

**Department of Forest, Environment and Wildlife Management
Government of Sikkim
Republic of India**

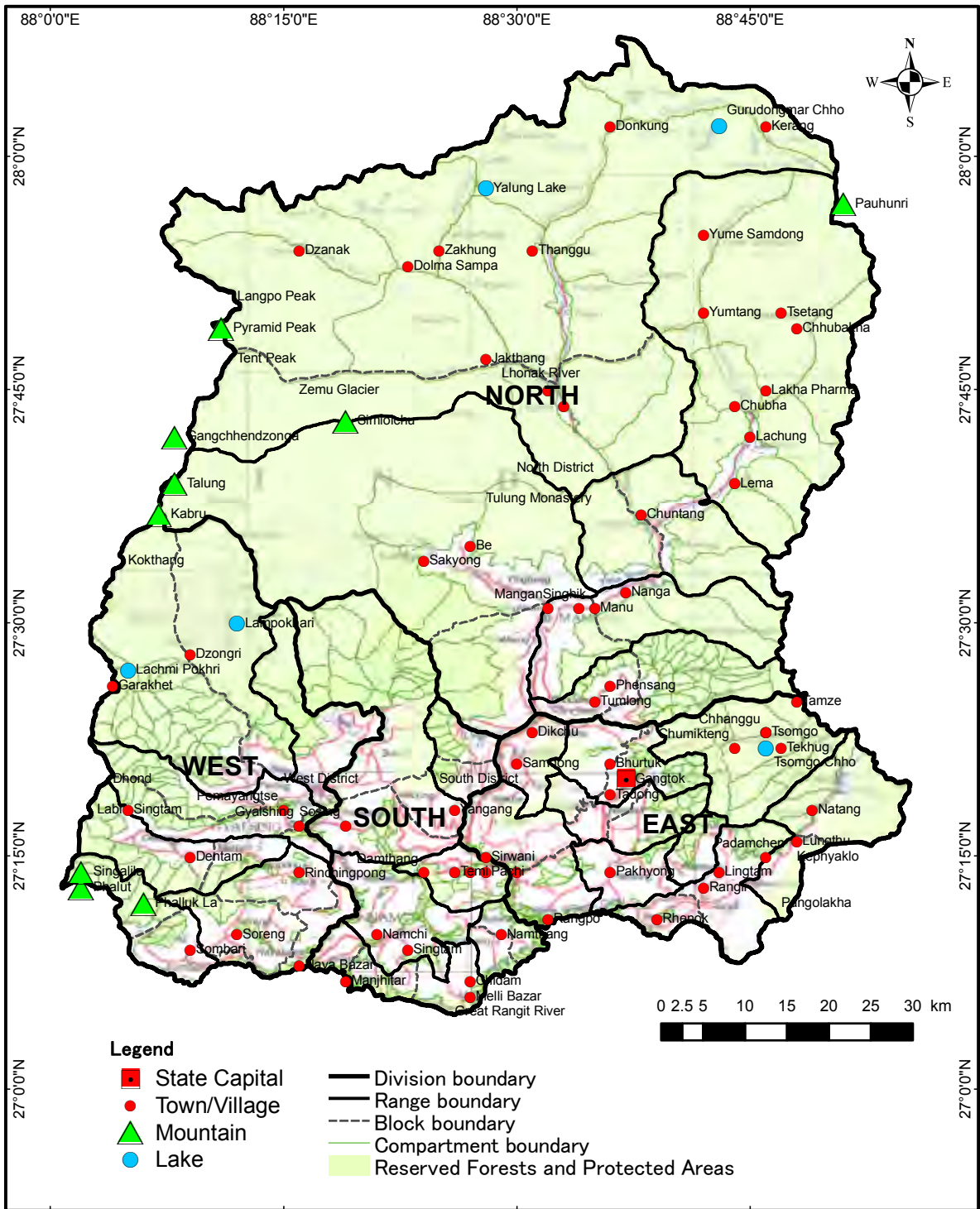
**Preparatory Study on Integrated Project for
Sustainable Development of Forest
Resources in Sikkim**

Final Report

November 2009

**Japan International Cooperation Agency (JICA)
IC Net Limited**

SAD
CR(10)
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(Source: Natural Resources Atlas of Sikkim, 2009, NATMO, and FEWMD, 2009)

Map of Sikkim

List of acronyms and abbreviations

ACF	Assistant Conservator of Forests
BO	Block Officer
BPL	Below Poverty Line
BRO	Border Road Organisation
CBO	Community-based organisations
CCF	Chief Conservator of Forests
CEO	Chief Executive Officer
DFO	Divisional Forest Officer
DFU	District Facilitation Unit
ECOSS	Ecotourism and Conservation Society of Sikkim
EDC	Ecodevelopment Committee
EIRR	Economic internal rate of return
EMC	Ecotourism Marketing Cell
ENVIS	Environment Information System
Fam trip	Familiarisation trip
FDA	Forest Development Agency
FEWMD	Forest, Environment and Wildlife Management Department
FRED	Finance, Revenue, and Expenditure Department
FRH	Forest rest house
FY	Fiscal Year
GDP	Gross domestic product
GOI	Government of India
GPS	Geographical positioning system
GOJ	Government of Japan
GRF	Garrison Reserve Engineering Force
HPSC	High Power Steering Committee
IBA	Important bird area
ICAR	Indian Council of Agricultural Research
ICB	International competitive bidding
ICOMOS	International Council on Monuments and Sites
ICPB	India Convention Promotion Bureau
IFS	Indian Forest Service
IGA	Income generation activity
IGNFA	Indira Gandhi National Forest Academy
IIV	Initial intervention village
INTACH	Indian National Trust for Art and Cultural Heritage
IPCC	Intergovernmental Panel on Climate Change
IUCN	International Union of Conservation of Nature
JFM	Joint Forest Management
JFMC	Joint Forest Management Committee
JICA	Japan International Cooperation Agency
JLR	Jungle Lodges and Resorts
KEEPS	Khedi Ecotourism and Ecodevelopment Promotion Society
KNP	Khangchendzonga National Park
LPG	Liquid petroleum gas
LTC	Leave Travel Concession
MICE	Meetings, Incentives, Conventions, Events
MOEF	Ministry of Environment and Forests
MW	Megawatt
NAEB	National Afforestation and Ecodevelopment Board

NAP	National Afforestation Programme
NCB	National competitive bidding
NGO	Non-governmental organisations
NPV	Net present value
NREGA	National Rural Employment Guarantee Act
NTFP	Non-timber forest product
PCCF	Principal Chief Conservator of Forests
PHC	Primary Health Centre
PMU	Project Management Unit
PRA	Participatory rural appraisal
PRI	Panchayat Raj Institution
PSS	Pokhri Sanrakshan Samiti
PSU	Public sector undertaking
REDD	Reduced Emissions from Deforestation and Forest Degradation
RMDD	Rural Management Development Department
RO	Range Officer
ROI	Return on investment
RSU	Range Supporting Unit
SAATO	Sikkim Association of Adventure Tour Operators
SC	Scheduled Caste
SEV	Spread effect village
SFS	State Forest Service
SHG	Self Help Group
SHRA	Sikkim Hotel and Restaurant Association
SMPB	State Medicinal Plants Board
SSBSAP	Sikkim State Biodiversity Strategy and Action Plan
ST	Scheduled Tribe
SWM	Solid waste management
TAAS	Travel Agent Association of Sikkim
TGS	Tradable goods and services
TIC	Tourism Information Centre
TIES	International Ecotourism Society
VFR	Visit friends and relatives

List of local terms

Adhyaksha Zilla Parishad	President of district council
Arvallis	Mountain range in western Indian state of Rajasthan
Chang	Millet alcohol
Chowkidar	Watchman
Dharamsala	Traditional guesthouse at a religious location
Dzumsa	Traditional local governance body found in Lachen and Lachung, North District, Sikkim
Gorucharan	Forestland settled and set aside by the Government of Sikkim for grazing of cattle in adjoining village areas
Gram Panchayat	Village council
Gram Sabha	Village level governance body formed by adult male and female village residents
Gundruk	Fermented radish
Gyapen	Secretary of Dzumsa
Haat	Market

Himal Rakshak	Shepherd in high-altitude areas that migrate seasonally. Also refers to villagers recognized as Honorary Mountain Guardians by the state government for performing conservation activities
Indira Awas Yojana	Indira Housing Scheme
Jhand	Fermented millet drink
Khasmal	Forestland settled and set aside by the Government of Sikkim to meet the bona fide domestic need for timber, firewood, and fodder of residents of adjoining villages
Khukir	Nepali knife locally available
Kinema	Ferment soybean
Lok Sabha	House of People (Lower House)
Mela	Market place at festivals
Meso	Pickled bamboo shoots
Panchayat Ghar	Office of village council
Panchayat Raj	Local self governance body
Pipon	Headman
Pokhari Samrakshak Samit	Lakes and wetlands protection committee
Rajya Sabha	Council of States (Upper House)
Sinki	Fermented spinach
Smriti Van	Memorial garden
Swarna Jayanti Gram Swarojgar Yojana	Self help group self employment scheme
Ward Sabha	Ward-level governance body formed by both adult male and female residents
Zilla Panchayat	District Council

Currency equivalents

(As of November 2009)

USD1.00	=	JPY 96.5
USD1.00	=	INR 48.5
INR 1.00	=	JPY 1.99

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CHAPTER 1 Introduction

1.1 Background of the Study

In 2006, the Government of India (GOI) submitted a Project Concept Note to the Government of Japan (GOJ) on the Integrated Project for Sustainable Development of Forest Resources in Sikkim ('Project'). In response to this, the Japan International Cooperation Agency (JICA) proposed to conduct a supplemental study to verify the relevance of the Project and to recommend a detailed project design. In February 2009, the Department of Forest, Environment, and Wildlife Management, Government of Sikkim ('Forest Department') agreed on the scope of work of the Preparatory Study for the Project ('Study'), which was launched in May 2009. The GOJ received an official request for an ODA loan to support the Project in June 2009.

According to the Project Concept Note and discussions held between the Forest Department and JICA, the main objectives of the project will be to improve the living standards of inhabitants of the state of Sikkim through entry point activities and ecotourism, and to conserve Sikkim's biodiversity through participatory biodiversity conservation, and forest protection and management. The Project Concept Note presented six major components, as summarised below.

- 1) Afforestation/Regeneration
 - a. Afforestation using rare and endangered species
 - b. Construction of high-tech nurseries in each ecoregion
 - c. Establishment and participation of Joint Forest Management Committees (JFMCs) and Ecodevelopment Committees (EDCs)
- 2) Protection and conservation of natural forests
 - a. Enforcement of legal provisions on forest protection
 - b. Demarcation of forestland
 - c. Establishment of facilities at the block, range, and division levels to enhance the knowledge, awareness, and participation of stakeholders
- 3) Biodiversity programmes
 - a. Promotion of sustainable livelihoods, eg, ecotourism service
 - b. Recovery of endangered fauna
 - c. Research on biodiversity conservation
- 4) Training, awareness, extension, and publication
 - a. Establishment of institutes for training and extension
- 5) Community development
 - a. Skills development in ecotourism, horticulture, animal husbandry, and sustainable energy sectors
- 6) Infrastructure development

1.2 Objectives of the Study

The main objectives of the Study are to verify the relevance of the Project, to confirm its scope, and to recommend a detailed project design, including the Project's main components, activities, implementation schedule, management structure, and evaluation methods.

1.3 Terms of reference of the Study

The terms of reference agreed on between the Forest Department and JICA are the following: 1) to verify the necessity and background of the Project; 2) to propose project details; 3) to propose the

project management structure; and 4) to examine project effectiveness. The Study is being conducted in accordance with the detailed terms of reference of the Study presented in Table 1-1 and the work schedule as shown in Table 1-2.

Table 1-1 Terms of reference of the Study

Terms of reference	Detailed terms of reference
TOR1: Verify the necessity and background of the Project	1-1: Examine issues and prospects of Sikkim state
	1-1-1: Review the issues and prospects of the strategies and/or policies of the forest sector, biodiversity conservation, tourism promotion, and poverty reduction in Sikkim state
	1-1-2: Review the socioeconomic situation, including poverty, and conditions of the natural environment in Sikkim state
	1-2: Examine the issues and prospects of biodiversity conservation and forest management in Sikkim state
	1-2-1: Review the issues and prospects of biodiversity conservation in Sikkim state
	1-2-2: Review the issues and prospects of forest management in Sikkim state
	1-2-3: Review the issues and prospects of production, sales, and distribution of non-timber forest products in Sikkim state
TOR2: Propose project details	1-2-4: Review the issues and prospects of entry point activities, including income generation activities, around forest areas in Sikkim
	1-2-5: Review the issues and prospects of ecotourism in Sikkim state
	1-2-6: Examine the relevance of the project for supporting biodiversity conservation and the forest sector in Sikkim state
	2-1: Propose project details
	2-1-1: Propose scope and target area of biodiversity conservation
	2-1-2: Propose selection criteria for afforestation areas, identification of afforestation areas, and scope of afforestation compatible to local characteristics
	2-1-3: Propose forest management-supporting activities
2-1-4: Propose programmes for implementing ecotourism	
2-1-5: Propose technical assistance, training programme of Forest Department staff and inhabitants, domestic exchange programmes for experience sharing	
2-1-6: Propose measures against major landslides affecting the livelihoods of local residents	
2-2: Estimate the total project cost and portion eligible for JICA assistance	
2-3: Propose implementation schedule of the Project	
2-4: Propose procurement method and construction and/or afforestation techniques	
2-5: Propose social consideration measures for project effectiveness	
TOR3: Propose project management structure	3-1: Propose project management structure
	3-2: Review technical capacity of executing agency and PMU
	3-3: Review financial capacity of the executing agency and PMU
	3-4: Propose appropriate post-project completion operation and maintenance structure
	3-5: Propose partnership/collaboration with government departments, NGOs, etc.
TOR4: Examine project effectiveness	4-1: Propose operation and effect indicators for the Project
	4-2: Review qualitative impact of the Project
	4-3: Calculate economic internal rate of return
	4-4: Examine the Project's contribution to climate change
	4-5: Design impact evaluation mechanism

Table 1-2 Schedule of the Study

First Field Study: early June – end of July 2009

Inception Report

- 1) Preparation
- 2) Consultation with stakeholders on the Inception Report
- 3) Verification of background and necessity of the Project
- 4) Preliminary discussion on project scope and subproject selection

Second Field Study: early August – late September 2009

Interim Report

- 5) Consultation with stakeholders on the Interim Report
- 6) Development of project details
- 7) Development of project management structure
- 8) Examination of project effectiveness

Third Field Study: mid-October 2009

Draft Final Report

- 9) Consultation with stakeholders on the Draft Final Report

Final Report: November 2009

CHAPTER 2 State of Sikkim

2.1 Natural characteristics

(1) General

Sikkim is a small hilly state in the Eastern Himalaya, extending approximately 114 km from north to south and 64 km from east to west. It is surrounded by the Tibetan Plateau to the north, the Chumbi Valley of Tibet and the Kingdom of Bhutan to the East, Darjeeling District of West Bengal to the south, and Nepal to the west. The total geographical area of the state is 7,096 km². The state, as a part of the inner ranges of the Himalayas, has no open valley or plains. It has, however, varied elevations ranging from 300 to 8,586 m consisting of lower hills, middle and higher hills, alpine zones, and snow bound land. The highest elevation is 8,586m at the top of the Mount Khangchendzonga. Of the total geographic area, about 30% has permanent snow and is covered by glaciers and steep rocks. The Tista River is the main river of the state, which originates as Chhombu River from the glacial Khangchung Lake at an elevation of 5,280 m in the northwest corner of the state (FEWMD, 2002c).

(2) Climate

The climate of the state broadly falls into the tropical, temperate, and alpine categories depending on the elevation. Sikkim experiences heavy rainfall, and humidity remains above 70% through the year in most of the areas due to its proximity with the Bay of Bengal. Rainfall is well distributed during the monsoon season from May to early October, and July is the wettest month in most places. Rainfall is moderate in April and October and low from November to February. The intensity of rainfall during the monsoon season decreases from south to north, while the opposite occurs in the distribution of winter rainfall. The highest annual rainfall for individual weather stations may exceed 5,000 mm. The northwest region of the state experiences minimum annual rainfall of approximately 400 mm, whereas the East District, where Gangtok is located, receives approximately 3,200 mm of rainfall annually. In parts of the West District, the annual rainfall is as high as 3,400 mm (NATMO, 2009). The mean temperature in the lower altitudinal zones varies from 4.5°C to 18.5°C, whereas it varies from 1.5°C to 9.5°C in higher altitudinal zones. The maximum temperature is usually recorded from July to August and the minimum from December to January. Fog is a common feature in the entire state from May to September, and there is snowfall at high-altitude locations during the winter months (ibid.).

(3) Geology and soil erosion

The entire state is a young mountain system with highly folded, faulted, unfossiliferous, metamorphic, and crystalline strata in many places. A major portion is covered by Precambrian rock consisting of gneisses and schists. Thus, the slopes are highly susceptible to weathering and prone to erosion and landslides. The western portion consists of hard, massive gneissose rocks, capable of resisting erosion, and half schistose rocks. The southern portion, which is lower in elevation, consists of gneissose rocks and comparatively soft, thin, slaty, and half-schistose ore rocks. The soils in the state belong to 3 orders, 7 suborders, 12 great groups, and 26 subgroups (NATMO, 2007).

Steep to very steep areas, glacier and perpetual snow areas, and moderately sloping areas cover 67%, 27%, and 2% of the total area of Sikkim, respectively. These physiographical and geological characteristics and the high intensity of rainfall cause excessive soil erosion, landslides, and loss of nutrients. About 33% of the total area of Sikkim is affected by water erosion, which results in terrain deformation. Poor and imperfect drainage are also commonly observed (NBSS, 1997).

(4) Natural resources

Sikkim is endowed with rich natural resources including agricultural, biological, and water resources. Many medicinal plants are found in low- and high-altitude areas, and hydropower projects are being implemented to tap into water resources. The potential of microbial diversity in Sikkim has not yet been harnessed except for through the processing of foods and beverages such as those traditionally produced and consumed in the area. Glacial micro flora and that of aquatic ecosystems, forests, soils, plants, and fungi are yet to be documented. The faunal composition of the state is also rich with around 150 species of mammals, 550 species of birds, and over 600 species of butterflies and moths, besides many species of reptiles and amphibians (FEWMD, 2002c).

Forestry is the major land use in the state. The forested area of the state increased from 44% in 2002 to 46% of the total area in 2006 and is one of the largest in the country (ibid., DP, ER, and NEC Affairs Department, 2007).

Broadly speaking, the following five ecoregions can be identified (ibid.).

- 1) Tropical ecoregion: Extends roughly from the foothills of the outer Himalayas to an altitude of about 1,200 m. Contains steep-sided valleys and gorges with well-drained flanking slopes.
- 2) Sub-tropical ecoregion: Extends up from about 1,800 m to 3,000 m. This zone receives the heaviest rainfall and remains humid throughout the year.
- 3) Temperate ecoregion: Extends from 3,000 m to 4,000 m, consisting of mixed coniferous forests with shrubby undergrowth of Rhododendron.
- 4) Alpine ecoregion: Up to 4,500 m with small trees and large shrubs interspersed with fir and pine. The stunted forest is comprised mainly of rhododendron of many species.
- 5) Trans-Himalayan ecoregion: Extends from 4,500 m to 5,500 m with characteristic cold desert vegetation 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 is home to a number of endangered species.

Most of the human population of Sikkim resides in the tropical and sub-tropical ecoregions in an agricultural setting where terrace-farmed rice, ginger, orange, and cardamom are commercially grown. On the other hand, 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 their harvest seasons. Soya bean, millet, and cruciferous vegetables are grown and processed into fermented foods. Oyster mushroom cultivation is being popularized along with trial commercial cultivation of flowers like hybrid orchids and gladioli. Hybrid stall-fed livestock are raised around villages, while the local breed of cow is grazed in the forests (ibid.).

(5) Land use patterns

The land use pattern in Sikkim is shown in Table 2-1. Cultivated areas and fallows amount to about 20% of the total and are concentrated in East, South, and West Districts, whereas forests and areas not suitable for cultivation comprise more than 70% of the total state area. This indicates that the intensification of agriculture in cultivated and fallow lands and non-consumptive utilisation of biodiversity resources in forests and non-arable land are key to increasing household incomes in rural areas.

Table 2-1 Land use patterns

Land use pattern	Area in km ²	% to total
I. Total of reported area for land use	6,710	95%
Forests	2,650	37%
Area not suitable for cultivation	2,500	35%
Permanent pasture	40	1%
Tree crops and grooves	50	1%
Cultivable waste land	20	0%
Fallow land not currently fallows	300	4%
Current fallows	50	1%
Cultivated area	1,100	16%
II. Area not reported	386	5%
Total area of Sikkim	7,096	100%

Source: Land Use Statistics, Ministry of Agriculture, Government of India (2005)

2.2 Socioeconomic characteristics

Previously an independent state ruled by the Chogyal monarchy, Sikkim became the 22nd state of India in 1975 by referendum. With the exception of a few years of instability in the 1970s, the state has been politically stable, particularly since 1994 when the current ruling party, the Sikkim Democratic Front, came to power.

(1) Demography

The demographic features of Sikkim state are presented in Table 2-2. Sikkim is one of the least and most sparsely populated states among all union territories and states of India, with only 0.02% of the country's total population. Approximately 91% of Sikkim's population resides in rural areas. The population is most highly concentrated in the East District where Gangtok, the state capital, is located. Although the North District has the largest area, it is least and most sparsely populated, with only one fourth of the total area available for habitation and cultivation. The population grew by 33.1% between 1991 and 2001 and 7.52% between 2001 and 2006. The largest increase was observed between 1971 and 1981 when the population grew by 50.8%, mainly due to the migration of people from neighbouring states into Sikkim. The average household size of the state is 5.2 persons per household, with no significant inter-district disparities (DESME, 2006).

Table 2-2 Demographic characteristics of Sikkim, by district

District	Population	Population density (Person/km ²)	Sex ratio (Females per 1,000 males)	Scheduled tribe (% of total)	Scheduled caste (% of total)
North District	38,352	9	928	78.5	3.3
East District	268,275	281	896	31.4	8.0
South District	141,689	186	943	30.4	6.1
West District	133,230	114	943	45.1	5.5
Sikkim	581,546	82	920	37.4	6.7

Source: DESME (2006)

Sikkim is a multi-ethnic state comprised of three major communities – the Nepalese, Lepchas, and Bhutias. The majority of Sikkim's residents are of Nepali ethnic-national origin and migrated to the area in the 19th century. The Lepcha and Bhutia, both of which are categorized as Scheduled Tribes, are considered natives to Sikkim. Sikkim has a relatively large proportion of Scheduled Tribes and Scheduled Castes, comprising roughly 43% of the population (DESME, 2006). In terms of religious

belief, the majority of inhabitants are Hindu (68%), followed by Buddhists (27%) and Christians (3%) (Lama, 2001).

(2) Social characteristics

As demonstrated in Table 2-3, households in Sikkim generally have better access to electricity and toilet facilities than the rest of India. At over 90%, the rate of domestic electrification is particularly high compared to the national average. On the other hand, access to piped drinking water remains poor, with a discrepancy of over 75 percentage points between urban and rural areas.

Table 2-3 Access to basic household amenities

	Sikkim*			India**		
	Total	Urban	Rural	Total	Urban	Rural
Electricity	92.1	99.9	90.2	67.9	93.1	55.7
Piped drinking water	36.1	96.1	20.9	42.0	71.0	27.9
Toilet facility	89.0	99.7	86.3	44.5	83.1	25.9

Sources: * MWFH (2006a), ** MWFH (2006b)

Literacy rates in Sikkim have more than doubled since 1981 and surpassed the national average by 1991 (Table 2-4). As of 2001, the state's literacy rate was 68.8%, while the national average was 64.8%. According to a socioeconomic census conducted by the state in 2006, the literacy rate had improved to 80.7% (DESME, 2006), which breaks up into 86.0% for males and 74.8% for females. Disparity between the sexes in terms of literacy rates is lower in Sikkim than at the national level where a gap of 21.7 percentage points was reported in 2001.

