (North, Dzongu) Chungthang, Lachung, Lachen, Thangu, Tso Lhamo, Lashar, Muguthang (North, Sub-Tropical, Temperate, Trans-Himalaya)
No. of Participants: 36

S. No	Name	Stake Holders	Address	Contact
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23	Chingya-Dokpa Pipon	CBO	Lashar-Dokpa, North Sikkim	
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Multi Stakeholder Consultation Workshop on Conservation and Sustainable Utilization of Medicinal Plants in Sikkim. UNDP / FRLHT / FEWD

Venue: SIRD Karfectar, Jorethang
Date: 19th and 20th May, 2003

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Multi Stakeholder Consultation Workshop on Conservation and Sustainable Utilization of Medicinal Plants in Sikkim. UNDP / FRLHT / FEWD

Venue: Conference Hall, Forest Department
Date: 7th June, 2003

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Multi Stakeholder Consultation Workshop on Conservation and Sustainable Utilization of Medicinal Plants in Sikkim. UNDP / FRLHT / FEWD

Venue: Conference Hall, State Secretariat
Date: 7th June, 2003 (afternoon)

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Document Review

Other than the members of the State Planning Committee, the document has also been reviewed by all the 35 members of the SikkimMPCN email group. The document was also forwarded to the following persons / agencies for review and their comments incorporated:

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Appendix IV: Collaboration with Research Institutes outside Sikkim in the Field of Medicinal Plants

Abbreviations:

- CIMAP — Central Institute for Medicinal and Aromatic Plants, Lucknow.
- NBRI — National Botanical Research Institute, Lucknow
- CDRI — Central Drug Research Institute, Lucknow
- FEWD — Forest, Environment and Wildlife Department
- JFMC — Joint Forest Management Committee
- EDC — Eco-Development Committee
- WC — Watershed Committee
- SHG — Self Help Group

Conservation related issues along with R & D support in ongoing initiatives regarding medicinal plants of Sikkim were the central theme of discussion with scientists of premier institutions like NBRI, CIMAP and CDRI. Discussions were based on following parameters:

- In situ conservation of medicinal plant rich Sikkim Himalayas.
- Participation of premier institutes in planning process of FRLHT project.
- Promotion to the native medical practices and exploration of new active components.
- Public participation in conservation efforts.
- Standardization of agronomic practices suitable to different agro climatic zones of Sikkim.
- Training and extension activities related to conservation efforts.

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Area of R&D	Overlapping areas of interest	Remarks
• Bioprospection of medicinal and aromatic plants • Conservation and molecular documentation of genetic diversity in medicinal and aromatic plants • Development of databases on medicinal & aromatic plants • To evolve and implement programmes on education of users • Cultivation, production and chemical processing of economically important medicinal and aromatic plants • Production of seeds and other propagating materials of the improved cultivars • Detect and characterize new anti-microbial, anti-cancer, and/or pesticidal chemicals by screening secondary metabolites of different plants	On going schemes of FDA, IWDP and other CSS can use these areas of overlapping interest for generation of alternate livelihood for fringe area population and provide fillip to in situ conservation of medicinal plants and bio diversity. Survey and preparation of feasibility report for cultivation • Supply of quality planting material • Training to cultivators and entrepreneurs • Technical services for cultivation and distillation/extraction • Transfer of process know how. • Testing, analysis and certification of crude drug and essential oils • Assistance to growers and help in marketing • Value addition technology	-Training workshop in first week of March on cultivation Of *Withania somnifera*, *Rauvolfia serpentina*, *Aloe barbadensis*, Catharanthus roseus *etc.* Mainly economically viable species of sub-tropical zone. Developed major techniques like menthol mint oil by chilling technique, total alkaloids from *Sadabahar (Catharanthus roseus*) -Herbal mosquito repellent lotion, Herbal anti-crack cream, herbal pain balm, Herbal mosquito repellant cream etc.

National Botanical Research Institute

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Area of R&D	Overlapping areas of interest	Remarks
Biodiversity research by inventorying, monitoring, assessment, conservation and sustainable utilization of medicinal plant genetic resource. **Bioprospecting** for search of plant products - herbal drugs, pharmaceuticals, nutraceuticals and cosmaceuticals. **Biomass biology** including biopesticides, biofuels and petroleum alternatives, **Bioinformatics** by developing computerized/electronic databases. **Biotechnology** (biotech processes/ products) including trans-disciplinary studies on molecular biology and genetic engineering for development of transgenic plants. **Genetics, plant breeding and agro technology**: Selection and genetic enhancement for development of new promising varieties of economically important non-crop plants. Enriching national herbarium and maintaining over 1,25,000 **national reference collections** and making them accessible to a large number of users. Developing and **maintaining a national botanic garden** of over 7,000 species/ cultivars with theme gardens for eco-education including special facilities for the physically challenged and visually impaired persons.	**Consultancy, training, education, advise, information and services** for identification of plants, floristic studies, conservation of rare and endangered plants and their sustainable utilization, cultivation and standardization of herbal plants and plant products including herbal drugs and pharmaceuticals, nutraceuticals, cosmaceuticals.	-Developed herbal products like herbal lipstick, herbal drinks, herbal beer etc. - NBRI is one of the leading R&D center in the field of floriculture (another area for alternate livelihood for fringe area population) - Director of this institute is one of the most renowned people in the field of medicinal plants.

Central Drug Research Institute

Director CDRI,
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Phone: 2212411to18 Fax:0522-2223405/2223938
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http://www.cdriindia.org/

Area of R&D	Overlapping areas of interest	Remarks
Research directed towards development of safer and cost effective drugs. Thrust area: reproductive health, Malaria, tuberculosis, thrombosis, stroke, ageing-related disorders. Drug discovery programme utilizes natural sources prescribed in traditional system.	Development of marketing linkages and creation of market Certification and product licensing	

Blue-print of Association/Collaboration