Table 2-4 Literacy rates (1981-2006)

Year	Sikkim (%)			India (%)		
	Total	Male	Female	Total	Male	Female
1981	34.1	43.9	22.2	43.7	56.5	25.0
1991	56.9	65.7	46.8	52.2	64.1	39.3
2001	68.8	76.0	60.0	64.8	75.9	54.2
2006*	80.7	86.1	74.8	-	-	-

Source: DP, ER and NEC Affairs Department (2001), * DESME (2006)

With regards to health, infant mortality rates and the share of mothers who access antenatal care both suggest that the health status of Sikkim's population is substantially better than the national average (Table 2-5). While the proportion of women who receive at least three antenatal care visits in Sikkim were comparable to the national level in 1998/99, and by 2005/06 it had increased by 25.3 percentage points in Sikkim as opposed to 6.7 percentage points for the national average.

Table 2-5 Key health indicators (1992-2006)

	Infant mortality		Access to antenatal care ¹ (%)	
	Sikkim*	India**	Sikkim*	India**
1992/93	-	79	-	43.9
1998/99	44	68	44.1	44.2
2005/06	34	57	69.4	50.7

Note: 1) Percentage of mothers who had three or more antenatal care visits for their last birth

Sources: * MWFH (2006a), ** MWFH (2006b)

Although indicators on gender equality in Sikkim are rarely found, the percentages presented in Table 2-6 suggest that Sikkim's women are generally more empowered than their counterparts in other areas

of India. This may be related to the relatively high participation of women in Sikkim in the work force, which will be mentioned later in this section.

Table 2-6 Gender equality indicators (2005/06)

	Sikkim*			India**		
	Total	Urban	Rural	Total	Urban	Rural
Wife participation in household decision-making (%) ¹	75.2	80.4	74.0	52.5	61.4	48.5
Spousal violence (%) ²	16.5	10.9	17.9	37.2	30.4	40.2

Note: 1) Percentage of currently married women who usually participate in household decisions. 2) Percentage of ever-married women who have ever experienced spousal violence

Sources: * MWFH (2006a), ** MWFH (2006b)

(3) Economic characteristics

Sikkim's real gross domestic product (GDP) growth is presented in Table 2-7. In FY 2004/05, Sikkim generated a real GDP at 2007 prices of INR 17,956 million, equivalent to a nominal value of INR 15,305 million. The real GDP per capita for the same year is estimated at INR 31,501, equivalent to a nominal value of INR 26,851, exceeding the national average.

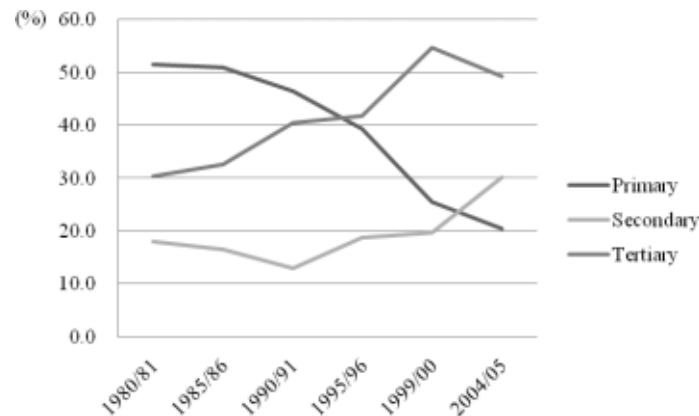
Sikkim's GDP almost doubled between 1993/94 and 2004/05 at a rate slightly higher than the national rate. The GDP per capita also increased by approximately 42% during the same period as compared to the national growth rate of 46%. In particular, the GDP per capita recorded a marked increase of 35% between 1999/00 and 2004/05, whereas the national figure was 20%. The GDP per capita has been consistently higher than the national level since 2002/03 until 2004/05, the latest fiscal year for which the information is available.

Table 2-7 GDP growth at constant (2007) prices

Fiscal year	GDP ¹				GDP per capita ¹			
	Sikkim		India		Sikkim		India	
	GDP (million INR)	Growth (%)	GDP (billion INR)	Growth (%)	GDP per capita (INR)	Growth (%)	GDP per capita (INR)	Growth (%)
1993/94	9,633		18,690		22,246		20,952	
1994/95	9,557	-0.78	19,904	6.49	21,527	-3.24	21,874	4.40
1995/96	10,247	7.22	21,134	6.18	22,472	4.39	22,773	4.11
1996/97	10,705	4.47	22,470	6.32	22,825	1.57	23,748	4.28
1997/98	11,465	7.10	23,440	4.32	23,737	4.00	24,304	2.34
1998/99	11,720	2.23	23,798	1.53	23,535	-0.85	24,216	-0.36
1999/00	12,011	2.48	25,065	5.33	23,369	-0.71	25,037	3.39
2000/01	13,288	10.63	26,030	3.85	24,978	6.89	25,532	1.97
2001/02	14,249	7.23	27,459	5.49	25,814	3.35	26,479	3.71
2002/03	15,597	9.46	28,495	3.77	28,104	8.87	27,009	2.00
2003/04	16,875	8.19	30,675	7.65	29,973	6.65	28,589	5.85
2004/05	17,956	6.41	33,296	8.54	31,501	5.10	30,519	6.75
2005/06	19,323	7.61			33,546	6.49		

Note: 1) Real values were calculated using India's CPI's (base Year 2007) published by the IMF
Source: Adapted from DP, ER, and NEC Affairs Department (2007)

The latest estimates available reveal that, in FY 2005/06, the primary, secondary, and tertiary sectors accounted for approximately 23%, 27%, and 50% of the state's total income, respectively (DP, ER, and NEC Affairs Department, 2007). As shown in Figure 2-1, a major shift in the sectoral composition of the state income occurred in the 1990s when the tertiary sector surpassed the primary sector in its share of the state's GDP. Despite this trend, agriculture and related activities such as horticulture continue to be the major source of income and employment for the state's population. Approximately 64% of the state's residents are dependent on the sector, though only 15% of the state land area is arable. Main crops include maize, rice, pulses, oilseed, millet, and buckwheat. The state is also the largest producer of cardamom in India (Lama, 2007).



Source: Mahendra (2007)

Figure 2-1 Sectoral contribution to GDP (1980/81-2004/05)

The secondary sector's rate of contribution has also increased, while change has occurred at a less dramatic rate than the other two sectors. The difficulty of market access and the hilly terrain have hindered the development of large-scale industries. The main industries to date have been breweries, distilleries, tanning, and watch-making. Meanwhile, Sikkim has a high degree of hydroelectric power potential equivalent to 8,000 megawatts (MW) that remain largely unharnessed (Lama, 2007). The state has been promoting and facilitating power development, which is one of the fastest growing areas of the Sikkim economy. During the 10th Plan period (2002/03-2006/07), 26 projects with a total installed capacity of 5,665 MW were awarded to private and public developers (DP, ER, and NEC Affairs Department, 2007). Among these, Tista V, a 510 MW power station commissioned by the National Hydro Power Corporation (NHPC), was recently dedicated to the nation. Built at a cost of INR 26.2 million and completed over a span of eight years, it is one of the largest hydroelectric power plants in India's northeast region.

Within the tertiary sector, public administration accounts for a maximum of 15% of the GDP (DP, ER, and NEC Affairs Department, 2007), followed by other subsectors such as transport, banking, insurance, and communications (Lama, 2007).

Table 2-8 Work participation rate, by residential area

	Sikkim			India		
	Total	Urban	Rural	Total	Urban	Rural
Work participation rate (%) ¹	48.6	49.7	40.2	39.1	32.3	41.7
Main workers (%) ²	39.3	45.9	32.0	30.4	29.3	30.8

Note: 1) Defined as rate of participation in any economically productive activity with or without compensation, wages, or profit. Includes activities such as agricultural production for domestic consumption and part time help on farm or family enterprise. 2) Persons engaged in work for at least six months or more.
Source: RGCC (2001)

Table 2-8 illustrates the status of labour force participation in Sikkim according to the 2001 Census. The share of workers and the share of main workers are both higher than the national average by approximately 9 percentage points. The work participation rates of male and female workers in Sikkim are 57.4% and 38.6%, respectively. The national averages of the same indicators are 51.7% and 25.6% for male and female workers, respectively, and show a gap of 26.1 percentage points between the sexes as opposed to 18.8 percentage points in Sikkim. These figures suggest that Sikkim's women are more actively engaged in economic activities than their counterparts in other Indian states.

(4) Poverty

Table 2-9 and Table 2-10 present the numbers and percentages of households living below the poverty line as of 2006. The former compares the figures and rates by district of residence and the latter by population group. Data on people or households living below the poverty line in India were not available for the same survey period. The latest data on poverty available for both Sikkim and India from 1999/2000, however, reveal that 36.6% of the Sikkim population was living below the poverty line (BPL), more than 10 percentage points higher than the national level.

Table 2-9 Households living below the BPL, by district

	North District	East District	South District	West District	Sikkim
Number of households	7,184	53,194	26,691	24,761	111,830
Number of households living BPL	1,340	7,199	6,507	6,572	21,618
Households living BPL (%)	18.7	13.5	24.4	26.5	19.3

Source: DESME (2006)

Table 2-10 Households living below the BPL, by population group

	Scheduled Tribe	Scheduled Caste	Most Backward Classes	Other Backward Classes	Others	Sikkim
Number of households	41,200	7,376	26,460	25,893	10,901	111,830
Number of households living BPL	8,573	1,739	6,345	4,422	539	21,618
Households living BPL (%)	20.8	23.6	24.0	17.1	4.9	19.3

Source: DESME (2006)

Among the four administrative districts, the East District has the lowest proportion of BPL households. The West District's share of BPL households among all households is highest, at almost double the rate of the East District. The percentage of BPL households among the different population groups shows an even larger divergence, with a gap of approximately 19 percentage points between the highest share (Most Backward Classes) and lowest share (Others). Annex 1 presents the detailed results of the poverty mapping and the poverty hotspot study conducted by the Government of Sikkim in 2006.

Table 2-11 People living below poverty line (1973-2006)

Fiscal year	People living below Poverty line (%)	
	Sikkim	India
1973/74	50.9	54.9
1977/78	55.9	51.3
1983	39.7	44.5
1987/88	36.0	38.9
1993/94	41.4	35.9
1999/00	36.6	26.1
2004/05	19.2	27.8*
2005/06	19.3**	-

Sources: DP, ER, and NEC Affairs Department (2007), Lama (2007), ** DESME (2006)

The progress made to date in Sikkim with regards to poverty reduction is illustrated in Table 2-11. The figures presented show that the proportion of the population living below the poverty line reached its peak in 1993/94 and has declined steadily since then. Poverty estimates have fluctuated, which may be attributed to the diversity of sources and methodologies. Nevertheless, according to the latest available data, Sikkim reversed its position against the national average by 2004/05 when the value dropped by an impressive 17.4 percentage points to 19.2%.

2.3 Status of development

In Sikkim, state resources started being allocated to development purposes under the guidance of the central government only after its merger with India in 1975. The state is now in the seventh plan period since then under the 11th Five Year Plan (2007/08-2011/12).

The main development strategy of Sikkim thus far has been to take advantage of its abundant natural resources. It has sought to reduce poverty and increase employment within this basic framework.

In line with the previous five-year plans, the current 11th Five Year Plan seeks to achieve sustainable economic development by focusing on horticulture and floriculture, education, hydroelectric generation, and tourism. First, the development of horticulture and floriculture is being pursued as a strategy to move away from subsistence agriculture toward farming of more commercial crops. Second, education continues to receive emphasis as a means of improving the state's human development indices and preparing youth for employment. Third, the power sector has been of growing importance especially since the 10th Plan period, during which the state awarded 26 projects with a total installed capacity of 5,665 MW to public and private developers. The state's expectation toward the tourism sector will be discussed later in this chapter.

(1) Socioeconomic development

Table 2-12 shows the growth rate targets and growth rates achieved during each plan period since the 9th Plan.

Table 2-12 GDP targets and performance

Plans	GDP growth	
	Target	Achieved
9 th Five Year Plan (FY 1996/97-2001/02)	10.00%	6.21%
10 th Five Year Plan (FY 2002/03-2006/07)	8.00%	7.79%
11 th Five Year Plan (FY 2007/08-2011/12)	7.79%	-

Source: DP, ER, and NEC Affairs Department (2007)

Sikkim's GDP and per capita income, indicated in the Section 2.2, both reflect the state's steady economic growth, which has occurred at rates comparable to or slightly higher than the national average. Despite being the income source for the majority of the people, agriculture has stagnated, and its revival is expected to be one of the major challenges for the years to come (Lama, 2007).

On the other hand, major social indicators related to health and education have improved dramatically, as elaborated in Section 2.2. Access to basic household facilities, particularly electricity and toilet facilities, are also generally better than the rest of India. These achievements may be products of the state's increased attention and resources dedicated to these areas since the early 1990s.

Furthermore, Sikkim belongs to a category of states that receives a higher share of the central government's resource allocation for development purposes. Preferential treatment is given to 11 such special-category states in three main forms: 1) excise duty concessions, 2) central funding in the form of 90% grants and 10% loans for centrally-sponsored schemes and external aid¹, and 3) supply of subsidised commodities ('Special-status,' 2009). Another benefit the state enjoys is that it has relatively well-developed roadway infrastructure, thanks to the in-state presence of the military and the Border Road Organisation (BRO), which are stationed along the borders with China, Bhutan, and Nepal. The state's socioeconomic development has been under the influence of considerably large inflows of external funds and assistance as such, which deserves special mention.

(2) Forestry and biodiversity conservation

The environment is one of Sikkim's valuable natural resources. Whereas the state covers only 0.2% of India's total land area, it is home to roughly one third of the nation's biodiversity. In addition, forests are an important source of livelihood for the state's primarily rural population. Sikkim's landlocked and hilly terrain and lack of transportation infrastructure have limited the growth of agriculture and industries. Thus, the state views its forests and wildlife as assets that are yet to be utilised for development purposes. The Forest Department, which oversees both the forestry sector and biodiversity conservation, has worked hard to protect these valuable assets. Here are some of the initiatives taken and achievements to date.

- Increase in forest cover from 42.3% in 1991 to 46.0% in 2005/06
- Adoption of Forest, Environment, and Wildlife Policy in 1999
- Ban on grazing of all domestic and semi-domestic animals in reserved forest areas
- Creation of two new wildlife sanctuaries to increase the protected area network to 31% of the state's land area

Of the state's geographical area, 81% is under the administrative control of the Sikkim Forest Department. Thus, in addition to the protection of forests, the department has emphasised using forest resources and the state's biodiversity as tools to improve its people's livelihoods. This approach is reflected in the following actions taken by the department:

- Establishment of Joint Forest Management Committees (JFMCs) and Ecodevelopment Committees (EDCs) for decentralization through participatory forest management
- Zoning of protected areas into conservation zones and zones for community use
- Preparation of the region for ecotourism development, eg, preparation of regulations for trekking

The state's efforts in preserving its forests and biodiversity, and initiatives taken that use forest and

¹ General category states only receive 70% of the central funding as a grant.

wildlife resources to the benefit of its people reflect the emphasis it places on its forests and wildlife.

(3) Tourism

Tourism was declared a focus area in the 9th and 10th Five Year Plans and will continue to be of equal significance in the 11th plan. Tourist inflow increased by more than 100,000 between 2001 and 2005 to a total of 268,267 in 2005. The state invested an estimated 1.9% of its total expenditure on tourism during the 10th Plan and has proposed a 2.2% outlay for the 11th Plan, indicating the state's high expectations toward the sector as a major source of revenue and employment.

During the 9th and 10th Plan periods, the state concentrated its resources on publicity and marketing, primarily through the organisation of fairs and festivals, and participation in national and international tourist marts. Tourist amenities and attractions also were developed and upgraded. The main thrust of the 11th Plan is to make Sikkim 'a premium ecotourism destination.' In addition to the activities initiated during the previous five-year plans, the state aims to train 3,360 youth to prepare them for employment within the sector. The state's intention to promote 'pro-poor tourism' matches the approach taken to forest and wildlife development, and reflects the heightened expectations toward tourism development from multiple facets of Sikkim society.

(4) Poverty reduction

Poverty reduction is not mentioned in Sikkim's five-year development plans or annual development plans as an independent category of its own. Neither is there a department within the state structure strictly dedicated to the purpose, although there is a Scheduled Castes, Scheduled Tribes, and Other Backward Classes Welfare Department. Instead, related schemes and programs are listed as being under the responsibility of relevant departments such as the Rural Management and Development Department (RMDD) and the Housing Department. For instance, Sampoona Grameen Rozgar Yojna is a scheme that receives 75% funding from the central government and is being implemented by the RMDD. Its objective is to provide additional wage employment and food security to rural communities, with special emphasis on women, scheduled castes, and scheduled tribes, and families below poverty line. The Scheduled Castes, Scheduled Tribes, and Other Backward Classes Welfare Department has implemented scholarship and vocational training schemes targeted exclusively towards members of scheduled castes and scheduled tribes.

Despite the absence of a specific poverty reduction policy or plan, the latest available data suggest that the share of people living below poverty line almost halved in the six years between FY 1999/2000 and 2005/06, as shown in Section 2.2. The state has set the goal of lowering the share of people below the poverty line to 15% by 2012.

2.4 Administration

2.4.1 State government

The Legislative Assembly of Sikkim is constituted to act as a law making body². There are 32 assembly members, who are chosen by direct election (DIT, 2009).

The Governor, who is appointed by the President of India, acts as the constitutional head of Sikkim. He exercises power over the Legislative Assembly, the High Court, and the Council of Ministers. The Governor serves a five-year term, which may be extended by another five years.

² The Government of Sikkim Act (1974) is followed.

The Chief Minister is the political head of the Government of Sikkim. He acts as the chairperson of the Council of Ministers, which consists of 12 members. The Council is the state executive body, and its members are selected from among the Legislative Assembly members.

There are 11 Ministers who are the members of the Council. Each minister administers more than one department, which is an administrative organ as shown in Table 2-13.

Table 2-13 List of departments administered by each minister

Minister	Responsible departments
Chief Minister	<ul style="list-style-type: none"> • Home Department • Finance Revenue and Expenditure Department • Development Planning, Economic Reforms and North East Council Affairs Department • Other departments not specially allotted to any other Minister
Minister 1	<ul style="list-style-type: none"> • Roads and Bridges Department • Labour Department
Minister 2	<ul style="list-style-type: none"> • Water Security and Public Health Engineering Department • Transport Department
Minister 3	<ul style="list-style-type: none"> • Health Care, Human Services and Family Welfare Department • Animal Husbandry, Livestock Fisheries and Veterinary Services Department • Parliamentary Affairs Department
Minister 4	<ul style="list-style-type: none"> • Human Resource Development • Sports and Youth Affairs Department • Information Technology Department
Minister 5	<ul style="list-style-type: none"> • Urban Development and Housing Department • Food, Civil Supplies and Consumer Affairs Department
Minister 6	<ul style="list-style-type: none"> • Energy and Power Department • Cultural Affairs and Heritage Department
Minister 7	<ul style="list-style-type: none"> • Rural Management and Development Department • Cooperation Department
Minister 8	<ul style="list-style-type: none"> • Food Security and Agriculture Development • Horticulture and Cash Crops Development • Irrigation and Flood Control Department
Minister 9	<ul style="list-style-type: none"> • Tourism Department • Forest, Environment and Wildlife Management Department • Mines, Minerals and Geology Department • Science and Technology Department
Minister 10	Buildings and Housing Department
Minister 11	<ul style="list-style-type: none"> • Commerce and Industries Department • Information and Public Relations Department • Printing and Stationary Department • Excise Department

Source: DIT (2009)

Each minister is assisted by a head of department, who is responsible for mandates, schemes, programmes, and projects that are specific to his/her department. For example, the head of department is given the power to give financial approval on salaries and other administrative costs³. The heads of departments are normally called Secretary, Commissioner-cum-Secretary, or Principal Secretary in Sikkim. In case of the Forest Department, it is PCCF-cum-Secretary is the head of department. Figure 2-2 describes the administrative hierarchy at state level.

³ The Sikkim State Financial Rules are followed.

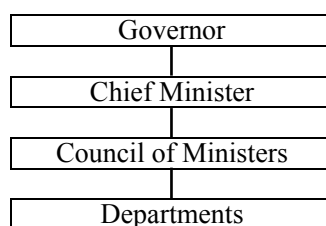


Figure 2-2 Administrative hierarchy at the state level

In particular, the Rural Management and Development Department (RMDD) is responsible for rural development through local government called Panchayat Raj Institutions (PRIs). It facilitates the implementation of programmes, projects, and schemes such as the National Rural Employment Guarantee Scheme (NREGS)⁴ and the Accelerated Rural Water Supply Programme at the community level.

There are four districts in Sikkim. Each district is administered by one District Collector, who belongs to the Indian Administrative Service⁵. The District Collector oversees regulatory affairs, including law and order, land administration and tax collection as well as development administration. Each District Collector is supported by Sub-Collectors who are stationed at the sub-division level. There are nine sub-divisions in Sikkim. Table 2-14 presents the administrative divisions of Sikkim at the district and sub-division levels.

Table 2-14 Administrative divisions of Sikkim

District	Name of district	Name of sub-division	Number of revenue villages
East	Gangtok	<ul style="list-style-type: none"> • Gangtok • Pakyong • Rongli 	133
West	Gyalzing	<ul style="list-style-type: none"> • Gyalzing • Soreng 	122
North	Mangan	<ul style="list-style-type: none"> • Chungthang • Mangan 	145
South	Namchi	<ul style="list-style-type: none"> • Namchi • Rabong 	54

Source: Lama (2007)

There are 454 revenue villages found in Sikkim through which the District administration collects taxes. Demarcation of the revenue villages is made as per physical land boundaries.

2.4.2 Local government

(1) Panchayat Raj institutions

There are two tiers of *Panchayat Raj*⁶ system in Sikkim: one at the district level named the *Zilla Panchayat* (District Council) and the other at the village level called the *Gram Panchayat* (Village Council). The Panchayats are constitutional entities.

A Zilla Panchayat represents a group of Gram Panchayats from its geographical jurisdiction. Thus, development plans prepared at the district level include village development plans prepared by Gram

⁴ The National Rural Employment Guarantee Act (2005) is followed. The objective of NREGS is to reduce poverty by providing 100 days of unskilled wage employment to each household in every financial year, if adult members of the household are willing to do unskilled manual work.

⁵ Indian Administrative Service (IAS) is the national administrative civil service of the Government of India. IAS manages the bureaucracy of both the central government and the state governments.

⁶ The Panchayat Raj Act (1965) and amendment (1982, 1993) are followed.

Panchayats. Table 2-15 highlights the duties and obligations of the Zilla Panchayat and the Gram Panchayat, the two of which constitute PRIs.

Table 2-15 Duties and obligations of PRIs

Zilla Panchayat	Gram Panchayat
<ul style="list-style-type: none"> • Regulation of <i>melas</i> (market places at festivals) or <i>haats</i> (markets) within local limits • Construction and maintenance of <i>Panchayat Ghars</i> (offices of village councils), <i>Dharamsalas</i> (traditional guesthouses at religious locations), and rest houses • Construction, repair, and maintenance of small irrigation under guidance of the Government of Sikkim • Regulation of water supply for irrigation or drinking water projects • Organisation of plantation programme in the public land, road sides and others • Establishment and maintenance of primary schools • Organisation of adult education centres • Establishment of health centres, and maternity and child welfare centres • Management and maintenance of public utility • Adoption of measures for relief of distress • Preparation of district level development plan(s) • Coordination and integration of development plan(s) prepared by Gram Panchayat(s) within jurisdiction • Performance of any other duties ordered by the Government of Sikkim 	<ul style="list-style-type: none"> • Prevention of public nuisances as well as infectious diseases • Supply of drinking water as well as cleaning and disinfecting the sources of supply and storage of water • Construction, repair, and maintenance of village roads and protection • Removal of encroachments of village roads and public places • Management of common grazing grounds, burning places, and public graveyards • Supply of local information that the District Collector, District Development Officer-cum-Panchayat Officer, or Zilla Panchayat may require within the limits of Gram Panchayat jurisdiction • Organisation of voluntary labour for community work and works for the development of concerned areas • Collection of taxes • Assistance in development works in the areas such as agriculture, forestry, animal husbandry, poultry, and fisheries • Assistance of Zilla Panchayat in preparing development plan(s)

Source: MOPR (2008)

Elections for Panchayat representatives take place every five years. The elections are conducted under the condition that a certain number of seats are reserved for Scheduled Castes, Scheduled Tribes, and women⁷ (MOPR, 2008).

There are four Zilla Panchayats and 166 Gram Panchayats in Sikkim. If the Dzumsa in Lachen and Lachung are counted as Gram Panchayats, the total amounts to 168. Table 2-16 shows the number of PRIs, Gram Panchayats wards, and revenue villages in Sikkim. A description of the Dzumsa is given in (2) below.

⁷ Until 2007, women representatives had to comprise at least 33% of Panchayat seats. In the third Panchayat election of 2007, the required proportion of reserved seats for women increased to 40% of the total seats following the amendment of the State Panchayat Act (1993).

Table 2-16 Number of PRIs, Gram Panchayat wards and revenue villages

District	Number of Zilla Panchayats	Number of Gram Panchayats	Number of Gram Panchayat wards	Number of revenue villages
East	1	50	273	133
West	1	51	274	122
South	1	45	255	145
North	1	20	103	54
Total	4	166	905	454

Source: Lama (2007)

Demarcation of the Panchayat is done as per population, and is irrespective of natural boundaries of land such as protected area and reserved forest. In Sikkim, one Gram Panchayat consists of approximately five Panchayat wards. One Gram Panchayat ward represents one constituency and comprises one revenue village or more. Thus, the number of the Gram Panchayat wards differs from the number of revenue villages.

(2) Dzumsa

The *Dzumsa* (meeting place) is a traditional village council with a history of over 200 years. It is found in Lachen and Lachung in the North District. The representatives of the Dzumsa consist of two *pipons* (headman) and two *gyapens* (secretary), each of whom serves for one year. Elections take place annually under the supervision of elderly village members.

The Dzumsa is considered equivalent to the Gram Panchayat in Lachen and Lachung. The difference between the Dzumsa and the Panchayat is that Dzumsa holds not only judicial power in its concerned village but also revenue collection power. One example is that it collects fines if one breaks the code set by the Dzumsa. Another example is that the household is the basic unit for voting rather than the individual. Thus, the participation of women appears negligible or nil in the Dzumsa. This rule is not in line with the Panchayat Raj Act, which ensures participation of women in decision making (Lama, 2001).

2.5 Public finance

(1) Central assistance, non plan budget, and plan budget

As mentioned in Section 2.3, Sikkim is one of the 11 special category states that receive budgetary assistance from the central government in the form of 90% grants and 10% loans. These states are given special permission to use up to 20% of central assistance for meeting the 'non plan gap,' which is unexpected expenditure at the time of budget approval (North Eastern Council, 2009). As shown in Table 2-17, central assistance amounts to approximately 80-90% of the approved budget, indicating the state's heavy dependence on central assistance, which has fluctuated significantly. Although the real annual growth rates of the approved budgets also fluctuate (-1% to 31%), the budget has generally recorded positive growth: for example, the FY 2006/07 budget (INR 5,509 million or USD 115 million) is twice as large as that of FY 1991/92 (INR 2,443 million). It should also be noted that the proposed size of investments by the Project (approximately INR 3,500 million) is significantly large compared to the size of the state budget.

Table 2-17 Approved budget of Sikkim and adjusted central assistance

Medium-term plan	Fiscal Year	Budget in current prices			Budget in constant 2007 prices	
		Approved budget ¹	Adjusted central assistance ²		Approved budget	Annual growth rate
			%			
		a	b	c=b/a	d	e
Annual Plan	1990/91	760	1,456	192 %	2,162	
Annual Plan	1991/92	960	2,055	214 %	2,443	13 %
8 th Five Year Plan	1992/93	1,100	984	89 %	2,631	8 %
	1993/94	1,200	1,080	90 %	2,605	-1 %
	1994/95	1,350	1,350	100 %	2,658	2 %
	1995/96	1,920	1,735	90 %	3,469	31 %
	1996/97	1,940	1,883	97 %	3,271	-6 %
9 th Five Year Plan	1997/98	2,200	2,253	102 %	3,276	0 %
	1998/99	2,370	2,515	106 %	3,372	3 %
	1999/00	2,500	3,299	132 %	3,420	1 %
	2000/01	2,500	2,638	106 %	3,298	-4 %
	2001/02	3,000	2,837	95 %	3,791	15 %
10 th Five Year Plan	2002/03	3,701	3,200	86 %	4,506	19 %
	2003/04	4,050	3,624	89 %	4,751	5 %
	2004/05	4,997	4,355	87 %	5,624	18 %
	2005/06	5,111	4,305	84 %	5,437	-3 %
	2006/07	5,509	4,649	84 %	5,509	1 %
	(Million USD ³)	(115)	(97)			

Note: 1) The 'approved budget' is the budget approved at the beginning of the fiscal year. It consists of the 'plan budget', mainly financed by central assistance, and 'non plan budget', mainly spent on salaries of government employees and financed by the state revenue. 2) The 'adjusted central assistance' indicates the amount of budgetary assistance adjusted for unexpected events. Since data on adjusted approved budgets were not available, those on approved budgets unadjusted for unexpected events are shown in this table. Thus, the share of adjusted central assistance to the approved budget ($c=b/a$) exceeds 100% for some of the fiscal years. 3) USD values were calculated based on the 24 June 2009 exchange rate at USD 0.02079/INR.

Source: DP, ER and NEC Affairs Department (2007)

State departments are allocated two types of budgets: the 'plan budget' and 'non plan budget.' The plan budget is the budget that is approved and appears in the five-year plans and subsequent annual plans, and is mainly financed by central assistance (North Eastern Council, 2009).

The procedure of obtaining the plan budget involves the following process: 1) the draft plan budget, prepared by each department, is submitted to the Development Planning, Economic Reforms, and North Eastern Council (DP, ER and NEC) Affairs Department and the State Planning Commission for their scrutiny; 2) the State Planning Commission submits the draft to the Government of India (GOI); 3) on obtaining the grant-in-aid from the GOI, the DP, ER and NEC Affairs Department allocates the funds to concerned departments of the state based on the plan budget; 4) the plan budget is also submitted to the Finance, Revenue, and Expenditure Department (FRED) to obtain approval from the State Legislative Assembly; and 5) the department is authorized to use the funds upon approval of the budget by the Assembly (ibid.).

The non plan budget is allocated by the FRED so that the administrative requirements of each department are met, including most of the salaries of government employees. This budget is usually secured from revenues generated by the state government. Although the non plan budget is approved by the state and comes from its budget, the state needs prior approval from the GOI before finalizing it.

The departments prepare detailed estimates and receipts of their non plan budgets and submit their proposals to the FRED for scrutiny to obtain approval of the Governor and the Legislative Assembly (ibid.).

Annual plans and corresponding project activities require approval before any expenditure can be authorized. Approval is required at two levels: 1) technical approval and 2) administrative approval. The heads of departments are the state-level authorities who accord technical approval, whereas administrative approval is accorded by the FRED after obtaining approval of the Government and the Legislative Assembly (DP, ER and NEC Affairs Department, 2007).

(2) Centrally sponsored schemes

Centrally sponsored schemes are funded from the central assistance budget based on the Centrally Sponsored Scheme Guidelines issued from time to time. Not all departments of the state are entitled to receive this benefit. The state government must usually follow the following steps to receive assistance in the form of centrally sponsored schemes: 1) the GOI identifies areas that require special attention at the state level and asks the state government to submit proposals; and 2) after evaluating the proposals, the GOI allocates funds to centrally sponsored schemes, which subsequently are reflected in the five-year plan of the particular state. For special category states, additional allocations can be made, which are administered by the North Eastern Council (North Eastern Council, 2009).

Financial assistance given to a particular department for a centrally sponsored scheme can also be shared by other line departments. For example, the RMDD, which receives funding from the central government, shares part of the funding with the Forest Department for the construction of village roads in forest areas. Similarly, funding for integrated watershed management projects, for which central funding is provided to the Agriculture Department, is shared by the Forest Department for support in implementation.

(3) Execution rates of approved budgets

Table 2-18 shows the execution rates of approved budgets with respect to actual expenditures. The rates represent the reliability of Sikkim's fiscal system.

Table 2-18 Execution rates of approved budgets

(million INR)				
Medium-term plan	Fiscal year	Nominal value		
		Approved budget (AP)	Actual expenditure	Execution rate (% to AP)
9 th Five Year Plan	1997/98	2,200	1,898	86 %
	1998/99	2,370	2,137	90 %
	1999/00	2,500	1,789	72 %
	2000/01	2,500	2,203	88 %
	2001/02	3,000	2,822	94 %
10 th Five Year Plan	2002/03	3,701	3,444	93 %
	2003/04	4,050	3,679	91 %
	2004/05	4,997	4,666	93 %
	2005/06	5,111	4,724	92 %
	2006/07	5,509	N.A.	N.A.

Source: DP, ER and NEC Affairs Department (2007)

It can be said that the fiscal system is relatively reliable, as recent execution rates have exceeded 90% and execution rates during the 10th Five Year Plan period have fluctuated less compared to the 9th Five Year Plan period. However, since 80-90% of the state budgets are financed from the GOI, the rates most likely represent the fiscal performance of the central government rather than that of the Government of Sikkim.

(4) Sectoral composition of the state budget

Table 2-19 shows the sectoral allocations of actual expenditure with respect to the 10th Five Year Plan of Sikkim (FY 2002/03-2006/07). Most of the expenditures incurred by the Forest Department fall into the agriculture and allied sectors, rural development sector, and science, technology and environment sector. The largest expenditure (43%) was committed to the social sector (education and health) followed by the transport sector (11%), energy sector (10%), and rural development sector (10%).

Table 2-19 Approved budgets and actual allocation of the 10th Five Year Plan, by sector

Sector	Approved budget			Actual allocation		
	Annual average	% to total		Annual average	% to total	
1 Agriculture and allied sectors	1,750	350	11 %	1,375	275	6 %
2 Rural development	1,240	248	7 %	2,236	447	10 %
3 Special area programme	300	60	2 %	815	163	4 %
4 Irrigation and flood control	310	62	2 %	451	90	2 %
5 Energy	2,429	486	15 %	2,340	468	10 %
6 Industry and minerals	620	124	4 %	731	146	3 %
7 Transport	2,550	510	15 %	2,496	499	11 %
8 Communications				276	55	1 %
9 Science, technology and environment	110	22	1 %	66	13	0 %
10 General economic services	404	81	2 %	781	156	3 %
11 Social sector (education and health)	6,263	1,253	38 %	9,930	1,986	43 %
12 General services	582	116	4 %	1,032	206	4 %
13 Non plan gap				542	108	2 %
TOTAL	16,557	3,311	100 %	23,068	4,614	100 %
(million USD ¹)	(344)	(69)		(480)	(96)	

Note: 1) USD values were calculated based on the 24 June 2009 exchange rate at USD 0.02079/INR.

Source: DP, ER & NEC Affairs Department (2007)

The actual allocation to the state (INR 23,068 million) was 39% higher than the approved budget (INR 16,557 million), indicating that the GOI was able to finance a larger demand for development than was initially envisaged for the 10th Plan period. This may be the result of the expansion of the tax base due to the recent economic growth of the country. Additionally, investment priority has shifted during this period. More funds were allocated to the rural development sector and social sector (education and health), and less funds were allocated to the agriculture and allied sectors, energy sector, and transport sector.

Public expenditure is expected to double in the 11th Five Year Plan period. The state has projected an amount of INR 47,334 million for this period and INR 8,643 million for FY 2007/08 in the Annual Plan. The budget to be allocated to rural local bodies is projected at INR 6,673 million in the five-year period and INR 1,295 million in FY 2007/08. For the urban local bodies, the 11th Plan projects INR 570 million and INR 120 million for the 2007/08 annual budget. This is indicative of the high priority placed by the Government of Sikkim on rural development though the enhancement of the local governments.

(5) Budget of Sikkim Forest Department

The annual budget plan for the Forest Department is prepared following the guidelines of the MOEF and the Government of Sikkim. When the plan is finalized, it is reviewed and approved by the FRED and the Sikkim Legislative Assembly.

Table 2-20 presents the approved budgets and actual expenditures of the Forest Department since FY 1999/00. The state plan budgets, or recurrent budgets, show higher rates of execution (98% to more than 100%) than those of plan budgets (55% to 100%) indicating the less flexible nature of the recurrent budget. Approximately a third of the total budget is composed of recurrent costs, and the rest is used for investments. In FY 2009/10, the total actual expenditure by the department was about USD 9 million, whereas about USD 10 million is expected to be executed annually by the same department under the Project. This means that the Forest Department will need to execute twice the amount of the current budget during the Project period. Accordingly, the capacity of the department to manage its budget will need to be enhanced to secure smooth project implementation.

The allocation of the FY 2008/09 budget by circle indicates that the highest proportion of funds were earmarked to the Wildlife Circle (34%), followed by Territorial Circle (26%), Land Use and Environment Circle (18%), and Social Forestry Circle (11%).

Table 2-20 Proposed budget and actual expenditure of the Forest Department

Year	Approved budget			Actual expenditure					(million INR)		
	State plan budget (SPB)*	Plan budget (PB) ^{1**}	Total	State plan budget (SPB)*	Plan budget (PB) ^{1**}		Total	% of actual expenditure to approved budget			
				% to Total	% to Total	SPB		PB	Total		
	(SPB)*	(PB) ^{1**}									
1999/00	62	201	263	53	23%	177	77%	229	85%	88%	87%
2000/01	95	256	351	70	23%	231	77%	301	73%	91%	86%
2001/02	83	285	368	92	24%	287	76%	379	110%	101%	103%
2002/03	97	254	350	113	30%	269	70%	382	117%	106%	109%
2003/04	74	221	295	74	25%	220	75%	295	101%	100%	100%
2004/05 ²	79	243	323	85	-	-	-	-	108%	-	-
2005/06	89	300	390	90	25%	276	75%	365	100%	92%	94%
2006/07	132	369	501	132	29%	322	71%	453	100%	87%	90%
2007/08	158	430	588	155	30%	359	70%	514	98%	84%	87%
2008/09	180	495	675	179	40%	274	60%	454	100%	55%	67%
(million USD ³)	(4)	(10)	(14)	(4)		(6)		(9)			

Note: 1) Plan budget is mainly used for public service delivery, investment, and creation of material assets. 2) In addition to the approved plan budget shown in the table, the Northeastern Development Commission provided INR 843 million as special assistance. 3) USD values were calculated based on the 24 June 2009 exchange rate at USD 0.02079/INR.

Sources: *Additional Director (Accounts), Forest Department, personal interview, July 2009; **Chief Conservator Forest (Wildlife), Forest Department, July 2009

CHAPTER 3 Forest management and biodiversity conservation

3.1 Policies, legal instruments, institutions, and plans

3.1.1 Policies

In the Indian context, policies on forest management and biodiversity conservation are closely interlinked. Article 48 (A) and 55 (A) (g) of the Indian Constitution declare that all states shall protect and improve the natural environment, including forests, rivers, lakes, and wildlife. This constitutional provision forms the basis of the government's policies and regulatory framework on forest management and biodiversity conservation. Resolution No. 3-1/86-FP (1988) of the Ministry of Environment and Forests (MOEF) provides that management of all state forests shall be guided by the National Forest Policy (1988). In line with the national policy, the Government of Sikkim in 2000 adopted the State Policy of Environment, Forests, and Land Use (SPEFLU) (IPRD 2008).

In 2000, the Sikkim government declared the period between 2000 and 2010 the Green Revolution Decade. It adopted the Sikkim Green Mission in 2006 committing, for example, to the inclusion of plantation components in all road projects. In addition, the Forest Fire Management Policy for Sikkim was established in 2002. Investments in the forest, wildlife and biodiversity sector and the environment sector are emphasised in the 11th Five Year Plan 2007-2012.

The SPEFLU is one of the most important forest and biodiversity conservation policies of Sikkim. It stipulates that Sikkim shall maintain environmental stability through the preservation and restoration of the ecological balance, adversely affected by human interventions including development-related activities. The SPEFLU sets the goal to extend forest or tree cover to two-thirds of the state's total area to prevent soil erosion and land degradation and to ensure the stability of the fragile ecosystem. The following are the key features of the policy for attaining this goal and for conserving Sikkim's biodiversity.

- The policy sets as an objective the conservation and preservation of natural forests to maintain the diversity of flora and fauna. It emphasises the establishment of a network of national parks, sanctuaries, and biosphere reserves to meet this objective.
- The policy encourages all protected areas (Pas) to provide for 'corridors' that link the protected areas, which serve to maintain genetic continuity between artificially separated subsections of migrant wildlife. In addition, forest management plans are required to address the need for wildlife conservation in areas outside the protected areas.
- The policy encourages both in-situ and ex-situ conservation efforts, including zoological gardens and arboretums, as there are many endangered species. Annex 2 provides lists of major and identified endangered and rare species of flora and fauna in Sikkim.
- The policy puts equal emphasis on the freshwater ecosystem and suggests that special efforts be made to maintain the ecology of inland water bodies like lakes, rivers, and streams. Legislation shall be adopted to prevent pollution of the water bodies. The impacts of water resource development projects for hydro-power generation and irrigation or flood control on the land, ecology, and society as a whole should be evaluated.
- The policy states that, at higher altitudes where the alpine ecosystem is fragile, the environment of areas under direct possession of the military, including the Border Roads Organisation (BRO), must be stabilized by 2020.
- The policy clearly identifies a knowledge-base⁸ gap on land use and mentions the urgent need

⁸ In this report, 'knowledge base' refers to a repository of knowledge used to optimize information collection, organisation, and retrieval for an organisation and/or for the general public. This knowledge consists of related information about a particular subject such as best practices, past issues or problems and their resolution, concepts, data, objectives, requirements, rules, and specifications (BusinessDictionary.com, 2009; SearchCRM.com, 2007).

to generate and update the database for natural resources of the state. Without this, appropriate decisions cannot be made, and the optimum utilisation of natural resources cannot be realized. Priority should be given to conducting scientific surveys of forest resources, land use, and biodiversity. Specific activities include periodic collection, collation, and publication of reliable data on prevalent aspects of the environment, forest, and land management, aided by modern technology.

- The policy explicitly states that the State Land Use Board should function as main custodian of data on land use.
- The policy stipulates that appropriate legislation and rules shall be formulated for the implementation of a comprehensive policy on environment, forest, and land use. Suggestions for organisational restructuring are found throughout the policy.

3.1.2 Legal instruments

The legal framework for forest management and biodiversity conservation in Sikkim includes national and state acts (Table 3-1) which the Forest Department is responsible for executing. Interpretation and application of these acts are constrained by a 1996 Supreme Court order, which bans green felling without a proper working plan.

Table 3-1 Acts and rules related to forest management and biodiversity conservation

Category	Act	Rules
Biodiversity	<ul style="list-style-type: none"> • Biological Diversity Act (2002) and amendment (2003) • Environment (Protection) Act (1986) 	<ul style="list-style-type: none"> • G.S.R.261 (E) [15/04/2004] – Biological Diversity Rules (2004)
Forest Conservation	<ul style="list-style-type: none"> • Forest (Conservation) Act (1980) and amendment (1988) • Indian Forest Act (1927) • Draft State/Union Territory Minor Forest Produce (Ownership of Forest Dependent Community) Act (2005) • Sikkim Forests, Water Courses, Road Reserve (Protection and Preservation) Act (1988) and amendment (2000) • Compensatory Afforestation Strategy for the Proposed Project Act (1988) • Forest Rights Act (2006) 	<ul style="list-style-type: none"> • G.S.R.23(E) – Forest (Conservation) Rules (2003) • G.S.R.719 – Forest (Conservation) Rules (1981) and amendment (1992)
Wildlife	<ul style="list-style-type: none"> • No. 16 of 2003, Wild Life (Protection) Amendment Act (2002) • Indian Wildlife (Protection) Act (1972) and amendment (1993) 	<ul style="list-style-type: none"> • S.O.1092(E) [22/9/2003] – The National Board for Wild Life Rules (2003) • S.O.445(E) [18/4/2003] – The Declaration of Wild Life Stock Rules (2003) • G.S.R.350(E) [18/4/1995] – The Wildlife (Specified Plant Stock Declaration) Central Rules (1995) • G.S.R.349(E) [18/4/1995] – The Wildlife (Specified Plants – Conditions for Possession by Licensee) Rules (1995) • G.S.R.348(E) [18/4/1995] – The Wildlife (Protection) Rules (1995) • Recognition of Zoo Rules (1992) • G.S.R.328(E) [13/4/1983] – The Wildlife (Protection) Licensing (Additional Matters for Consideration) Rules (1983) • G.S.R.29(E) [25/1/1973] – The Wildlife (Stock Declaration) Central Rules (1973) • G.S.R.198(E) [9/4/1973] – The Wildlife (Transaction and Taxidermy) Rules (1973)

Source: Study team

The following state rules are derived from the Sikkim Forests, Water Courses, Road Reserve (Protection and Preservation) Act (1988), shown in Table 3-1.

- Sikkim Forests Rules (1998)
- Sikkim Transit of Timber and Other Forest Produce Rules (1999) and amendment (2000 and 2001)
- Sikkim Forest Cattle Trespass Rules (2000)
- Sikkim Private and Other Non-Forest Land Tree Felling Rules (2001) and amendment (2002)
- Sikkim Detection, Enquiry, and Disposal of Forest Offences Rules (2001)

Here are other rules related to forest management and biodiversity conservation in Sikkim.

- Sikkim Ecology Fund Environment Cess Rules (2007)
- Sikkim State Biological Diversity Rules (2006)
- State Environment Agency Guidelines (2006)
- Guidelines for Lake Conservation in Partnership with Gram Panchayat (2006)
- Sikkim Ecology Fund and Environment Cess Act (2005)
- Sikkim Wildlife (Regulation of Trekking) Rules (2005)

Under the National Forest (Conservation) Act (1980) and amendment (1988), important state notifications such as that on the establishment of Joint Forest Management Committees (JFMCs) in Sikkim (1998) and amendments (2001, 2002, and 2006), and the Sikkim Ecodevelopment Notification (2002) on the establishment of Ecodevelopment Committees (EDCs) are gazetted by the Government of Sikkim. Compared to other states, these state notifications on the establishment of JFMCs and EDCs were gazetted recently.

In the same token, the establishment of the National Biological Diversity Act in 2002 led to the adoption of the Sikkim State Biodiversity Rules in 2006 by the Government of Sikkim. In the State Biodiversity Rules, there are 29 functions prescribed for the State Biodiversity Board. One of these is to develop biodiversity registers, mainly for access and benefit sharing. The process involves cataloguing local traditional knowledge in terms of their utility, methodology, and status of protection against biopiracy and of their intellectual property rights. However, the Board has not been funded sufficiently by the central and state governments and has limited capacity to perform the expected functions. Thus, it is recommended that the Project coordinate with the Board to reflect the objectives of Sikkim State Biodiversity Rules in the annual work plans and budgets of the Project.

3.1.3 Implementing institutions

(1) National level

The MOEF is responsible in planning, designing, promoting, coordinating, monitoring, and funding programmes on environment and forests. The programmes funded and implemented by the MOEF include those on biodiversity conservation and surveys, forest and wildlife management, pollution control, afforestation, regeneration of degraded areas, and environment protection in accordance with legislations sanctioned by the Government of India. The MOEF is headed by the Minister, who is supported by the Minister of State (Environment), the Minister of State (Forests and Wildlife), and the Secretary (Environment and Forests). There are two wings in the MOEF, the Environment Wing and the Forests and Wildlife Wing.

There are a number of programmes funded by the MOEF, including the National Afforestation Programme (NAP). The NAP is implemented by the National Afforestation and Ecodevelopment Board (NAEB), which was established in 1992. The NAEB applies a decentralized implementation

mechanism, which places the Forest Development Agency (FDA) at the forest divisional level and JFMCs at the village level. In addition, it has seven regional offices including one at North Eastern Hill University, Shillong, Meghalaya. The office provides support, guidance, and direction as well as programme monitoring to the states located in the northeast region.

(2) State level

The Forest Department is the main implementing organisation for forest management and biodiversity conservation. Details on this department are presented in Section 3.2. The departments that are potential partners to the Forest Department for implementing the Project are listed in Table 3-2.

Table 3-2 Potential partners to the Forest Department

Department
Animal Husbandry, Livestock, Fisheries and Veterinary Services Department
Development Planning, Economic Reforms and North East Council Affairs Department
Finance Revenue and Expenditure Department
Horticulture and Cash Crops Development
Rural Management and Development Department
Sports and Youth Affairs Department
Tourism Department
Urban Development and Housing Department

Source: Study team

(3) Institutions outside the government agencies

There are a number of institutions that are para-governmental⁹, non-governmental, and/or foreign in Sikkim: the Botanical Survey of India, Geological Survey of India, GB Pant Institute for Himalayan Environment and Development, WWF India, Ecotourism Conservation Society of Sikkim, Society for Better Environment, The Mountain Institute India, Khangchendzonga Conservation Committee, Green Circle, Concern Citizens, Sadbhavana Samitee, Motanchi Lom Al Shezum Dzongu, South Asia Foundation, Sikkim Development Foundation, Paryawaran Sangrakshan Sangh, and Sikkim Youth Welfare Association.

There are several institutions working on forest-related and environmental issues in Sikkim. On the other hand, there are no well-known in-state research and education institutions and NGOs on biodiversity conservation, though there were several initiatives in the past. Thus, in-state institutions and Sikkim-based research NGOs need to be strengthened. Their activities and collaboration could contribute to building human resources for conservation-related planning, implementation, and evaluation. NGOs will need to be profiled to ensure that appropriate organisations could build a peer-review platform that consolidates conservation initiatives.

The Government of Sikkim and the Forest Department acknowledge that successful resource management can only be achieved through the collaboration and partnership efforts of local people. For example, ex-herders and local residents conduct the protection and management of high-altitude resources under Himal Rakshak Committees and Pokhri Sanrakshan Samitis (PSS's) by monitoring graziers, medicinal plant collectors, poachers, and lakes. These local bodies are entrusted with the responsibility of collecting local revenue, which is deposited into both the government revenue and the committee accounts.

⁹ Government-sponsored but autonomous

3.1.4 Current plans and programs

(1) Forest management

Working Plan: Within the current legal framework, management of forests can be conducted only with a proper working plan. The development and application of a working plan need to comply with the National Working Plan Code (2004), which defines criteria and indicators for sustainable forest management.

Currently, only the South District has a working plan. The planning period is from 2000 to 2020. It was approved by the MOEF in 2001 with the exception of the section on harvesting. According to the MOEF, prescriptions related to harvesting could not be approved because ground proofing was insufficient. The working plans for the East and West Districts are currently being developed, and the second preliminary drafts have been produced. The two plans are ten-year plans describing how the reserved and protected forests of the respective districts should be managed¹⁰. They do not, however, deal with protected areas¹¹. The plans will come into effect once they are approved by the MOEF and will be revised after five years of implementation as necessary. All operations in the above-mentioned forests will have to comply with the working plan. No work has started for the North District.

The activities of the proposed project should be in line with the working plans being prepared and completed. The Project should also assist the development of a working plan for the North District and the upgrading or revision of the working plans for the other three districts during its implementation. As the South District's working plan, which was completed in 2000, was the first to be developed under the Forest Department since 1952, only a very limited number of officials have practical experience with the process. Given that the working plans are meant to serve as guiding principles for all forest management activities in reserved forests, the enhancement of the capacity of the Forest Department to formulate and implement working plans is fundamental to sound forest management.

Stage Forestry Action Plan (SFAP): SFAP is a 20-year plan under the National Forestry Action Programme 1994-5 (NFAP). It was formed to set guidelines on management plans for all forests and ecosystems of the state. According to this plan, prior attention is to be given to the strengthening of policies, legislation, and institutional frameworks.

JFMC, EDC, and FDA: The JFMC and the EDC were introduced in 1998 and 2002, respectively. The activities of JFMCs and EDCs are technically and financially supported by the FDA, which was established as a society. The FDA provides employment opportunities and support for asset accumulation to the members of scheduled tribes, scheduled castes, and other weaker sections of society. The FDA provides a mechanism through which assistance under various centrally sponsored schemes and externally aided projects flows on a priority basis to the targeted population and areas. The FDA can receive funds from various sources and act as an administrative, supervisory, and monitoring body for implementation of centrally sponsored schemes and externally aided projects involving JFMCs and EDCs. The FDA can be registered as a federation of JFMCs and EDCs under the Societies Registration Act (1860).

Catchment Treatment Plan (CTP): All hydropower projects are required to finance the CTP, which

¹⁰ For example, the East District's working plan contains 19 sets of prescription or 'working circles.' They are 1) Sal selection cum improvement; 2) middle hill forests selection cum improvement; 3) oak restoration; 4) plantation; 5) NTFP; 6) bamboo; 7) forest protection; 8) joint forest management; 9) wildlife; 10) soil and moisture conservation; 11) ecotourism and ecotourism; 12) biodiversity conservation; 13) conifer and miscellaneous species development; 14) monoculture Dhuppi replacement; 15) wetland; 16) applied forestry research; 17) teak and miscellaneous plantation thinning; 18) alpine meadows; and 19) khasmal forest.

¹¹ The reserved forests and protected areas are governed by different sets of laws and regulations. Thus, the protected areas have their own management plans, which are described in the following section.

is executed by the Forest Department. Implementation of CTPs is monitored by a multidisciplinary team composed of experts from line departments and NGOs.

Treatment of landslides and erosion control: These are carried out through a centrally sponsored scheme under the Ministry of Rural Development. They are implemented by Divisional Forest Officers (DFOs).

IWDP/Hariyali Project: Funds for this project are obtained from the Ministry of Rural Development by the Zilla Panchayat for soil conservation works in identified watersheds. The scheme has been in progress from 1997. Since the Forest Department has to depend on other agencies for funds to be released, the progress of work and utilisation of funds have been slow.

(2) Management of protected areas and biodiversity conservation

The National Biodiversity Strategy and Action Plan (NBSAP): This plan is a project of the MOEF. The Government of Sikkim adopted the plan in September 2000, which was followed by the formulation of the Sikkim State Biodiversity Strategy and Action Plan (SSBSAP) by the Forest Department with the participation of relevant stakeholders (FEWMD, 2006e).

Protected area management plans: The management of protected areas in Sikkim is governed by regulations different from those on reserved forests; thus, management plans for protected areas need to be developed separately. The development of the management plan for Khangchendzonga National Park and those for all seven wildlife sanctuaries were completed in August 2009. These management plans have been written for a period of 10 years (FY 2008/09-2017/18) in conformity with the Manual for Planning Wildlife Management in Protected Areas and Managed Forests prepared by Wildlife Institute of India. Since the establishment of protected areas, this was the first attempt by the department to develop comprehensive plans¹² that identify human and financial resource gaps for the proper implementation of the plans (FEWMD, 2009a, 2009b, 2009c, 2009d, 2009e, 2009f, 2009g, and 2009i). They are to be reviewed and modified as necessary midway through the planning period.

The proposed project should assist the completion, improvement, and implementation of the protected area management plans. Project activities should be in line with the plans and assist the monitoring and periodical revision of their implementation. Since the eight above-mentioned protected area management plans were the first ever to be completed by the Forest Department, only a limited number of officials have practical experience in planning and implementing the plans. Therefore, the proposed project should seek to enhance department officials' capacity to plan and implement the protected area plans.

Currently, there is no planning framework that integrates the management of protected areas and reserved forests, including khasmal and gorucharan forests. For example, the zonation of reserved forests is based on the area (compartment) concept, whereas protected area zonation is based on the species concept. This discrepancy should, at least, be mitigated by the promotion of interdepartmental coordination between the sections responsible for development and implementation of the protected area management plans and working plans. In principle, the proposed project will support attempts to establish the planning framework and strengthen intradepartmental coordination.

Other initiatives: Several independent, biodiversity-oriented programs and plans are under way. They

¹² Protected area management plans include 1) descriptions of current natural and socioeconomic status of the areas, 2) management concept and strategies, 3) proposed measures for zonation, 4) conservation of biodiversity, 5) management of human interventions, 6) enhancement of economic activities of forest fringe communities through establishment of EDCs and promotion of ecotourism, 7) research, monitoring, and training, 8) organisation and administration, and 8) estimated resource requirement.

include 11 important bird areas (IBAs) in Sikkim, Tendong State Biodiversity Park, Sidkeong Bird Park, Sling-Dong Fairreanum Conservation Reserve, a proposed butterfly park in Rangrang, Chogyal Palden Thendup Namgyal Park, 19 major sacred groves, 13 herbal gardens, and memorial forests called Smriti Vans. Besides these, there are several grassroots initiatives supported by the state to enhance environmental awareness through mainstreaming tree plantation in villages and soil stabilization, which may eventually contribute to biodiversity conservation.

3.2 Forest, Environment & Wildlife Management Department

The original form of the current Forest, Environment & Wildlife Management Department ('Forest Department') was established under the rule of the tenth King of Sikkim in 1909. The King brought a forest officer from West Bengal and appointed him as the first forest manager. The forest manager completed the classification and demarcation of forestland into three distinct categories and developed the first forest manual. The three categories were reserved forests, *khasmal* (forestland for meeting of domestic needs), and *gorucharan* (forestland for grazing of cattle) (FEWMD, 2009a).

The Forest Department adopted acts and regulations on forest management and biodiversity conservation issued by the Government of India in 1975. JFM for participatory forest management and EDCs for biodiversity conservation were introduced to Sikkim in 1988 (ibid.). The Forest Department went through continuous reform over the years, and the current form of the Forest Department was constituted in 1999.

3.2.1 Institutional set-up

Under the Minister of Forests, Environment and Wildlife¹³, the Forest Department is led by the Principal Chief Conservator of Forests (PCCF)-cum-Secretary. The PCCF is the administrative head as well as the principal advisor to the Minister on all matters related to policy and administration of the Department. The PCCF is directly assisted by two Additional PCCFs and a Chief Conservator of Forests (CCF). One Additional PCCF is responsible for Wildlife and acts as the Chief Wildlife Warden. The other Additional PCCF looks after planning and administration (FEWMD, 2009a). The CCF is responsible for operations related to biodiversity, the Integrated Watershed Development Programme and liaison with JICA.

The organisational chart of the Forest Department from PCCF to DFO is presented in Figure 3-1.

¹³ The Minister of Forests, Environment and Wildlife is a legislative assembly member of Sikkim. He is concurrently the Minister of Tourism and the Minister of Mines, Minerals and Geology.

Chapter 3 Forest management and biodiversity conservation

Circle		CCF	Director	CF	Additional Director	Joint Director	DFO	ACF	Assistant Director	Range Officer	Block Officer	Head Forest Guard	Forest Guard	Total
PCCF	Accounts Division				1	1		2						4
	Utilisation	1* ³					1	1		1				4
	Territorial	1* ³		1* ⁶			4	23		21	70	29	220	369
	Social Forestry						5	1		7	8	1	5	27
	Sericulture		1			1			1	2	2	1		8
	Planning & Administration*		1* ³		1		1* ⁷	2* ¹⁰		1* ⁷				6
	Working Plan			1* ³			2			1	1		1	6
	Forest Conservation Act	1				1	1			1				4
	Wildlife	1					5	7		12	12	7	18	62
	Land Use & Environment	1* ⁴		1* ³			5	3	10	10	5	1	9	45
	Silviculture/ Research		1		1		1	1		2		1		7
	Non Timber Forest Produce/ State Medicinal Plants Board				1	1	1* ⁸	4		6		1	2	16
	Himalayan Zoological Park		1		1		1* ⁹	6		1	1			11
	Biodiversity/ Integrated Watershed Development Project/ JICA * ²													0
Total		5	4	3	5	4	27	50	11	65	99	41	255	569*¹¹

Note: 1) It looks after Tribal Sub-Plan and Scheduled Caste Sub-Plan Division. 2) It is not a circle. 3) The posts are vacant. 4) He is the Nodal Officer for Forest Conservation Act, and acts as CCF, Territorial until further notice. 5) He is called Special Secretary. 6) He acts as CF, Working Plan until further notice. 7) The post is with the Parks and Garden division. 8) He is the Nodal Officer for Tribal Sub-Plan and Scheduled Caste Sub-Plan. 9) The post is filled by veterinarian. 10) They are called Under Secretary. 11) The number does not include the PCCF, two Additional PCCFs, and the CCF shown on the left side of the table.

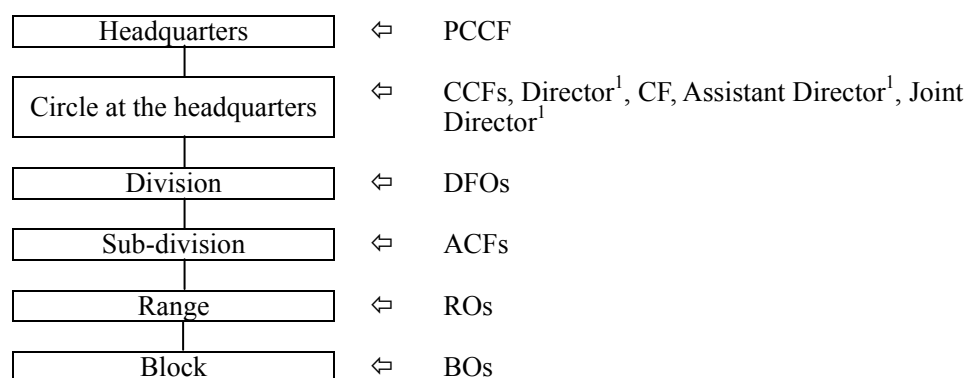
Source: Sikkim Forest Department (2009)

Figure 3-1 List of officers and staff members in the Forest Department as of August 2009

The Forest Department is divided into 12 Circles in Sikkim. These are namely the Utilisation, Territorial, Social Forestry, Sericulture, Planning and Administration, Working Plan, Forest Conservation Act, Wildlife, Land Use and Environment, Himalayan Zoological Park, Non Timber Forest Produce, State Medicinal Plants Board, and Silviculture and Research Circles. The Accounts Division is a division of its own.

Each Circle is headed by a CCF, who is supported mainly by the following ranks of officers: Conservator of Forests (CF), Divisional Forest Officer (DFO), Assistant Conservator of Forests (ACF), Range Officer (RO), Block Officer (BO).¹⁴ In addition, the Head Forest Guards, Forest Guards as well as support staff members such as an office superintendent, a junior accountant, head office assistant, lower divisional clerk, data entry operator, driver, and peon work under the CF(s).

Figure 3-2 shows the administrative hierarchy of the Forest Department.



Note: 1) Positions are filled by officers who belong to the Sikkim Public Service.

Source: Forest Department (2009a)

¹⁴ A list of officers and staff working at the division level and below is presented in Annex 3.

Figure 3-2 Administrative hierarchy of the Forest Department

The main function and numbers of the Forest Department officers and frontline staff members are presented in Table 3-3.

Table 3-3 Main functions and numbers of officers and frontline staff members of the Forest Department as of August 2009

Post	Main function	Number of officers in position	Number of sanctioned posts	Gaps in numbers
Chief Conservator of Forests	<ul style="list-style-type: none"> Assistance to PCCF and Additional PCCFs Policy-related work Preparation of circle work plans and budgets Supervision of DFOs and below 	6	2	+4
Chief Conservator (Territorial)	<ul style="list-style-type: none"> Assistance to CCFs and above Policy-related work Preparation of circle work plans and budgets Supervision of DFOs and below 	3	5	-2
Divisional Forest Officer	<ul style="list-style-type: none"> Assistance to CFs and above Overall management of programme/project implementation at divisional level Supervision of ACFs and below 	27	11	+16
Assistant Conservator of Forests	<ul style="list-style-type: none"> Assistance to DFOs and above Management of programme/project implementation at sub-divisional level Supervision of ROs and below 	50	87	-37
Range Officer	<ul style="list-style-type: none"> Assistance to ACFs and above Implementation of activities assigned to Range Office(s) Supervision of BOs and below 	65	75	-10
Block Officer	<ul style="list-style-type: none"> Assistance to ROs and above Implementation of activities assigned at block level Supervision of head guards and below 	99	111	-12
Head Forest Guard	<ul style="list-style-type: none"> Assistance to BOs and above Implementation of activities at community level Supervision of forest guards 	41	39	+2
Forest Guard	<ul style="list-style-type: none"> Assistance to head forest guards and above Implementation of activities at community level 	255	430	-175* ¹
Total		546* ²	760* ²	-214* ²

Note: 1) Before the end of 2009, 139 new forest guards will be appointed. 2) The numbers do not include one PCCF, two Additional PCCFs, four Directors, five Additional Directors, four Joint Directors, 11 Assistant Directors, and supporting staff members. Although budget requests have been made for all 760 sanctioned posts, those for only 546 posts have been approved by the Parliament of Sikkim.

Source: Forest Department (2009)

In addition, there are officers such as the Chief Accounts Officer, Accounts Officers, and Director for Sericulture working in the Forest Department. They belong to the Sikkim State Public Service (FEWMD, 2009a).

Table 3-4 presents the boards that are established as per the rules and regulations followed by the Government of Sikkim. They work closely with the Forest Department.

Table 3-4 Names and functions of boards relevant to forestry and biodiversity conservation in Sikkim

Name	Function
State Biodiversity Board	Implementation of the Biological Diversity Act (2002) and amendment (2003) and enforcement of other acts related to biodiversity conservation
State Land Use Board	Enforcement of policies on proper land use to ensure conservation and optimum return from land and conservation and improvement of the environment
State Medicinal Plants Board	Formulation of projects/schemes related to medicinal plants; implementation of such schemes; marketing; research; protocol for cultivation and quality control; and protection of issues related to the medicinal plants
State Pollution Control Board	Implementation of the provisions of the Water (Prevention and control of Pollution) Act (1974) and enforcement of other acts related to water, air, public liability, and environment protection
State Wildlife Advisory Board	Advisory to the Government of Sikkim in selection and management of protected areas; formulation of policies on protection and conservation of wildlife and other matters related to wildlife and the Wildlife Protection Act (1972)

Source: FEWMD (2007a)

(1) Monitoring and evaluation

There is no circle responsible exclusively for monitoring and evaluation within the Forest Department. Instead, monitoring and evaluation are handled by each circle. The monitoring system developed by the MOEF is applied to centrally sponsored schemes such as the National Afforestation Programme (NAP)

(2) Knowledge management

The MOEF introduced the Environment Information System (ENVIS) to manage and provide information on the environment to policy and decision makers in 1982. In Sikkim, the ENVIS Centre was established in 2002 and became fully operational in 2006¹⁵. The primary role of the Centre is to collect data and information related to the environment, to host this information on the website of the Centre, and to manage the ENVIS library. In addition, it assists the State Environmental Agency in implementing the National Environment Awareness Campaign, the National Green Corps and other programmes. These programmes aim to raise awareness on the environment among students in both urban and rural areas with the support of the Forest Department, other relevant departments, schools, and local NGOs. The ENVIS Centre has so far published a bi-annual newsletter called *PANDA* and the *State of Environment Report 2007* (FEWMD, 2009a).

The Centre is managed by a team of four persons, one senior programme officer with a background in computer engineering, one programme officer with a background in botany, one programme assistant with a diploma in computer science, and one data entry operator to be appointed shortly. The CCF, Land Use and Environment is appointed as the programme coordinator for the centre. The CCF, Land Use and Environment, have to manage a wide range and large volume of work as the ENVIS programme coordinator and the acting CCF, Territorial.

Despite the small set-up of the ENVIS operation, the role of the ENVIS Centre may be expanded, as

¹⁵ The web address of the Centre is www.sikenvis.nic.in.

there is room for improvement in the Forest Department in terms of quality of the publications it issues. As of now, there are inconsistencies in statistics and facts are found in the publications issued by the Forest Department.

(3) Infrastructure

a) Office and residence

The Forest Department is responsible for providing an efficient working and living environment to its officers and staff members. There are more than 200 buildings used as offices and residences that are managed by the Forest Department. According to the senior officials in the Forest Department, many of the buildings require renovation if not reconstruction.

The study team and the senior officials in the Forest Department went through the list of buildings managed by the Forest Department and identified essential buildings that are in need of immediate assistance. The construction of office-cum-residences for range officers and block offices was found to be most crucial to strengthen the capacity of the Forest Department. In addition, the need for renovation and/or reconstruction of residences of the frontline staff members as well as the check posts was identified to be equally important.

b) Mobility

DFOs and officers above them are provided vehicles to perform their duties. Other than that, access to the Forest Department vehicles is very limited to ACFs and officers and staff members below them (CCF, Forest Department, personal communication, June 2009). There are nine vehicles procured by the Forest Department. One truck belongs to Utilisation Circle and does not work. Four pick-up trucks are with Territorial Circle and are ready for replacement. The Parks and Garden Division has a pick-up truck, which needs to be replaced. The Sericulture Circle is experiencing the same situation. Thus, the Forest Department is left with only two vehicles that are in good condition and are available for official use. As for motorcycles, the Forest Department does not provide any to its field officers. Therefore, the ACFs seek assistance to their reporting DFOs to extend their vehicles for performing their duties from time to time. For other officers and frontline staff members, the primary means of transportation are buses and taxis.

The current situation requires improvement if the Forest Department is to fulfil its mandates.

c) Equipment

All posts filled by IFS and SFS officers¹⁶ at the Forest Department headquarters are equipped with internet connection and computers. Computers are distributed to all offices at the division level as well as to Range offices under the Territorial Circle (CCF, Forest Department, personal communication, June 2009). However, there is no internet connectivity at range level. Thus, neither information nor report(s) from range officers are submitted to the headquarters via internet.

The check posts are not equipped with computers. Thus, the officers at the check posts manually maintain their records, reports, and other documents required using paper. It is a very time consuming process to be followed daily by a limited number of persons to man the check posts.

As for other tools for documentation, digital cameras, GPS and other survey instruments are not available at field level. To improve the capacity of the Forest Department in forest management and biodiversity conservation, these tools are essential. It is critical that both procurement and training on

¹⁶ See section 3.2.3 for details on categories of the Forest Department officers

such equipment are provided to selected officers and frontline staff members in the Project.

d) Communication

Sikkim has a state-wide communication network in most areas. Mobile phones are used as a means of communication between the headquarters and field regularly. At the same time, there are areas such as Lachen, Lachung, and Limgmoo where the network is not yet established.

At present, communication through mobile phones is the only institutionalised mechanism of communication in the Forest Department. Advanced communication technology is available and can be used in Sikkim. Thus, the Forest Department should find a way to upgrade its communication system. For example, a new wireless communication system called Very Small Aperture Terminal (VSAT)¹⁷ may be suitable for use in Sikkim. This system is applied in the Madhya Pradesh Forest Department.

3.2.2 Human resource management

There are different categories of permanent employees working in the Forest Department. They are: the Indian Forest Service, State Forest Service, and others such as Range Officers, Block Officers and Frontline staff members who are responsible for forest management and biodiversity conservation in Sikkim.

(1) Indian Forest Service (IFS)

The IFS officers are recruited to be in charge of forest administration at the central and state levels. The primary roles and responsibilities of the IFS officers include the enforcement of laws and orders related forestry as well as the maintenance of uniform standards of forest management and biodiversity conservation throughout India. Since 1984, the MOEF holds cadre controlling authority of the IFS, though IFS officers are recruited annually through the All India Competitive Examination administered by the Union Public Service Commission. The examination is open to those who hold Bachelor of Science degrees.

The IFS (Appointment by Promotion) Regulations (1966) define the promotion criteria of the IFS officers. The IFS officers who are posted outside their assigned state cadre are still considered for promotion as per the criteria if the state government certifies that they would have continued in the assigned post in the state but for their deputation to the ex-cadre post. Thus, it is not likely to be an obstacle for IFS officers to be rendered to the Project during the project period under the Society Mode, since no negative impact is made in terms of their promotion.

(2) State Forest Service (SFS) and others

The SFS is one of the State Civil Services of Sikkim, and is administered by the Sikkim State Public Service Commission. The Sikkim State Public Service Commission is responsible for recruitment of the SFS officers under the recruitment rules of the Government of Sikkim. Approximately 50% of the SFS officers are promoted from the RO grade after completing eight years in service. The SFS officers are posted as ACFs on various posts or DFOs of territorial or functional forest divisions in the Forest Department.

Block officers, Head Forest Guards, and Forest Guards are collectively called frontline staff. They assist ROs and have the maximum exposure to communities. In many cases, the frontline staff

¹⁷ VSAT is a flexible communication platform, which utilise any fixed satellite terminal to provide interactive or receive-only communications.

members are the only persons from the state government whom communities have regular interactions with, especially in mountainous and remote areas. Thus, expectations from such communities towards the frontline staff are high because they rely on the frontline staff to assist them in improving their living standards and the environment.

(3) Capacity development

During FY 2008/09, the Forest Department spent INR one million on capacity development. There are 573 officers and frontline staff members in the Forest Department as of August 2009, which indicates that the Forest Department allocated only INR 1,745 per person for capacity development. In FY 2009/10, the allocation of funds for capacity development is approximately INR 1.5 million. Thus, the budget per person for capacity development amounts to INR 2,618 based on the assumption that the number of the officers and frontline staff members remains the same.

a) Training for IFS officers

The IFS officers receive both induction and in-service trainings at the Indira Ghandi National Forest Academy (IGNFA) located in Dehradun, Uttarakhand¹⁸. These trainings aim to develop and enhance the officers' competence, skills and knowledge for managing the forest and wildlife resources. Subjects of training courses include Theory of Forestry, Ecological Science, Biological Science, Applied Ecology and Social Science as well as laboratory work and excursions to acquire the skills and knowledge required of IFS officers. Refresher courses are offered to the IFS officers annually as a part of their in-service training. These officers select courses, which are prepared under the guidance of the Government of India, based on their interest and/or area of expertise (MOEF, 2009). Table 3-5 lists the training courses attended by 13 IFS officers from the Forest Department in 2007.

Costs for training courses for IFS officers organised by the MOEF are borne by the MOEF. Thus, the Forest Department is only responsible for paying travel expenses.

Table 3-5 List of training courses attended by IFS officers in 2007

Name	Venue	Duration
In-service training	IGNFA, Dehradun, Uttarakhand	12 days
Senior forester's workshop	IGNFA, Dehradun, Uttarakhand	3 days
Advance forest management course for senior forest officers	IGNFA, Dehradun, Uttarakhand	3 weeks
Role of state forest department in conservation, cultivation, harvesting, marketing and benefit sharing	Amity School of Natural Resources University, Noida, Uttar Pradesh	2 days
Ecotourism assessment and development	Jungle Lodges & Resorts Ltd., Bangalore, Karnataka	19 days
Preparing projects and schemes, monitoring and evaluation	State Institute of Rural Development, Karfector, Sikkim	6 days
Training on environmental impact indicators and valuation technique	Administrative staff college of India, Hyderabad, Andhra Pradesh	5 days
Enhancing the effectiveness of implementation of the government policies and programme	Indian Institute of Management, Bangalore, Karnataka	5 days
International forest standards	Forest Research Institute, Dehradun, Uttarakhand	5 days
Science writing and journalism	Forest Conference Hall, Gangtok, Sikkim	4 days

Source: FEWMD (2007a)

¹⁸ IGNFA is administered by the MOEF, and is responsible for capacity development of the IFS officers and production of an annual training calendar.

The IFS officers expressed interest to the study team in learning about the following subjects:

- Biodiversity management and conservation
- Clean Development Mechanism
- Climate change
- Community forest management
- Ecotourism
- Wildlife and zoo management
- Training on urban and aesthetic forestry in Japan

b) Training for SFS officers and ROs

There are three State Forest Service Colleges in India. They are located in Dehradun (Uttarakhand), Coimbatore (Tamil Nadu), and Burnihat (Assam). These colleges offer trainings such as a two-year diploma course in forestry¹⁹, in-service training courses, workshops, and seminars to the SFS officers. The Directorate of Forest Education (DFE), located in Dehradun, coordinates all regular training courses conducted by them²⁰ (MOEF, 2009). There is also Eastern Forest Rangers College in Kurseong (West Bengal) where ROs are generally sent for a two-year certificate course. As for training costs, the arrangement made to the IFS officers applies to the SFS officers and ROs.

Table 3-6 highlights the training courses taken by several ACFs and ROs in 2007 and 2008. The information in the table below only represents the record of Wildlife Circle, East Division.

Table 3-6 List of trainings attended by ACFs and below in Wildlife Circle in 2007 and 2008

Name	Venue	Level	Duration
Certificate course in Wildlife Management	Wildlife Institute of India Dehradun, Uttarakhand	RO	3 months
Arms training	Sikkim Armed Police Pangthang, Sikkim	BO	15 days
Computer training	Department of Information Technology Gangtok, Sikkim	RO	10 days
Training and capacity building of frontline staff	Advanced Technical Training Centre Bardang, Sikkim	ACF and below	7 days
Training-cum-workshop on wildlife management	Eastern Forest Ranger’s College Kurseong, West Bengal	RO	4 days
Research methodology course	National Institute of Criminology and Forensic Science New Delhi	RO	6 days

Source: Forest Department (2009)

The SFS officers and range officers named the following as priority matters in which they require assistance for developing their capacity:

- Biodiversity management and conservation
- Ecotourism promotion and management
- Wildlife and zoo management
- New technique/technology applied in forestry in Japan

¹⁹ A two-year diploma course is offered only in Dehradun and Coimbatore.

²⁰ The DFE is administered by the MOEF and is responsible for capacity development of the SFS officers and production of an annual training calendar.

(4) Training for frontline staff members

Frontline staff members receive induction training, which is of shorter duration compared to that offered to the IFS and SFS officers. According to the frontline staff members who attended the focus group meetings, most of the frontline staff members have received induction training at Eastern Rangers College and other training centres in West Bengal. Frontline staff members go outside Sikkim for training because there are no training facilities on forestry in Sikkim. Fire arm training is offered through the Sikkim Police Service to frontline staff members when possible. Likewise, fire management training is offered by the Sikkim Fire Service to the staff members with a focus on fire management at an urban setting.

At present, many staff members have been trained on fire management. Yet, the tools that were introduced to the staff through the training, which are necessary for fire management in Sikkim, are not available in the Forest Department.

Information regarding in-service training for the staff members was not available. In fact, senior IFS officers told the study team that in-service training is hardly ever offered to the staff members. They attributed budgetary constraints as the primary reason for non-availability of the training. At the same time, they expressed the need for capacity development of the staff members. The senior IFS officers recognise the important role the staff members played at field level in protecting and managing forestry and biodiversity in Sikkim.

The study team made the following observations and conclusions upon the collection and analysis of information and data on capacity development:

- The Forest Department has never prepared a capacity development plan. Therefore, capacity development is neither strategically planned nor implemented by the Forest Department to enhance its capacity.
- The Forest Department has a very limited budget for capacity development. Only a limited number of officers have benefited from the training offered and are able to improve their skills and knowledge. Thus, it will take a long time to strengthen the capacity of the Forest Department if current situation continues.
- The Forest Department is not fully aware of the training needs of officers and frontline staff members. There is no mechanism in the Forest Department to assess capacity development needs. Thus, it is extremely difficult to determine what is needed to increase efficiency and effectiveness of the Forest Department at all levels.

3.2.3 Financial management

The Accounts Division in the Forest Department plays the main role in most matters related to financial procedures. One of the national programmes, called the National Afforestation Programme (NAP)²¹, is an exception. Under the NAP, a society named the Forest Development Agency (FDA) is set up to administer the programme.

The Forest Department normally takes the following ten steps to obtain approval for expenditure from the plan budget. As shown in Table 3-7, it is a long and time-consuming procedure.

As for non plan budget, the PCCF is empowered to approve all expenses on salaries, administrative costs such as electricity, and furniture of any amount. Two Accounts Officers and 17 DFOs in the Forest Department are appointed as Drawing and Disbursing Officers. As per the financial rules of the

²¹ The NAP is funded by the MOEF, and aims to regenerate degraded forests jointly by the state forest departments and communities. Joint Forest Management is applied in the NAP.

Government of Sikkim, they are empowered to approve up to INR 5,000 for salaries and administrative expenses.

Accounts books are maintained at RO level. There is no accounting software introduced to manage financial procedures in the Forest Department. From the RO to headquarter level, the accounts books are kept and maintained manually using paper books. Below the RO level, there is no operational procedure for accounting.

The procedural steps and time spent for one approval request under the NAP is almost half of what it takes for regular approval procedure by the Forest Department (Table 3-8).

Table 3-7 List of approval procedure of plan budget expenditure

Step	Activity	Responsible person(s)
1	Preparation of work estimates and proposal(s), and submission of the document(s) to DFO	RO and BO
2	Review and finalisation of the document(s), and submission of the final version of the document(s) to CF	DFO
3	Review and validation of the document(s), and submission of the documents to the Accounts Division	CF
4	Verification of the information stated in the document(s) based on the schedule rates applied in the Government of Sikkim as well as budget and administrative approval, and submission of the verified document(s) to CCF	Additional director, Accounts
5	Recommendation for approval to Additional PCCF	CCF
6	Recommendation for approval to PCCF	Additional PCCF
7	Approval of the document(s), and submission of the approved document(s) to the Planning Department	PCCF
8	Confirmation of budget allocations and approval, and submission to the Finance Department	Planning Department
9	Concurrence and submission of approval to the Government of Sikkim	Finance Department
10	Approval and sanction as per the financial rules applied in Sikkim as follows: <ul style="list-style-type: none"> Minister is empowered to approve proposal(s) of up to INR one million Chief Minister is empowered to approve proposal(s) of up to INR two million The Council of Ministers is empowered to approve proposal(s) in excess of INR two million 	Government of Sikkim

Source: Forest Department (2009)

Table 3-8 Procedure steps for one approval request under the NAP

Step	Activity	Responsible person(s)
1	Preparation of work plan, and submission of the document(s) to DFO	RO and BO
2	Review and finalisation of the plan, and submission of the final version of the document(s) to CF	DFO
3	Review and validation of the plan, and submission of the documents to the National Afforestation and Ecodevelopment Board under MOEF	CCF
4	Approval of the plan, and submission of sanction request to the Principal Pay and Accounts Officer, MOEF	National Afforestation and Ecodevelopment Board under MOEF
5	Funds transfer to FDA	MOEF

Source: Forest Department (2009)

The study team made the following observations on the regular procedures of the Forest Department based on a comparison with those of the FDA:

- It requires review and approval from the Planning Department and the Finance Department in addition to an internal review and approval of the Forest Department for all requests.
- It takes more than one month to process an approval request.
- Accounting software for speedy document preparation has not been introduced to the Forest Department.

In the Project, the introduction of basic accounting software would be useful if the computerisation of the Forest Department can be achieved. Moreover, the Society Mode is highly recommended to ensure the timeliness of financial procedures and the smooth implementation of the Project.

3.2.4 Challenges and opportunities

(1) Summary of SWOT analysis²²

Table 3-9 highlights the perceived strengths, weaknesses, opportunities, and threats (SWOT) of personnel assigned to various posts within the Forest Department. The SWOT analysis was conducted by the DFOs, ACFs, range officers, block officers, head forest guards, and forest guards who participated in the focus group meetings.

Table 3-9 Summary of SWOT analysis

SWOT	DFO & ACF	RO & BO	Head Forest Guard & Guard
Strengths	<ul style="list-style-type: none"> • Magisterial power • Uniformed department • Significant role in dealing with communities and other departments • Variety of work and knowledge 	<ul style="list-style-type: none"> • Power to compound offences, raid houses, check vehicles • Member Secretary of Forest Development Agency 	<ul style="list-style-type: none"> • Good cooperation with community members, JFMCs, Gram Panchayats, NGOs • Sound health • Power to mobilise communities • Dedication to service
Weaknesses	<ul style="list-style-type: none"> • Unbalanced distribution of resources • Tedious financial process • Lack of skilled manpower for support • Inadequate opportunity of capacity development • Shortage of frontline staff members • Lack of research and database 	<ul style="list-style-type: none"> • Lack of working plans • Lack of skilled manpower • Lack of infrastructure including mobility • Lack of financial power • Lack of exposure to good practices and training • Slow reimbursement of travel allowance 	<ul style="list-style-type: none"> • No facilities such as fire management tools, quarters, training outside Sikkim • Heavy work volume/pressure • No transparent decision-making by supervisors • No reimbursement of travel allowances
Opportunities	<ul style="list-style-type: none"> • Great exposure to learn about nature • Work with communities and NGOs • Ability to work in protected/restricted areas • Contribution towards climate change issues 	<ul style="list-style-type: none"> • Member Secretary of Forest Development Agency • Public relations 	<ul style="list-style-type: none"> • Working with JFMCs and NGOs • Ecotourism • Village tourism • JICA Project

²² Three focus group meetings were held in Sikkim's East District in June and July 2009. A total of about 90 officers and frontline staff members participated and conducted SWOT analysis. The study team facilitated the meetings.

Table 3-9 Summary of SWOT analysis (continued)

Threats	<ul style="list-style-type: none"> • Political interference • Frequent transfers • Biased punishment • Natural calamities 	<ul style="list-style-type: none"> • Political and departmental interference • Conflict with animals • Natural calamities • Wild animals • Fire • Transfers 	<ul style="list-style-type: none"> • Wild animals such as snakes • Heavy rain • Landslides • Political pressure • Conflict with animals
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Source: Study team

(2) Challenges and opportunities

The results of the SWOT analysis above illustrate both challenges and opportunities for the Forest Department, which will be taken into consideration when designing the Project.

The challenges identified across the different ranks are as follows:

- Skilled manpower is lacking in the Forest Department for effective forest management and biodiversity conservation as well as for community development in the field.
- Limited opportunities are available for capacity development in the Forest Department for the SFS officers and staff below them.
- Limited infrastructure and equipment are available in the Forest Department to perform the expected duties and obligations particularly at the range level and below.
- The current structure of the Forest Department is not organised in a manner to carry out activities contributing to the reduction of damage caused by natural and man-made disasters which frequently occur in Sikkim.
- The overall department plan, which includes activities of all Circles and Divisions, is not prepared in the Forest Department. This results in disparity in work distribution and coordination among different Circles, for example.
- The technologies currently available such as wireless communication tools and computers are not fully utilised by the Forest Department.

Moreover, the following opportunities were emphasised by most of the participants:

- The Forest Department is the linkage between the Government and communities.
- The Forest Department officers and staff members have access to protected/ restricted areas.
- The Forest Department can play a significant and effective role in the promotion of community development.

3.3 Community-based organisations

The Joint Forest Management Committee (JFMC), Ecodevelopment Committee (EDC), and *Pokhri Sanrakshan Samiti* (PSS; Lake Conservation Committee) are village-based committees established for the purpose of joint management and conservation of forests and biodiversity under the jurisdiction of the Forest Department. Up to now, 158 JFMCs, 57 EDCs, and two PSS's²³ have been formed in the state of Sikkim (FEWMD and Mountain Institute India, personal communication, July 2, 2009).

These committees are established for the management of different land use categories: JFMCs are

²³ One PSS is called Changu Lake PSS in the East District. It was established in 2007 and registered in April 2008, and is in active operation. The other PSS is called Khecheopari Lake PSS in the West District which has been established in 2008 and is at an early stage of operation.

constituted for the management of reserved forests, khasmal, and gorucharan; EDCs are for protected areas; and PSS's are for lakes. Although the Gram Panchayat ward is the basic unit for establishing these committees, a single Gram Panchayat ward cannot have both a JFMC and an EDC.

3.3.1 Joint Forest Management Committee

(1) Legal provisions and establishment

a) Legal provisions

Following the 1988 National Forest Policy Resolution, the Forest Department issued Notification No. 202/F dated June 26, 1998 ("the JFM Notification") to constitute Forest Protection Committees for the management of reserved forests, khasmal, and gorucharan in the state of Sikkim. These were later renamed JFMCs. The JFM Notification was amended by Notification No. 105/F dated May 14, 2001 and Notification No. 472/FEWD dated October 1, 2002.

b) Selection of JFM areas

For the selection of JFM areas, the JFM Notification stipulates that the DFO shall choose Gram Panchayat wards that meet these two conditions on a priority basis: 1) the ward is vulnerable to severe biotic interference and damage to forest crops; and 2) villagers are willing to offer their cooperation. For each selected Panchayat ward, the DFO then chooses a specific area taking into account the size of the population and requirements of usufruct forest products.

In 2006, the Forest Department issued a directive on decentralization and universalisation of JFM in Sikkim. The aim of this notification is to establish a JFMC or EDC in each of the 907 Gram Panchayat wards. The JFMC or EDC would become the nodal agency for all programmes related to forests, land use and environment, medicinal plants, watersheds, and wildlife and biodiversity.

c) Selection of beneficiaries

According to the JFM Notification, beneficiaries should be from economically underprivileged classes that reside in the vicinity of the forests. However, the Notification also stipulates that every family living in the Panchayat area should be given the opportunity to become a member if they are interested in forest protection work.

d) Establishment

The establishment of a JFMC requires approval by the concerned DFO. In addition, all members of the JFMC need to sign a Memorandum of Understanding between the Forest Department and the JFMC.

(2) Structure and functions

a) Organisational structure

A JFMC consists of a General Body and an Executive Committee. One member from each household of the ward forms the General Body.

Table 3-10 Composition of JFMC Executive Committee

Designation	Details of member	Number
Member	Panchayat President or any member of Panchayat nominated by President	1
Member	Elected representative of the beneficiaries (not exceeding six, of which at least 33% should be women members)	6
Member	Representative of NGO	1
Member Secretary	Concerned Range Officer	1

Source: FEWMD, (1998b), FEWMD (2002a)

The composition of the Executive Committee is shown in Table 3-10. The President of a JFMC is elected by the Executive Committee out of the elected members. The specific roles and responsibilities of each of the Executive Committee members are not defined in the JFM Notification. This was confirmed by Committee members during stakeholder meeting discussions.

b) Duties

The main duty of a JFMC is to protect forests and plantations in the JFMC area with Committee members. Forest and plantation protection activities include the following: 1) informing forest officials about trespassing or damages in the said forest/plantation, or forest theft; and 2) assisting the forest officials in preventing and controlling fires and grazing in the forests/plantations.

(3) Planning and financial management

a) Planning and funding

The activities of a JFMC are carried out under the NAP and based on a micro plan specifying a detailed work program, timeframe, and budget. The micro plan is prepared in a participatory manner to reflect the needs of the village.

Activities commonly selected under the micro plan are as follows.

- Plantation and regeneration
- Soil and moisture conservation
- Entry point activities
- Awareness raising
- Microplanning²⁴
- Fencing
- Monitoring and evaluation

Entry point activities (EPAs) refer to activities for creating community assets for the purpose of community development. Examples of such activities in Sikkim include the construction of footpaths and gates and the installation of water tanks at schools.

Under JICA-funded forestry projects in other states, the micro plan also entails income generation activities as well as microfinance services to Self Help Groups (SHGs). Microfinance is provided to SHGs by the State Forest Department through JFMCs.

Since NAP is a centrally sponsored scheme, funding is provided by the MOEF, through the FDA. For

²⁴ Microplanning refers to the preparation of the micro plan.

funds to be released from the FDA to JFMCs, each JFMC must submit to the FDA a micro plan for the proposed work through their respective Chief Executive Officer (CEO) of the FDA. After the work plan is examined and revised by the CEO, it is submitted to the executive committee of the FDA for approval. Upon approval, funds are released in advance of the execution of work upon application by the JFMC.

b) Accounting

Funds released by the FDA are transferred to a bank account operated jointly by the JFMC President and the concerned Member Secretary. The Member Secretary is responsible for maintaining accounts and submitting periodic reports to the DFO.

c) Auditing

A JFMC is required to appoint a chartered accountant for compilation, preparation, and audit of accounts of the particular year, and for issuance of certificates. The audit report compiled by the accountant is forwarded to FDA for record and reference.

(4) Sharing of benefits

The Committee members need to protect the forests and plantations for at least five years to be eligible for receiving benefits under the programme. Upon satisfactory performance, the members receive 25% of the net income derived from forest crops for every harvest at the concerned forests and plantations. In addition, the members may also be given 25% of the income generated from intermediate felling.

Furthermore, members are entitled to collect the following items free of royalty if they do not damage the forests and plantations:

- Fallen twigs, grass, fruits, flowers, seeds and leaves, and medicinal plants;
- One fourth of the products obtained as intermediate yields from thinning etc.;
- 25% of the sale proceeds of minor forest produce.

3.3.2 Ecodevelopment Committees and Pokhri Sanrakshan Samitis

(1) Legal provision and establishment

a) Legal provision

Sikkim Ecodevelopment Notification 2002 No. 1/WL/F/76/204 provides the legal basis of EDCs as an initiative involving local communities in the protection and conservation of protected areas. For lake conservation, the Forest Department announced the formation of PSS's in 2006 for the protection and conservation of the lakes in the state that have environmental, cultural, and economic importance²⁵ (FEWMD, 2006a).

b) Selection of EDC areas

EDC areas are selected in the same manner as the selection of JFMC areas. The DFO (Wildlife), in consultation with the DFO (Territorial), selects Panchayat wards in the vicinity of protected areas. For selection of PSS areas, lakes are identified by the DFO (Territorial) and local communities or NGOs.

²⁵ In Sikkim, lakes are traditionally worshipped as sacred places and have spiritual meanings attached to them.

c) Selection of beneficiaries

Beneficiaries are also selected in the same manner as the selection of JFMC members. An EDC member is not allowed to become a member of another EDC or a JFMC (FEWMD, 2002b).

d) Establishment

Requirements for the establishment of EDCs are the same as those for JFMCs, except that their establishment requires approval from the DFO of the Wildlife Division instead of the Territorial Division.

The establishment process of PSS is unique, as it directly involves the local Panchayat: the Gram Sabha establishes a PSS. In fact, if Gram Sabha is judged to be capable of performing the functions and duties of the PSS, it will be designated as the PSS. Once established, the PSS has to be registered at the office of the DFO.

Further, a state level federation of PSS's called the *Rajya Pokhri Sanrakshan Sangh* (the State Lake Conservation Federation) can be formed in order to discuss various issues related to lake conservation.

(2) Structure and functions

a) Organisational structure

Similarly to the JFMC, both an EDC and a PSS consists of a General Body and an Executive Committee. The compositions of the General Body and the Executive Committee are also similar to those of JFMCs. However, in the case of a PSS, the ex-officio President is a Panchayat Ward Member, whereas the President of a JFMC or EDC is elected by the Executive Committee out of the elected members.

The specific roles and responsibilities of each of the Executive Committee members are not defined in the notifications for EDCs or PSS's.

b) Duties

EDCs are responsible of conservation and management of wildlife and biodiversity in their respective areas. All duties assigned to EDCs are categorized as follows.

- Protection and conservation of forests, environment, wildlife, and biodiversity²⁶
- Assistance in forestry works
- Assistance in ecocodevelopment activities
- Assistance in the implementation of various forest legislations
- Assistance in ecotourism activities²⁷

The main duties of a PSS are to ensure the protection of the lakes, their environment, wildlife, and biodiversity under the PSS area, and to provide assistance in ecotourism²⁸. Their activities include the following (Mountain Institute India, personal communication, July 2, 2009):

²⁶ Activities include controlling natural calamities like forest fires, resolving man-animal conflicts, and providing details and statistics.

²⁷ According to the notification, assistance in ecotourism refers to such activities as the following: 1) providing quality services to visitors; and 2) ensuring responsible behaviour of the visitors and ecotourism service providers in protected areas. (FEWMD, 2002b)

²⁸ Activities referred are the same as those of EDCs, except, in case of PSS's, the target area is the PSS area. (FEWMD, 2006b)

- Conducting awareness and education campaigns on lake conservation
- Adopting garbage control measures
- Cleaning lakes
- Managing tourist shops near the lakes
- Observing the biodiversity around the lakes
- Patrolling for illegal activities of tourists

(3) Planning and financial management

EDCs have the same system of planning and financial management as JFMCs, where funds are transferred from the central government. However, PSS's have a unique system of financing and expenditure, as explained below.

a) Planning and funding

A PSS generates its funds by way of collecting Lake Conservation Fees²⁹ worth ten INR 10 per tourist per day. Half of the levy collected is deposited into the revolving fund of the PSS, and the rest is transferred into the bank account of the State Environment Agency. The fund is used for the activities specified in the Lake Conservation Plan prepared annually by the PSS and the DFO, and approved by the Gram Sabha.

b) Accounting

A PSS opens a revolving fund account operated jointly by the President and Member Secretary. Maintenance of the account³⁰ is the responsibility of the President.

c) Auditing

The PSS President is responsible for the submission of annual audit reports from a statutory auditor to the Forest Department. The Gram Sabha is also required to conduct a social audit of the PSS revolving fund.

(4) Benefit sharing

Members of an EDC are eligible for receiving a 100% share of forest products³¹ collected by the government agency free of royalty but on payment of collection costs³². In addition, the EDC is authorized to collect ecotourism fees³³ from tourists. The ecotourism fees collected are to be deposited to the EDC's revolving fund account.

On the other hand, EDC members are required to contribute at least 25% of the investment required for each village's ecodevelopment work, either in cash, labour and/or materials. This contribution is called success security and deposited into the EDC revolving fund account. It can be withdrawn only after the successful completion of the ecodevelopment work.

²⁹ Called *Pokhri Sanrakshan Shulk* in the local language.

³⁰ For example, the Office Secretary, an employee of the PSS, is in charge of keeping cashbooks for the Changu PSS. (Changu PSS, interview, July 11, 2009)

³¹ Forest products include firewood, grass, bamboo, specified non-edible fruits, pods, flowers, leaves, seeds and decorative fungus. (FEWMD, 2002b)

³² However, this is on the condition that the Chief Wildlife Warden deems the collection and removal of such forest products to be necessary for the improvement and management of wildlife in the EDC and grants permission for it.

³³ Tourists are to hire ecotourism service providers through the concerned EDC and pay ecotourism fees to the EDC, which is 5% of the amount charged by the service provider to tourists. (FEWMD, 2002b)

Regarding benefit sharing, the only monetary benefit stipulated in the notification for PSS's is the Lake Conservation fees collected from the tourists³⁴. The fees are utilised as a source of funding for PSS activities. (FEWMD 2006a)

3.3.3 Challenges and opportunities

Issues and challenges from the perspective of committee members were discussed by stakeholders during group discussions.³⁵ Major issues raised can be grouped into 1) activity-related issues; and 2) financial issues.

(1) Activity-related issues

In all the stakeholder meetings, JFMC, EDC, and PSS members pointed out the issue of untimely distribution of seedlings by the Forest Department. Due to the delayed distribution of seedlings, plantation activities compete with agricultural work, hindering timely plantation work by members who are mainly farmers. Moreover, the tree species of which seedlings are distributed are inappropriate, because they do not adapt to the local environment. Limited dissemination of technical knowledge on plantation by the Forest Department was also noted by the committee members.

Inadequate handling of the microplanning process was mentioned by a JFMC president. He argued that, since the micro plan was not formulated following a participatory decision-making process, it does not reflect the community's needs, resulting in weak ownership by participants of JFMC activities. Weak ownership of, for example, plantation activities, is usually associated with the low survival rate of seedlings.

In sum, the low quality of public services, delays in their provision, and the limited level of local participation in micro planning and execution result in the low effectiveness and sustainability of JFM activities.

(2) Financial issues

The major financial issues reported during the group discussions were related to funding and payment from the Forest Department.

The FDA is required to make an advance payment to a JFMC or EDC once the micro plan is approved. However, the group discussions revealed that this advance has not been paid in some cases. Furthermore, JFMC and EDC members in some locations reported that their committees have not received in full the amount they claimed. Members also reported delays in wage payment for plantation activities. Others pointed out that too few or no funds are allocated to essential activities such as the maintenance of plantations. These financial issues hamper the timely execution of work and cause distrust of the government among the committee members. Regarding these claims raised during the group discussions, the Forest Department suggested that delays in the verification of plantation areas and the quality of plantation work of the joint forest management schemes are a major cause of the untimely and insufficient release of funds. To address these issues, the activities of both Forest Department officials and of JFMC, EDC, and PSS members need to be monitored more aggressively.

³⁴ Changu PSS has generated a net income of INR2,800,000 (USD57,362) (Changu PSS, interview, July 11, 2009)

³⁵ Group discussions were conducted by the study team as part of the stakeholder meetings held in each of the four districts: the East Stakeholder Meeting was held on 15 June 2009 in Gangtok; the North on 18, 19, 21 June 2009 in Lachung, Lachen, and Mangan, respectively; the South on 22 June in Rabang; the West on 24 and 26 June in Yuksom and Kaluk & Rinchenpong, respectively. The purpose of the group discussions was to understand the development needs and issues as perceived by stakeholders.

(3) Other issues

Other issues discussed during the group discussions or interviews are as follows.

- The President is overworked because the responsibilities of Executive Committee members are not defined clearly.
- There are some inefficient administrative procedures. For instance, receipts for Lake Conservation Fees need to be stamped by the DFO.
- There is political interference from both the Forest Department and the state government, which leads to frequent changes of Executive Committee members or interruption of the smooth implementation of activities.
- Relationships with the Panchayat and NGOs are poor due to lack of cooperation and collaboration.
- Pollution of lakes due to petroleum waste from army camps.

Weak relationships and lack of coordination with the other entities obstruct the smooth management and implementation of activities of the committee. However, in two villages in the North, namely Lachung and Lachen, the JFMCs work in close collaboration with a traditional local governance body called the Dzumsa, which deals with many issues in the area including natural resource management. Thus, further improvement is necessary to achieve effective cooperation and collaboration of JFMCs and the local government.

3.4 Use of forests and forest resources

3.4.1 Rights over state forests

Approximately 5,765 km² or 81% of the total area of Sikkim is state-owned forestland managed by the Forest Department. The area and classification of forestland is given in Table 3-11. Forestland with tree cover, which is 2,650 km² or 37% of the total state area, is classified into reserved forests and protected forests³⁶. Both the reserved forests and protected forests are state domain where production activities are restricted³⁷.

Table 3-11 Classification of forestland

Classification	Area (km ²)
Reserved forest	2,261
Protected forest: khasmal	285
Protected forest: gorucharan	104
Subtotal	2,650
Alpine pasture and scrub	1,024
Perpetual snow covered area	2,091
Total	5,765

Source: FEWMD (2008)

In the reserved forests, consumptive use is banned in principle. The felling of trees and the collection

³⁶ According to the second preliminary draft of the working plan for the East District, the Forest Department does not have authentic data on the distribution of khasmal lands. Demarcation and pillaring are yet to be completed in khasmal and gorucharan lands. Moreover, although demarcation and pillaring have been completed for at least some portions of the reserved forest boundaries, it is unclear how much progress has been made. The same source suggests that the forestlands have not yet been officially notified. It explains that the working plan, when completed, will notify these lands as forest areas.

³⁷ The principal rules governing forests and forest resource use are stipulated in the Sikkim Forests, Water Courses, Road Reserve Preservation and Protection Act (1988).

of forest products are basically illegal. Silvicultural treatments such as thinning are conducted, but harvesting can only be performed under a working plan approved by the central government. Grazing is also banned in the reserved forests, and a forest officer has the right to seize any cattle trespassing in such areas³⁸. In effect, the reserved forests are no different from the protected areas in terms of the activities that are allowed. They are basically out of bounds for people to use.

The protected forests are open to subsistence use by forest fringe communities. In the khasmal forests, collection of timber, fuelwood, and other forest products for household use is permitted. The gorucharan forests are set aside for grazing. The state may, however, close any part of the protected forests at its discretion. Since 2001, the state has imposed two five-year bans on the collection of all medicinal plants and non-timber forest products (NTFPs) for commercial purposes inside both the reserved forests and protected forests³⁹. The ban will be in place until September 2011.

For 'forest dwelling Scheduled Tribes' or 'the members or community of the Scheduled Tribes who primarily reside in and who depend on the forests or forestlands for bona fide livelihood needs and includes the Scheduled Tribe pastoralist communities', their rights to reside in forestland and access forest resources gained recognition through the introduction of the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act (2006). This act enables such people to legally continue their traditional practices in the forests. They may live, cultivate, collect minor forest products, fish, and graze inside forestland.

As explained earlier, the Dzumsa continues to function in two communities in the North District, Lachen and Lachung. This traditional institution has its own code of forest use and regulates the felling of trees, collection of fuelwood, and grazing. Villagers are required to obtain the permission of the pipon, or the head of Dzumsa, before they can utilise forest resources. Similarly to modern regulations, the Dzumsa stipulates which trees may be cut and penalises those who break the rules (WWF, 2004). Notwithstanding, these areas are no exceptions to the regulations imposed by the state such as the ban on collecting medicinal herbs.

In sum, the population of Sikkim has very limited rights over state-owned forests. Commercial activities are completely prohibited in both the reserved forests and protected forests. There is no scope for generating income through the utilisation of forest resources, as whatever limited uses are permitted are allowed only for domestic purposes. The current policies on state-owned forests are biased towards protection and conservation. The concept of sustainable forest management does not seem to be practiced.

3.4.2 Rights over private trees

Private forests and trees on private land are also regulated by the state. Owners of forests are not allowed to cut their trees without the permission of a forest officer. The tree owners are required to obtain a permit from 1) a Range Officer or an officer of higher rank if they wish to fell for domestic use; and 2) a Deputy Conservator of Forests or an officer of higher rank for commercial use. The conditions under which private trees may be harvested are stipulated in detail by the state⁴⁰. Furthermore, the state can decide, through official notification, to exempt certain trees from this rule on one hand, and unilaterally ban felling of certain trees altogether on the other.

The rules governing privately-owned trees not only discourage commercial forestry but also the

³⁸ Regulations on grazing are stipulated in detail in the Sikkim Forests Cattle Trespass Rules (2000) and its amendment.

³⁹ Before the ban, the Forest Department demarcated temporary areas for collection of medicinal plants by the year, season, or month.

⁴⁰ The Sikkim Private and Other Non-Forest Lands Tree Felling Rules (2001) and its amendment provide the administrative rules and procedures for felling trees on private land. The rules stipulate the fees that arise in the procedures and penalties for non-compliance. It also stipulates that ten saplings shall be planted for every tree felled.

growing of timber for consumption, because the regulations are strict and obtaining permits is cumbersome. The necessity of obtaining permits for transporting forest products beyond village boundaries further discourages the utilisation of trees⁴¹.

The public is, however, encouraged to plant trees by the state. The Forest Department may provide up to 100 seedlings per individual free of charge to plant on their private land.

The prevailing rules for private trees show a significant level of distrust by the government towards the public in their dealing with trees and forests. The current policies for private trees strongly encourage the planting of trees but place strong control over their use. The policies do not promote forestry or sustainable forest management.

3.4.3 Forest cover

The forest cover in Sikkim has been on the rise. It increased from 37% in 1975 to 46% in 2005 (FEWMD, 2008). During the 10th Five Year Plan period, which started in 2002, an average of 2,743 ha was planted annually under the NAP. In 2008/09, 3,295 ha were afforested under this programme. The Forest Department is not only conducting tree planting in forestland but is encouraging people to plant on their own land. However, according to the Forest Cover Assessment of 2005, 852 km² or about one quarter of the forested area was open forest.

Table 3-12 Detailed classification of land within and outside forestland

Class	(Area in km ² , 1988)			
	Forestland	Outside Forestland	Total	% to total state area
Crop land (terraced/semi-terraced)		604.85	604.85	9
Fallow/scrub in revenue blocks		155.69	155.69	2
Sal dense forest	5.30	0.77	6.07	0
Sal open forest	15.93	1.54	17.47	0
Sal degraded forest	3.32	0.71	4.03	0
Mixed dense forest	464.46	138.88	603.34	9
Mixed open forest	433.37	333.38	766.75	11
Mixed degraded forest	194.56	235.06	429.62	6
Dense conifer forest	351.94	16.14	368.08	5
Open conifer forest	340.63	21.55	362.18	5
Degraded conifer forest	156.89	16.30	173.19	2
Oak rhododendron forest	100.34	26.24	126.58	2
Scrubs in reserved forests	101.87		101.87	1
Forest blanks	90.56		90.56	1
Alpine scrub	611.44	27.72	639.16	9
Alpine pastures	431.32		431.32	6
Alpine barren	815.80	2.35	818.15	12
Snow	1018.23	5.41	1023.64	14
Glaciers	208.23		208.23	3
Lakes	32.30	0.70	33.00	0
Rivers/major streams	31.81	32.50	64.31	1
Dry river beds	31.49	9.10	40.59	1
Built up area	0.30	3.24	3.54	0
Land slide area	5.37	5.16	10.53	0
Miscellaneous	6.93	6.30	13.23	0
Total	5452.39	1643.59	7095.98	100

Source: Adopted and modified from FEWMD (2008)

Table 3-12 gives a detailed breakdown of land use and vegetation cover of all lands in Sikkim obtained

⁴¹ The rules are stipulated in the Sikkim Transit of Timber and Other Forest Produce, Rules (1999).

through remote sensing in 1988. According to this data, open forests, degraded forests, and forest blanks make up 1,235 km² and 608.54 km² of forestland and land outside forestland, respectively (FEWMD, 2008). In total, they represent 26% of the entire state area.

There are inconsistencies in the available information on land use and vegetation cover. Nevertheless, the available figures suggest that a significant proportion of land may require silvicultural treatments. A Forest Department official interviewed by the study team explained that some of the areas clear-felled before the felling ban have not regenerated. Due to the loss of top soil and the harsh climate, some of the clear-felled upper slopes and hilltops have not regained forest cover, despite reforestation efforts.

Surveys conducted for developing the working plan for the East District found that natural regeneration in temperate forests and sub-alpine conifer forests is very limited. In particular, regeneration in oak forests, which are concentrated in the altitude range of 1,700 to 2,400 metres, is a problem. The crown density of oak forests is only around 30%, and their understory is dominated by dwarf bamboos and *Symplocos* and *Viburnum* species, making the regeneration of oak difficult. The Forest Department has so far not been able to establish and practice a method to deal with the issue of oak regeneration in Sikkim⁴². Regeneration of silver fir is also a challenge although to a lesser extent as compared to oak⁴³. Thus, afforestation activities should be promoted by the Project, together with a component to improve afforestation techniques.

3.4.4 Forest management information

As mentioned in the previous subsection, basic information necessary to properly manage forests such as data on land use and maps are unavailable or insufficient. The available documentation is fraught with uncertainties. There is confusion in the terminology used, and many documents lack accurate descriptions of the data they present. Capacities in information gathering and management seem weak.

The Forest Department has a GIS lab with a basic set of software and hardware, but there is no qualified permanent staff appointed to develop and operate a system for forest management. The datasets available are very basic. Important information such as topography or contour lines is not available. The only important primary information stored electronically is the boundaries of ranges, blocks, and reserved forests⁴⁴. The attribute table for the compartments are at an infant stage. Data on the boundaries of protected areas are not available. The Forest Department's GIS capacity has significant room for development.

The lack of reliable data on forests suggests the need for a proper assessment of forestland and forest resources to enable informed decision-making on their management. Compartmentalisation and demarcation of forestland using GIS and on the ground are necessary. A geo-referenced database of forestland should be developed and maintained so that the status of the forests can be monitored and rational management decisions can be made. Without such information, it is difficult to decide, for example, where to plant trees, where to protect, or where to allow collection of forest products.

On the positive side, the Forest Department is making considerable headway in the demarcation and compartmentalisation of forestland. It is also compiling the results from field surveys and available secondary information into the working plans it is developing. In the draft working plans, profiles of all the compartments are given. Such efforts should be supported and enhanced by the proposed

⁴² The West Bengal Forest Department has successful experience in artificial oak regeneration. The Forest Department in Sikkim has already studied such examples and wishes to apply the method developed in West Bengal to Sikkim.

⁴³ Many trees in the sub-alpine and alpine forests were logged by the military during the Sino-Indian border conflict of the 1960s and 1970s.

⁴⁴ Boundaries of ranges, blocks, and compartments are generated by interpreting scanned topographical maps without ground truthing.

project. Moreover, the proposed project should help the establishment of a more effective system to manage information on forests including protected areas, reserved forests, and khasmal and gorucharan lands. The new system could build on the current basic system and the information compiled to date. It should also build the capacity of Forest Department officials in data management and planning based on the new system.

3.4.5 Utilisation of forest resources

(1) Timber harvesting by the Forest Department

According to the prevailing forest policy, an MOEF-approved working plan, indicating the details for harvesting, is required to fell trees on state land. At current, only the South District has a working plan. However, the harvesting component of the plan was not approved by the MOEF, as it lacked the required data such as those on stocking because no field survey was conducted in the process of planning. Hence, harvesting of trees in the reserved forests is basically not allowed, even by the Forest Department.

The Forest Department sells wind-fallen trees, logs produced from authorised clearing of forestland for non-forest use⁴⁵, and timber, fuelwood, and charcoal from thinning. Table 3-13 shows the annual quantity of forest products sold and revenue achieved by the Forest Department⁴⁶. The volume of timber sold in 2001/02 and 2002/03 is much higher than in the other nine years in the period from 1997/98 to 2007/08. However, in absolute terms, even these figures are very small, mainly because the forest policies are oriented towards forest conservation. In 2002/03, when the highest volume of sales was recorded, the figure was a mere 380 cubic metres. In the most recent year for which data is available, the volume of timber sold was less than 29 cubic metres. The average price of timber that year was INR 6,695 per cubic metre.

Table 3-13 Forest products sold by the Forest Department

Year	(Revenue in thousand INR)					
	Timber		Fuelwood		Charcoal	
	Quantity (cubic metres)	Revenue	Quantity (piles)	Revenue	Quantity (bags)	Revenue
1997/98	60.98	275	36	50	986	57
1998/99	28.45	141	58	22	180	18
1999/00	43.48	223	157	84	620	45
2000/01	49.32	293	168	83	245	18
2001/02	336.11	2,231	95	18	77	37
2002/03	380.05	2,013	380	190	213	28
2003/04	137.72	1,028	152	76	176	26
2004/05	109.09	823	169	85	13	21
2005/06	95.36	814	112	77	13	19
2006/07	53.13	281	224	121		
2007/08	28.53	191	91	56		

Source: FEWMD (2008)

⁴⁵ Examples include clearing for road widening and establishment of hydroelectric dams. Logs are also recovered from landslides.

⁴⁶ The Forest Department runs a sawmill with the capacity to saw four cubic metres per day at Chuba.

(2) Forest resource use by the population

In the forest areas of Sikkim, collection of wood for fuel, collection of NTFPs such as medicinal plants, and grazing are the main forms of forest use by local people. Commercial uses of forest resources are not prominent, because they are either banned or discouraged.

Harvesting of timber is very limited due to the enforcement of the felling ban. Nevertheless, a village survey conducted by the study team⁴⁷ revealed that the demand for fuelwood is prominent. This finding is in line with the statements made in many Forest Department documents suggesting the need to satisfy the demand for fuelwood in rural areas. Many villagers purchase fuelwood, as they are not able to collect the required amount by themselves. The villagers said that the fuelwood they purchase come from private land owned by their neighbours or relatives and from reserved forests. In the latter case, they purchase fuelwood from the Forest Department.

Grazing on forestland is practiced despite the ban. According to Avasthe (2005), in the northern highlands, there are transhumance families who graze yaks and sheep in large numbers. However, the impact of such practices on the ecosystem largely remains to be studied. In most other areas, grazing is less common.

The above-mentioned people of the northern highlands also consume wood of alpine tree species and collect medicinal plants in 'sizable quantities' (Avasthe, 2005). The people in the northern part of Sikkim, Lachen in particular, have been collecting and trading medicinal plants for a long time (Misra and Dutta, 2003).

The study team found that people in the alpine areas are suffering from the ban on NTFP collection. They have not been allowed to collect wild medicinal herbs on which they relied heavily for cash income in the past since the ban started in 2001. The Forest Department is helping the regeneration of herbs and supplementation of income through the provision of seedlings, establishment of plantations, and benefit-sharing of the revenue attained through the sales of the herbs. However, according to the interviewees of Lachen, the opportunity lost is greater than the current support they were getting.

The resource base of some species may have declined due to excessive extraction (Avasthe, 2005), therefore necessitating the control on collection. However, scientific data is lacking to confirm this point. It is necessary to develop a proper management regime for sustainable use of medicinal herbs based on scientific information in order to open up income generation opportunities for the local people without undermining the resource base.

(3) Illegal activities and forest fire

According to the Forest Department officials interviewed, forest offences such as illegal felling, grazing, and collection, and encroachment into forestland are not prominent problems nowadays. They believe awareness campaigns are contributing to the control of such activities. Cases of illicit felling are few⁴⁸ (Table 3-14). No new encroachment has been observed during the past six years (Table 3-15). However, that more than 3,000 ha are currently under encroachment and that almost 100 trees were cut down illegally in 2006/07 suggest that measures are still necessary to eliminate forest offences.

⁴⁷ Details are given in Chapter 5.

⁴⁸ Villagers' perceptions may be slightly different. The Participatory Rural Appraisals conducted in the East District in preparation for its working plan revealed that villagers of 28 out of the 44 Gram Panchayats surveyed perceived that illegal activities were going on in the forests in their area.

Table 3-14 Illicit felling

Year	Cases	Trees felled	Volume lost ¹	Offenders arrested
2002/03	41	41	51	2
2003/04	30	35	35	9
2004/05	40	45	47	6
2005/06	25	65	45	8
2006/07	15	92	83	24
2007/08	15	29	30	8

Note: 1) Volume in cubic metres

Source: FEWMD (2008)

Table 3-15 Encroachment of forestland

Year	Total encroached area (ha)	Evicted area (ha)	Net encroached area (ha)
2002/03	3613.00		3613.00
2003/04	3613.00		3613.00
2004/05	3613.00	156.93	3456.06
2005/06	3456.06	8.00	3448.06
2006/07	3448.06	2.00	3446.06
2007/08	3446.06		3446.06

Source: FEWMD (2008)

Table 3-16 shows the incidence of forest fires and the area affected. During the past seven years, the biggest number of fires recorded in a single year was 58. This figure is roughly equivalent to 13% of the 454 villages or 35% of the 166 Gram Panchayats in Sikkim. Although the number of incidences and the total area affected vary from year to year, forest fires are not uncommon and require attention particularly in the dryer areas of the south and west.

Table 3-16 Incidence of forest fires and area affected

Year	Incidents of fires			Area affected (ha)
	Protected area	Outside protected area	Total	
2002	4	28	32	170
2003	5	18	23	122
2004	5	16	21	118
2005	6	36	42	362
2006	8	50	58	408
2007	2	29	31	100
2008	3	48	51	346

Source: FEWMD (2008)

3.4.6 Markets of forest products

There is limited circulation of timber originating in Sikkim because the harvesting of trees in the state is restricted. Basically, apart from the timber imported from other states, the only legal wood in the market are those sold by the Forest Department, which is very limited in quantity as stated above, and the few that originate in private forests⁴⁹. Timber sourced from outside Sikkim dominates the wood market. For example, in 2006/07 a mere 53 cubic metres⁵⁰ of timber was produced in the state compared to 4,879 cubic metres brought in from other states (Table 3-17). The amount of imported timber saw a sudden increase in 2004/05 and has remained high since then, which is reported to be

⁴⁹ According to several Forest Department officials, the majority of timber produced in Sikkim comes from trees on private land. Alder trees, which are COMMONLY found as shade trees on cardamom farms, are a major source of timber.

⁵⁰ This figure represents the volume sold by the Forest Department. There is no data on the timber produced on private land.

caused by the commencement of large hydropower development projects in Sikkim. When the demand for fuelwood in rural areas, described earlier, is considered together, the market potential for local timber is high. Promoting afforestation in suitable areas for commercial purposes, accompanied by measures to encourage the circulation of timber from sustainably managed forests, would be one avenue the proposed project can follow.

Table 3-17 Timber from outside Sikkim

	(Cubic metres)				
Year	2002/03	2003/04	2004/05	2005/06	2006/07
Volume	340	651	4,740	7,087	4,879

Source: Response to the JICA questionnaire by the Forest Department, November 2008

Although production activities are not encouraged in forestland, cultivation of medicinal plants is encouraged on private land. The State Medicinal Plants Board (SMPB) is implementing the Promotional and Contractual Farming Scheme funded by the National Medicinal Plants Board. Under this scheme, 30% of the total cost for cultivating medicinal plants in private holdings for commercial purposes is subsidised⁵¹. The SMPB registers interested cultivators, collectors, and traders of medicinal plants. As of March 2008, 590 farmers have been registered as cultivators, 209 as collectors, and 202 as traders (FEWMD, 2008). Registered farmers may trade their products within and outside the state through registered traders upon obtaining a transit permit from a DFO. As the markets for many medicinal plants are already established, production of medicinal plants would be an activity that can be promoted by the proposed project.

Table 3-18 shows the medicinal plants that may be cultivated and marketed.

Table 3-18 Medicinal plants found in Sikkim

Category	Species
Group A - Plants claimed as drug source (proven value plants) but marketed in large scale	<i>Aconitum ferox</i> , <i>Nardostachys jatamansi</i> , <i>Picrorhiza kurrooa</i> , <i>Piper longum</i> , <i>Swertia chirata</i>
Group B - Plants claimed as drug source (proven value plants) but marketed in small scale	<i>Acorus calamus</i> , <i>Astilbe rivularis</i> , <i>Bergenia ciliate</i> , <i>Heracleum wallichii</i> , <i>Holarrhena antidysenterica</i> , <i>Mesua ferrea</i> , <i>Orchis latifolia</i> , <i>Podophyllum hexandrum</i> , <i>Rhus semialata</i> , <i>Terminalia belerica</i> , <i>Terminalia chebula</i> , <i>Viscum articulatum</i> , <i>Zantoxylum alatum</i>
Group C - Plants with effective use but not marketed	<i>Artemisia vulgaris</i> , <i>Clematis buchananiana</i> , <i>Costus speciosus</i> , <i>Drymaria cordata</i> , <i>Eupatorium cannabinum</i> , <i>Ficus cunia</i> , <i>Ptris baurita</i> , <i>Rumex nepalensis</i> , <i>Urtica dioica</i>
Group D - Plants recently explored	<i>Panax pseudo-ginseng</i> , <i>Przewalsikia tangutica</i> , <i>Taxus baccata</i>
Group E - Plants claimed only as being medicinal (potential or latent value plants)	<i>Dichroa febrifuga</i> , <i>Fraxinus floribunda</i> , <i>Hymenodictyon excelsum</i> , <i>Yarocotyle asiatica</i> , <i>Litsaea citrate</i> , <i>Oroxylum indicum</i> , <i>Paederia foetida</i> , <i>Physalis minima</i> , <i>Phytolacca acinosa</i> , <i>Thysanolaena maxima</i>

Source: Adopted from Misra and Dutta (2003)

Data on circulation of forest products including NTFPs are sparse. However, the study team learned that certain products such as medicinal herbs and juniper trees have high demand⁵². For example, tubers of an alpine medicinal herb, *Aconitum heterophyllum*, are traded at around INR 2,000 to 3,000 per kg. Junipers are highly valued, as they are used as scent sticks. Dried leaves of junipers are sold at INR 100 to 120 per kg in Gangtok. Fuelwood is high in demand in the high-altitude areas where heating was required throughout the year. One truckload of fuelwood costs around INR 6,000 or more.

⁵¹ From 2009, the Horticulture Department is administering this scheme because the activities take place on private land.

⁵² Information presented here is based on the survey conducted in Lachen, North Sikkim by the study team.

3.4.7 Prospects for joint forest management

The involvement of forest fringe communities in forest management is imperative in Sikkim, as the extent of the forestland is vast. The state cannot effectively protect and manage the forests without the participation of local people. Joint forest management is a necessity from the viewpoint of the forest administrators. Moreover, virtually all the communities in Sikkim are forest fringe communities and can be organised into JFMCs, EDCs, or PSS's because over 80% of Sikkim is forestland. The prospects for joint forest management are high.

However, unlike some of the other states in India, the opportunities for local people to directly benefit from forest management activities are rather limited in Sikkim. In many states in India, JFMC members plant trees on degraded state land and manage the forests in return for the benefits derived from harvesting trees and from NTFPs. In Sikkim, degraded forests exist, but the state forestry policy heavily favours protection and conservation over production. Timber production is not encouraged on state land. Regulations discourage production of timber even on private land. Commercial use of forest resources is basically banned on state land. Moreover, the limited land people own are primarily used for agriculture. Therefore, the opportunity for JFMC members to gain incomes from forestry activities is limited.

If the state can continuously pay wages or provide other kinds of incentives to JFMC, EDC, and PSS members for the forestry activities, benefits to the people can be sustained. If this is not possible, alternative measures to ensure benefit streams to the JFMC, EDC, and PSS members would be necessary to sustain joint forest management. A significant number of workshop participants expressed the opinion that dependency on the various types of government's subsidies and local employment measures such as the forestry activities is a threat to their future welfare, since changes in policy could terminate them at any time.

Several points deserve consideration for the proposed project to carry out and sustain joint forest management successfully into the future. First, production activities should be encouraged where it is ecologically feasible so that income can be generated from forestry. Second, rules should be relaxed for commercial exploitation of forest resources on a trial basis with the view of extending the relaxed rules to all well-performing JFMCs, EDCs, and PSS's. Third, alternative income generation activities that do not consume forests should be identified. Ecotourism may be one option, but as will be explained later, it is not a viable option in many places.

It is important to bear in mind that joint forest management only succeeds when both the state and the local people see benefits in the joint venture. The best situation is when the subject of the joint action, which is basically the forests, produces benefit streams for both parties. If the local people only benefit from non-forestry activities, wages, or giveaways, sustainability is at risk. If forestry activities are sustained by such incentives funded through an aid programme, the chances of joint forest management collapsing once the subsidies are over are high. Sustainable management of forest resources, which provides local people with the opportunity to generate income from the forests, is the strategy to follow if the proposed project is to succeed in joint forest management.

3.5 Biodiversity conservation

3.5.1 In-situ biodiversity conservation

(1) Protected areas

The establishment of protected areas in Sikkim is governed primarily by the Wildlife (Protection) Act (1972) and amendments (2003 and 2006). These stipulate that the state government may declare an area,

whether inside a sanctuary or not, as a national park for the purpose of protecting and developing wildlife and its environment (Section 35). The state government cannot alter the boundaries of a national park except on the recommendation of the National Board for Wildlife (Section 35(5)). No grazing is allowed inside a national park (Section 35(7)). All provisions applicable to national parks are also applicable to sanctuaries (Section 35(8)).

The mainstay of in-situ biodiversity conservation is the network of protected area systems that began in 1977 with Khangchendzonga National Park (1,784 km²). Kitam Bird Sanctuary (6 km²) is the most recent addition in 2005. There are eight protected areas (one national park and seven sanctuaries) that cover 2,183.10 km², which is nearly 31% of Sikkim's total area (Table 3-19) (Figure 3-3).

Table 3-19 Protected areas of Sikkim

Protected areas	Area (km ²)	Altitude (m)	Geo reference (Lat., Long.)
1. Khangchendzonga National Park	1,784	1,400-8,586	88° 03'-88° 39'E, 27° 27'-27° 53' N
2. Fambonglho Wildlife Sanctuary	52	1,524-2,749	88° 29'-88° 35'E, 27° 10'-27° 23' N
3. Maenam Wildlife Sanctuary	35	2,000-3,263	88° 21'-88° 25'E, 27° 21'-27° 25' N
4. Kyongnosla Alpine Sanctuary	31	3,292-4,116	88° 44'-88° 45'E, 27° 12'-27° 24' N
5. Singba Rhododendron Sanctuary	43	3,048-4,575	88° 43'-88° 46'E, 27° 43'-27° 48' N
6. Bersey Rhododendron Sanctuary	104	2,110-4,100	88° 02'-88° 11'E, 27° 10'-27° 13' N
7. Pangolakha Wildlife Sanctuary	128	1,760-4,390	88° 35'-88° 51'E, 27° 09'-27° 22' N
8. Kitam Bird Sanctuary	6	320-875	88° 20'-88° 22'E, 27° 06'-27° 07' N

Source: IPR (2008)

The minimum elevation of all protected areas average 1,931 m (range: 320 - 8,586 m), which is relatively high. Also, they are small in size (range: 6 - 1,784 km²; median: 52 km²; average size: 272 km²) and occupy mountain tops in most cases. In the higher reaches, these protected areas have played an important role in maintaining natural resources and biodiversity and in ensuring Sikkim's headwaters to sustain life downstream. Rare and endangered flora and fauna are also protected in their natural habitats.

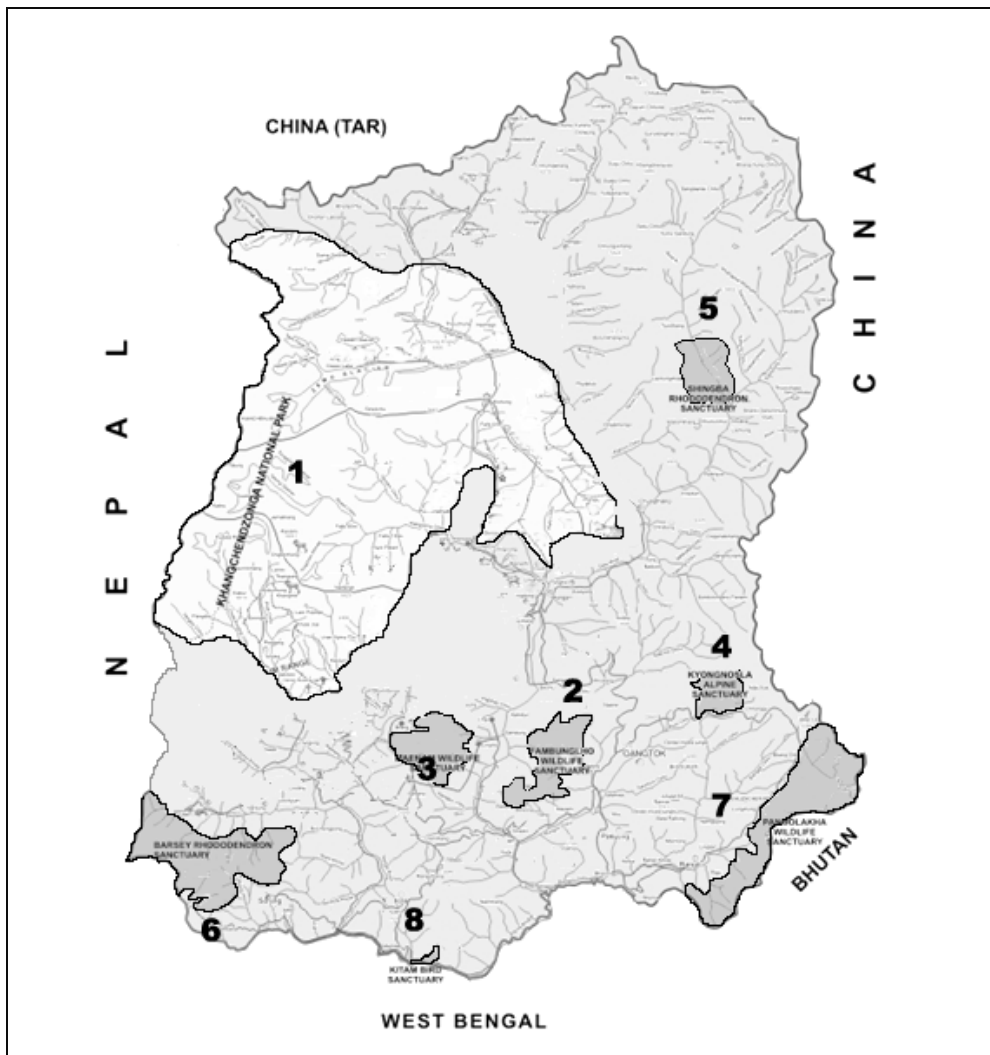
Of all protected areas, Khangchendzonga National Park (KNP) is the first protected area in Sikkim and the largest. It was extended from 850 km² in 1977 to 1,784 km² in 1997 and was declared a biosphere reserve in 2000. In the west, Khangchendzonga National Park has been further zoned into Yongzokdrak Blue Sheep Conservation Zone (56 km², 3.14% of the total area of KNP) in West Sikkim, Arreylunchok Musk Deer Conservation Zone (27 km², 1.51% of the total area of KNP), and Lampokhari Medicinal Plants Conservation Zone (15 km², 0.84% of the total area of KNP) for the protection and conservation of animals and medicinal plants.

Fambonglho Wildlife Sanctuary (51.76 km²), near Gangtok, borders with Rumtek Monastery to the southeast. Its highest peak, Tinjurey, is a triangular hilltop at 2,749 m and connects to Fambonglho and Ragorathai Peaks. Its temperate forest vegetation includes both broadleaved and mixed coniferous forests where the Himalayan black bear, red panda, and satyr tragopan occur. Maenam Wildlife Sanctuary (35.34 km²) is a small area with similar flora and fauna as Fambonglho. Kyongnosla Alpine Sanctuary has been extended from 4 km² to 31 km² to protect rare ground orchids *Cypripedium tibeticum* and rhododendrons *Rhododendron neivium*, which are interspersed with junipers and fir. Faunal elements include the red panda, Himalayan black bear, musk deer, Tibetan fox, blood pheasant and griffon vulture. Some marmots were also introduced to the area earlier.

Shingba Rhododendron Sanctuary (43 km²) in the Lachung Valley lies between Yakchey La and Yumthang. Temperate conifer vegetation includes fir, spruce, larch, and juniper with rhododendrons. The musk deer, blue sheep, red panda, Himalayan black bear, and three species of pheasants including the blood pheasant occur. Barsey Rhododendron Sanctuary (104 km²) connects with Khangchendzonga National Park and the Singhalila National Park of West Bengal. With an altitudinal

range of 2,200-4,100 m, it supports sub-tropical, mixed broadleaf, conifer forests and alpine vegetation. There are 30 villages comprising 6,500 households with a total population of about 40,000 people adjoining the sanctuary. Pangolakha Wildlife Sanctuary (128 km²), covered with broadleaved vegetation, connects with Toorsa Strict Nature Reserve of Bhutan. Kitam Bird Sanctuary (6 km²) has subtropical vegetation where the sal dominates.

In addition, two more high-altitude protected areas have been proposed. They are Cho Lahmu Cold Desert National Park, with 500 km² above 4,000 m, and Nimphu Wildlife Sanctuary (200 km²) (CISMHE, 2006).



Source: KNP Division, FEWMD

Note: Numbers represent protected areas as listed in Table 3-19

Figure 3-3 Protected areas in Sikkim

(2) Freshwaters

Sikkim's Tista River system has 104 rivers and streams (IPRD, 2008) where 50 fish species occur (Tamang, 2001; CISMHE, 2006). Out of 2,509 lakes total (227 high-altitude lakes) in 17 watersheds of the Tista Basin in Sikkim, Chhombu Chho watershed has 69 lakes, Yumthang 60, Zemu Chhu 56, Prek

Chhu 39, and Rangpo Chhu 26. Most of the low-altitude or valley lakes have noticeable degradation. Some are drinking water sources. For example, Menmoi Chhu is a source of drinking water for downstream villages. Lakes like Martam and Nagi are used for feeding domestic animals.

The large influx of tourists and their activities have affected lakes like Thosa, Rabomthang Tso, Chhangu, Khecheopalri, and Gurudongmar. Mid- and low-altitude lakes harbour indigenous fish species such as the *Clarius*, *Schizothorax*, and *Catla*. The exotic trout (*Salmo trutta fario*) occurs in Chhangu, Menmoi Chhu, and Rabomthang Tso. Fry and fingerlings of the brown trout from farms in Lachung and Lachen have dominated the upper stretches of Lachung Chhu, Lachen Chhu, and Rangpo Chhu. Many high-altitude lakes in Sikkim like Khangchung Lake, Jheutha Lake, Chho Lhamo, and Chho Nempo provide critical habitats for the Trans Himalayan migratory birds (Roy and Thapa, 1998). A few lakes like Lamgepui Tso, Makang Tso, Thum Tso, Kupup, and Mashya Tso are well-known for their waterfowls.

3.5.2 Status of ex-situ conservation

Established in 1994, the state-owned Himalayan Zoological Park (area: 230 ha, elevation: 1,890 - 2,130 m) has a natural forest set-up where wild animals of the Eastern Himalaya are housed. It aims to ensure conservation of all endangered animals and their environment through a holistic approach of captive management and education. Exhibits include the red panda, the Tibetan wolf, and the snow leopard. It is second to Darjeeling Zoo in the country to have bred red pandas in captivity. Two cubs were born in 2002 (FEWMD, 2007b).

Many small establishments that may support in-situ biodiversity are found throughout Sikkim. There is a state biodiversity park in Damthang, which has rare and threatened endemic species and varieties. Likewise, the J. N. Botanical Garden at Rumtek has several varieties of orchids, rhododendrons, and other important plants. Its goal is to educate people about the richness of the flora of the Eastern Himalaya.

There are 400 medicinal plants that require protection from over-harvest for their utility values (Rai et al. 2000). Also, there are 19 sacred groves that are repositories of local germplasm. The National Medicinal Plants Board has 13 herbal garden projects to conserve seeds as germplasm, conducted in agro-climatic zones for ex-situ cultivation, which cover a total area of 130 ha. In addition, there are 166 Panchayat herbal gardens to familiarize the general public with herbal plants and to disseminate techniques for medicinal plant cultivation.

Many NGOs, Self Help Groups, schools, institutes, departments, community-based organisations, individuals, and households have been involved in Smriti Van ('memorial forest'), a tree planting exercise to commemorate their local events. As a result, more than 1,000 ha of wasteland, with over 50 Smriti Vans, have been reclaimed, regenerated, and replenished without any substantial investment. Also, the Green Mission, a grassroots approach to planting trees, has been effective state-wide. Other initiatives include the Sidkeong Bird Park, Sling-Dong Fairreanum Conservation Reserve, the proposed butterfly park in Rangrang, and the Chogyal Palden Thendup Namgyal Park.

3.5.3 Lessons from past interventions

(1) Co-managing forest resources

Since 1995, the curtailing of traditional grazing practices in reserved forests and the ban on green tree felling for commercial purposes have led to a series of follow-up policies and regulations. Legislations, rules, and guidelines had been revised and/or amended until 2007 to make them more stringent. The need to devolve or decentralize power to the people to counteract such initiatives has been fully acknowledged. As a result, JFMCs have been constituted for non-notified areas, whereas EDCs have

been constituted by the FDA in the protected areas. In total, 158 JFMCs, 57 EDCs, and 8 FDAs are required to manage and protect forest resources. Although there are no published success stories on JFMCs and EDCs in Sikkim, it is envisioned that the wide-scale participation of the people would contribute to managing natural resources on a sustainable basis so that rural societies can become self-reliant through democratic processes.

(2) Protected areas

The existing network of protected areas suffers from their small physical size, inadequate landscape-level distribution, and insufficient development and management of physical infrastructure. They are all small despite that their boundaries have been repeatedly expanded (Figure 3-4). This is not to say that they are faulty by design, but all opportunities and potential to make them larger must be fully explored. In addition to reviewing the design, landscape-level stepping stones⁵³, which may assist as secondary corridors to connect all protected areas within the state and beyond countries, eg, India, Nepal, and Bhutan, need to be established. This is more imperative now than before, given the progression of land fragmentation, habitat degradation, and climate change.

Of all protected areas, Khangchendzonga National Park has most effectively addressed the impact of tourist volume. It has introduced the Singhalila Ecotourism Promotion Zone in its western sector, with 27 designated camp sites and four treks: Khangchendzonga Base Camp, Yambong-Singhalila, Everest Singhalila, Arreylunchok-Dzongri. Although the Wildlife (Protection) Act 1972 prohibits cattle grazing in national parks, nearly 100 yaks graze around Dzongri. Furthermore, there are 30 households in Tshoka that require relocation, suggesting that the park management mechanism and traditional livelihoods require a longer time to interface with conservation.

There are too many area-based, small conservation programs like state parks, butterfly parks, bird parks, and community parks that dot the entire state. Management of these types of programs requires large human resource inputs. Therefore, management should be streamlined, and conservation programs should bear scientific validity for their establishment. Furthermore, the state legal apparatus should be mobilised to maintain the proper management of these programs.

(3) River water and lakes

The water current velocities of the Tista River and its tributaries are characterized spatially by non-uniform and non-steady flows of water, influenced by water discharge, waterfalls, solid boundaries, and free surface. It is almost static in pools in lower stretches, while it may be as high as 9.0 m/s at the headwaters (Negi, 1994). In 1998, the majority of phytoplankton and phytobenthic species in all these rivers and streams were pollution-intolerant and indicated the non-polluted state of these rivers. However, these biodiversity parameters may be changing with the increased intensity of hydropower development (29 projects, 5,347 MW) (ENVIS, 2009), as the Sikkim Forests and Water Courses (Preservation and Protection) Act 2007 empowers the state to regulate the use of natural waters, ice, and glaciers by industrial establishments.

To address problems associated with lakes in high altitudes, several PSS's have been constituted by local people to manage and protect them. They generate and collect revenues from tourists, and share them with the state government and entrusted committees. The committee's goal is to conserve wetland areas as drinking water sources for villages and to protect fragile ecosystems consisting of Trans-Himalayan flora and fauna.

⁵³ Defined as 'pockets of habitat that, while not necessarily connected, facilitate the movement of mobile species across otherwise inhospitable landscapes' (Scotland, 2002).

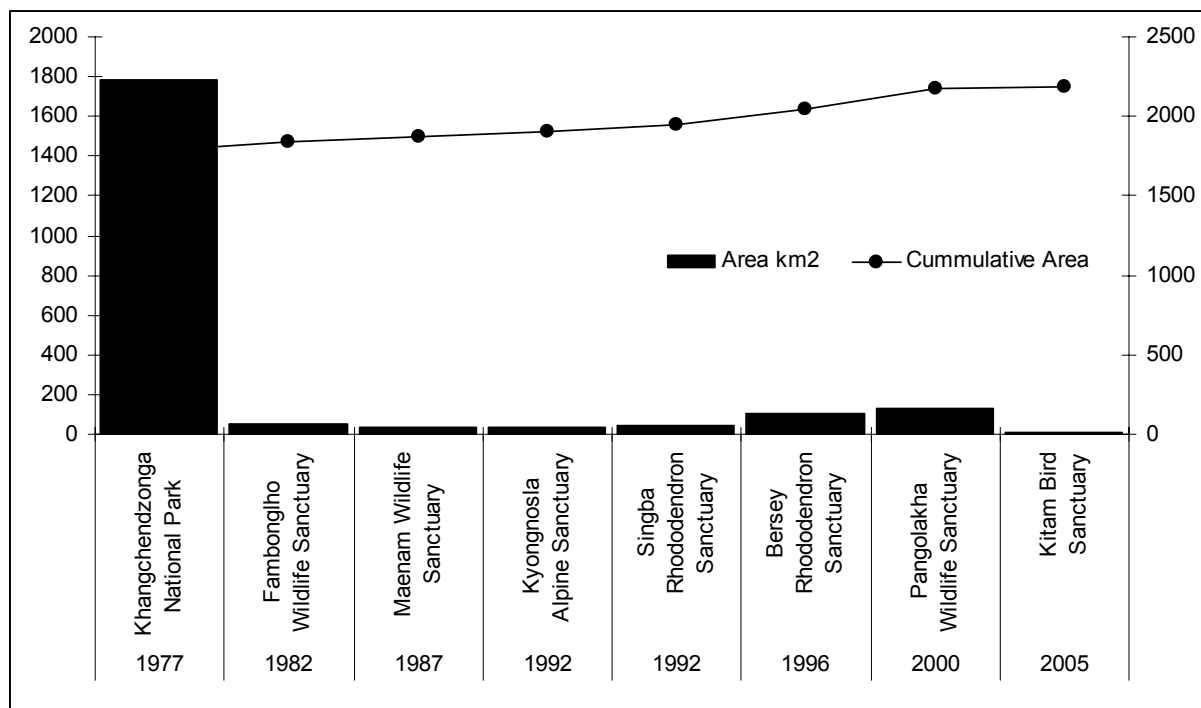


Figure 3-4 Protected area size and cumulative protected area (1977-2006)

3.5.4 Constraints and opportunities

(1) Rights and concessions

In 1952, the Government of India enunciated a forest policy to guide the management of state forests in the country. The National Forest Policy (1998) reviewed the nation-wide situation and adopted a strategy for forest management to include preservation, maintenance, sustainable utilisation, restoration, and enhancement of the natural environment. The Rights and Concessions (Section 4.3.4) of the policy re-emphasises that the lives of tribal people and other poor living within and near forests revolve around forests. Thus, their rights and concessions should be fully protected.

Of Sikkim's major ethnic groups, the Lepcha are said to have originated from Dzongu, which is the northeast buffer zone of Khangchendzonga National Park. The Bhutias, who also live in the north, have their own traditional legal system called the Dzumsa. It can be inferred from the National Forest Policy (1998) that the protected area system should have a legal framework to recognize Dzongu as a Lepcha cultural heritage site and the Dzumsa as a Bhutia political institution so that they can continue to claim their rights and concessions in co-managing biodiversity conservation.

(2) Stability of protected areas

All protected areas are surrounded by different categories of land use, including forests. As land use changes over time due to over-extraction of resources and land hunger, smaller protected areas suffer more than large ones in terms of faunal collapse because spatial heterogeneity is non-existent. Meeting the habitat requirements of large ungulates and predators is important for biodiversity conservation in the parks and reserves. If a flagship species is suppressed because the small area cannot accommodate their habitat requirements including food and cover, this would not result in biodiversity conservation.

Besides protected areas, Sikkim's forests are grouped into the following categories: 1) reserved (2,261 km²), 2) khasmal (285 km²), and 3) gorucharan (104 km²). In reserved forests, cattle grazing and

timber extraction are restricted. Khasmal forests are set for meeting household needs for timber, firewood, and fodder. Although gorucharan forests were set aside by the state for adjoining villages to graze cattle, it was rarely practiced due to bans on cattle grazing.

The above-discussed issues provide opportunities for extending protected area boundaries to maintain their ecological stability and to unlock resources from the three categories of managed forests. By incorporating more forest areas into national parks, biodiversity would be conserved on a long-term basis, and revenue generating opportunities would be enhanced through ecotourism development. The spinoff of such an initiative is that it would expose Sikkim's protected area system to internationally-accepted standards.

(3) Inscription of Khangchendzonga Biosphere Reserve

There is overlap and confusion regarding the management of the Khangchendzonga area, as the state has declared it simultaneously a national park and a biosphere reserve. Khangchendzonga National Park has 20 EDCs that involve 4,042 households in an area of 600 ha. *Ecodevelopment* is a specifically Indian terminology, synonymous with the *buffer zone* of a national park elsewhere. The Khangchendzonga area was declared a biosphere reserve in 2000, which combined Khangchendzonga National Park as the core zone and its fringe areas as the buffer zone.

For policy makers, park designers, and managers, these two notifications raise several management-related issues. Are ecodevelopment areas and buffer zones different? To what extent do they overlap? What are the management strategies for ecodevelopment areas, buffer zone areas, and core areas? How should community members decide whether to participate in ecodevelopment and/or buffer zone activities? Can they participate in both? Should communities manage forests in buffer zones? How do communities prepare operational plans to manage their forests? In addition, the terminal intake of one hydroelectric project from Chokeyhurangchu is inside the core area of the biosphere (FEWMD, 2007b). All the above-mentioned issues and uncertainties need to be reconsidered and addressed in legal terms.

(4) Important bird areas (IBAs)

In Sikkim, 11 zones are declared important bird areas (IBA) (Table 3-20), which are critical not only for birds but also for providing connectivity to the protected area system. All IBAs satisfy three criteria: 1) the IBA contains significant numbers of globally threatened (endangered, critical, and vulnerable) bird species; 2) it contains highly restricted range species such as endemics- or biome-restricted species; and 3) there is a high congregation of migratory or other birds, especially wetland species (Islam & Rahmani, 2004). These areas, which have been identified by the Birdlife International and Bombay Natural History Society, India, can be used as landscape-level stepping stones.

Table 3-20 Important bird areas of Sikkim

Important Bird Areas	Area (ha)	IBA Criteria
Bersey Rhododendron Sanctuary	10,400	A1, A2, A3
Dombang Valley-Lachung-Lema-Tsungthang	60,000	A1, A2, A3
Fambonglho Wildlife Sanctuary - Himalayan Zoological Park-Ratey Chu Reserved Forest	7,826	A1, A2, A3
Khangchendzonga National Park and Biosphere Reserve	28,500	A1, A2, A3
Kyongnosla Alpine Sanctuary-Tsomgo-Tamze-Chola	3,100	A1, A2, A3
Lhonak Valley	5,000	A1, A2, A3
Low Land Forest (Melli Bguwa Kitam, Jorethang-Namchi-Sombarey)	2,000	A1, A2, A3
Maenam Wildlife Sanctuary-Tendong RF	3,539	A1, A2, A3
Pangolakha Wildlife Sanctuary- Zaluk-Bedang Tso-Nathu La	12,400	A1, A2, A3
Tso Lhamu Plateau Lashar-Sebu La Yumesamdong Complex	5,000	A1, A2, A3
Yumthang-Singba Rhododendron Wildlife Sanctuary	43,000	A1, A2, A3

A1= Threatened Species, A2= Restricted Range Species, A3= Biome Species, A4= Congregatory Species

(5) Biodiversity management strategy and plans

Sikkim State Biodiversity Strategy and Action Plan (SSBSAP) is a participatory state-wide plan on biodiversity conservation. The plan broadly specifies the state's responsibilities on biodiversity management and recommends activities in two categories: state and Indian Army (FEWMD, 2006d). The State SSBSAP recommends 166 program activities including the following: propagation of medicinal plants; rotational cattle grazing; biodiversity registers for access and benefit sharing; education of army personnel; forest department infrastructures; regulated trekking; domestication of wild edible plants; access to alternative energy including biogas; promotion of agrobiodiversity activities by NGOs; in-situ gene bank; stringent EIA of hydropower projects; community sanitation; and support for traditional medicines and institutions.

The Indian Army SSBSAP suggests activities tending more towards education, awareness-building, exchange of information on wildlife, elimination of feral dogs in and around army camps to save argali, and containing large-scale disturbance by the road-building activities of Garrison Reserve Engineering Force/Border Road Organisation (GREF/BRO) to acceptable environmental standards.

The protected area management plans for the Khangchendzonga National Park, and management plans for all seven wildlife sanctuaries are approved by the Department this year. The plans establish the Forest Department's responsibilities, management frameworks, and expected resource allocations for a ten year period (FY 2008/09-2018/09). The completion of these plans is a remarkable event, since they were the first-ever comprehensive plans guiding the management of protected areas to be formulated in Sikkim. The plans identify constraints in achieving the appropriate level of protected area management, such as those regarding community participation, the department's deployment of field staff, financial resource allocation, technical and information bases, and management infrastructure such as physical facilities and communication networks. Therefore, there is potential for the proposed project to contribute to overcoming these constraints.

3.5.5 Priority areas for project intervention

(1) Policy review, and strategic planning and implementation

Although periodic reviews of the existing legal framework for forestry are adequate, the protected area system should be reviewed and strengthened through policy reform. If the protected area network is extended in the near future, the management organisation should be restructured, and more field staff should be deployed. At present, there are barely enough field staff deployed, as the Forest Department has also pointed out.

There are several ongoing initiatives that have increased awareness amongst people to support biodiversity conservation. All these are much accepted by the media, NGOs, and civil society. Against this background, the protected area management plans must be able to attract public support and attention upon their execution. Thus, one of the Project's priorities will be to assist the Forest Department in overcoming the constraints identified in the plans.

(2) Infrastructure and human resource development

Investments in the development of both infrastructure and human resources are inadequate. The state invests only 10% of the total outlay for the forestry sector in the development of infrastructure for forest protection. This includes infrastructure such as patrolling vehicles, firearms, telecommunications, check posts, and officer's quarters and offices. Moreover, the government's investment in human resource development is lacking. Many of the field staff are undertrained in protected area management and do not perform as expected. Both short- and mid-term trainings should be provided within and outside India to equip them with the professional competence needed to perform their demanding field duties in adverse settings.

(3) Institutional set-up for land-based information technology

The first step to safeguarding biodiversity through systematic planning is to secure access to accurate land-based information. A range of land use information and the importance of scale are the centrefold for land-based planning. Detailed topographical maps with altitudinal relief would allow realistic plans to be developed for extending the boundaries of existing protected areas and creating other stepping stones at the landscape level. Such information would benefit many, including policy makers, decision-making bodies, government agencies, donors, civil society, and research organisations.

Also, the establishment of geo-mapping research facilities within the state is essential to complement human resource development. Concerned government agencies, in-state universities, and research organisations could work together using these facilities, as well as trained forestry staff, university graduate students, and knowledge-based NGO volunteers.

(4) Collaborative partnership to mitigate bio-politics and interface science with management

Institutional boundaries are not physical and are driven by management requirements. Biodiversity conservation requires collaborative partnership between institutions such as government agencies and educational institutes. Thus, cross-institutional boundaries are preferred for managing ecosystems in Sikkim. In this regard, an autonomous biodiversity education centre would be an ideal institution as a platform for researchers, planners, and managers to carry out conservation research and related management activities.

The centre should offer a range of services to individuals, tourists, school students, teachers, professionals, media people, farmers, and traditional healers, among others. It should provide training, information, support, institutional strengthening, and other capacity building measures with the following aims: 1) to promote holistic research-based biodiversity information; and 2) to provide integrated education to all about biodiversity and ecosystems management in Sikkim.

(5) Biodiversity information base to coordinate research and management

A biodiversity database is not static by nature because all land use is dynamic. A biological inventory is characterized by hierarchically related levels (scales) that include genes, organisms, populations, communities, and landscapes. Using standard survey techniques for rapid biodiversity surveys, representative levels (scales) can be quantitatively identified to set up baseline information. Based on the

dataset, a management plan should be prepared to secure biodiversity in protected areas. All protected area inventory data can be updated periodically once the benchmark is set.

(6) Understanding flagship species

Flagship species are important because their continual survival signifies the well-being of other free-ranging animals and their habitats within their home range and distribution. For example, the viability of the snow leopard population implies the availability of prey species and buffer species. If supported by field surveys, this would prove the health of the ecosystem. On the other hand, livestock depredation by large predators like the snow leopard may signify increased conflict, because livestock may have out-competed free-ranging ungulates. As such deduction needs field verification, long-term studies should be conducted to monitor ecosystem health.

(7) High-altitude ecosystem

The study of vegetation in high altitudes is complex due to the existence of wild and domesticated ungulates. It is widely acknowledged that livestock has degraded high-altitude vegetative structures. However, this can be avoided through a management regimen of studying harvest (grazing), response of species composition and biomass, and their impact on forage production under different grazing regimens. Here are some of the questions that may be addressed. Does high livestock density result in low animal production? How should high stocking rates be avoided? How should competition between livestock and wild herbivore be determined, even when there is diet similarity and spatial overlap? Is grazing pervasive to biodiversity? A comparison of above-ground, cultivated plant biomass and alpine meadow biomass may suggest a lead. Therefore, an integrated partnership for creating clear management goals and an adaptive management strategy are necessary for the herders and high-altitude wildlife.

CHAPTER 4 Tourism and ecotourism

The development of the tourism sector in Sikkim has been impressive especially in the last decade, and the state has emerged as the most popular leisure tourism destination in Northeast India. Visitors come to enjoy its spectacular scenery, especially the magnificent Khangchendzonga mountain range, the wildlife and flora in this acknowledged biodiversity hotspot, and the rich and varied culture of the Sikkimese tribes.

4.1 Sikkim's tourism assets and analysis of tourist demand to Sikkim

4.1.1 Destinations and attractions of Sikkim

A brief description of the destinations and attractions in Sikkim is provided in this section with a more detailed and comprehensive presentation in Annex 4.

The tourism assets of Sikkim are mostly based on its exceptional nature and culture. The high mountain environment offers a range of sights for tourists to enjoy such as peaks and passes, glacier systems, river systems, lakes, waterfalls, hot springs, caves, sanctuaries, and the Khangchendzonga National Park. Visitors enjoy nature walks, studying the rich flora such as the 600 species of recorded orchids, and the wildlife including a great variety of butterflies and 500 to 600 species of birds. Some are attracted to the more active and adventurous trekking, mountaineering, rock climbing, and mountain biking.

However, there are obstacles to the development of tourism based on nature in Sikkim. Mountaineering has great potential but is restricted to just five peaks, as several of the more famous peaks were closed some time ago. Rafting was possible in the past on the two main rivers, but most water-based activities have stopped because hydro projects have affected water flows along the Tista and Rongit rivers. According to stakeholders, there is little chance that this activity can be revived. Since the construction of the dams, the rivers are dangerous during the monsoon season and do not provide strong enough rapids during the winter season. Boating on the majority of Sikkim's lakes is not allowed because most are considered sacred.

The state is divided into four districts. The East District borders Tibet and Bhutan and is the most populated area of Sikkim. With the capital, Gangtok, being the first stop for 90% of all tourists to the state, it has the greatest concentration of tourist facilities and better infrastructure than other districts. The area appeals to the general sightseeing tourist, with a number of popular attractions that can be visited on day excursions. Gambling tourism is also emerging in the higher category hotels of the capital and, if allowed to develop, has the potential to be a future high earner for the state.

The West District borders Nepal and is the main agricultural area of Sikkim. It is the second most visited district of the state, and its main destinations are Pelling and Yuksom, which is the base for the popular Dzongri trek. Pelling has a growing concentration of hotels and other tourist facilities. The West District has high mountains, dense forest, valleys, and is where the source of the Rongit River is located.

The North District is the largest and most sparsely populated district. It offers high mountains, passes, high-altitude lakes and beautiful alpine valleys. It is home to the Lepcha community as well as to a variety of other indigenous people. It borders Nepal and Tibet and is where the source of the Tista River is located. Increasing numbers of tourists are visiting the North despite all visitors having to obtain a permit. This is putting a strain on the infrastructure of the two emerging destinations of Lachung and Lachen. Trekking is becoming popular in the North District, which shares the Khangchendzonga National Park with the West District.

The altitude of the South District is lower than the other districts, and it is the most densely populated

area of Sikkim. It has less tourist facilities than the East and West Districts, although various departments of the Government of Sikkim are building a number of new facilities and attractions such as cultural centres in Yangyang and Solakhop, a pilgrimage centre near Namchi. Tourism is mostly resort-based in a rural environment. At present, the South District serves as a transit area for visitors travelling to the West from the East District.

4.1.2 Sikkim's cultural heritage assets

Sikkim offers a mix of traditional Lepcha, Bhutia and Nepali culture. The Buddhist tradition, which is apparent throughout the state, is supported by a network of 107 working monasteries, some of which are 300 years old. One of the important Buddhist sites is located at Samdruptse. A 135 feet high statue of Guru Rinpoche, the patron saint of Sikkim, is the world's tallest representation of the saint.

The artistic expression of the culture is represented through arts and handicrafts such as Tibetan carpets, handbags and cushion covers, wood crafts like the traditional Tibetan tables, Tibetan paintings, cane and bamboo crafts, paper products, jewellery, and artefacts. The three communities each present distinct and exotic folklore and cuisine which would be of great interest to tourists. However, there are few opportunities for local communities to showcase their culture to visitors either through cultural performances or through the sales of traditional arts and crafts.

There are few museums in Sikkim, with the exception of Gangtok, where the Namgyal Institute of Tibetology and the science museum are located. Other attractions in the capital include the Directorate of Handicrafts and Handlooms, where tourists can see craftsmen at work and visit the craft museum, and the Himalayan Zoological Park, which stretches over a 205ha area. Throughout the year, different festivals are organised in every district of the state, ranging from cultural and religious festivals, botanical festivals, to sporting events.

Sikkim has the right mix of quality natural and cultural assets to promote ecotourism, adventure tourism, cultural tourism, and village tourism.

4.1.3 Tourist arrivals to Sikkim

According to the figures compiled by the Tourism Department, 21,162 foreign tourists and 460,564 domestic tourists visited the state in 2008 as shown in Table 4-1.

Table 4-1 Tourist arrivals (1999-2008)

Year	Domestic Tourist Arrivals	Percentage change from the previous year	International Tourist Arrivals	Percentage change from the previous year
1999	173,745	8.27%	8,563	40.12%
2000	180,256	3.75%	8,794	2.70%
2001	192,354	6.71%	7,757	-11.79%
2002	203,835	5.97%	8,433	8.71%
2003	220,824	8.33%	10,954	29.89%
2004	286,678	29.82%	13,528	23.50%
2005	314,622	9.75%	16,518	22.10%
2006	378,109	20.18%	18,049	9.27%
2007	414,072	9.51%	17,837	-1.17%
2008	460,564	11.23%	21,162	18.65%
Average growth rate		11.20%	14.20%	

Source: Tourism Department, Government of Sikkim

The figures for international arrivals are precise, as foreign visitors have to obtain a permit to enter Sikkim and are recorded. However, the figures for domestic arrivals are more dubious, as they are obtained from hotel registration of visitors. This method excludes visitors that stay with friends and relatives, stay at accommodations that do not register or report guests to the Tourism Department, or those accommodated at camp sites. To compensate, the department inflates the figures it has collected from the registration by 25%. It is also likely that there are incidents of double and triple counting of visitors that travel around Sikkim and stay in several hotels during their trip. It is estimated that the number of domestic tourists is likely to be substantially higher.

The growth rate of tourist arrivals to Sikkim has been comparable to that of India as a whole. Since 1999, average annual growth rates have been 11.20% for domestic tourist arrivals and 14.20% for international arrivals. Sharp increases in foreign arrivals are directly related to political problems in neighbouring Nepal, which suggests that Sikkim is currently perceived as an alternative to Nepal.

4.1.4 Tourism demand and profile of visitors to Sikkim

No visitor survey has been conducted in Sikkim. The Tourism Department estimates that 80% of all visitors to Sikkim come for general sightseeing, principally to see its nature and the spectacular mountain views, and for many domestic visitors from the hotter states of India to experience snow. With Sikkim's exceptional mountains and rivers, visitors come to enjoy adventure tourism such as trekking and mountaineering. After general sightseeing, trekking is the activity that attracts the most tourists. The remaining tourists visit Sikkim for pilgrimage to Buddhist monasteries, to pursue special interests such as bird watching, for business purposes, and to visit friend and relatives, in more or less equal proportions.

Despite the current interest in developing ecotourism in Sikkim, it is not identified as a specific motive for visiting the state by the Tourism Department. This is probably because there is no real definition of the concept of ecotourism in Sikkim, and different institutions and organisations use the term to suit their requirements. It is likely that there are some ecotourists among the general sightseers as well as in the adventure tourism group. It is imperative that the internationally accepted definition for this form of tourism is well understood by all stakeholders in Sikkim.

(1) Domestic tourists

The neighbouring state of West Bengal is not surprisingly the main domestic market to visit Sikkim. The metro of Kolkata currently accounts for 45% of all domestic visitors. However, it is reported by the Tourism Department that the share of domestic tourist traffic from other metros is increasing, with Delhi now accounting for 15% of domestic visitors, Mumbai 10%, Hyderabad 8%, Bangalore 7%, and Chennai and Ahmadabad 5%, respectively, as shown in Table 4-2.

Table 4-2 Domestic generating markets to Sikkim

Market Source	Share in tourist traffic to Sikkim (approximate)
Kolkata	45%
Delhi	15%
Mumbai	10%
Hyderabad	8%
Bangalore	7%
Ahmedabad	5%
Chennai	5%
Others	5%
Total	100%

Source: Tourism Department, Government of Sikkim

Marketing campaigns by the government and the private sector have succeeded in attracting domestic visitors from all over India, but two factors have had a major impact on domestic tourism to Sikkim. The first is the improvement in air connectivity because of the increasing number of low cost airlines flying into Bagdogra Airport, and the second is the amendment to the Leave Travel Concession (LTC) rule by the Government of India, allowing employees of central government and public sector undertakings (PSU) – government-owned corporations – to travel by air free once a year with their entire family to Northeast states, including Sikkim. These factors have given a real boost to the number of domestic arrivals in the last couple of years.

Sikkim is now directly connected via Bagdogra Airport to distant markets like Mumbai, Chennai, Bangalore, and Hyderabad. The change in the LTC rule opens up a potential market of 10 million government employees from all over India.

According to operators interviewed for this study and during the formulation of the Uttarakhand Tourism Development Master Plan in 2007, tourists from West Bengal are reputed to be enthusiastic travellers who particularly enjoy nature and the mountains. They tend to be budget travellers and low spenders. Visitors from Delhi, Mumbai, Hyderabad, Bangalore, and Chennai tend to be high spenders. They look for cool weather, enjoying the snow, beautiful mountain sights, and good food. Their main purpose of travel is leisure. They usually demand good quality comfortable accommodation and will pay the price. They are interested in tasting local cuisine. Visitors from Gujarat are normally medium to high spenders. Like tourists from West Bengal, Gujaratis are keen travellers and enjoy exploring new destinations.

Indian tourists usually travel in a family group which limits their activities. For instance, they may enjoy nature walks, but few tourists of this market segment will trek. They require a safe environment, enjoy trying out local food, and like shopping, particularly in Gangtok, which is their principal destination. Many are interested in village tourism and the culture of indigenous people but are reluctant to stay at homestays and prefer hotels. While the majority are not 'ecotourists' per se, they are attracted to natural sites and enjoy visiting national parks and sanctuaries, looking at plants and flowers, and trying to spot wildlife, seeing waterfalls, caves and rushing rivers, and generally like being in the natural environment.

Increasingly young Indian tourists are visiting Sikkim to participate in active vacations such as trekking. Tour operators report that Indian trekkers at the moment only make up 5% of the market and that they tend to choose the easier routes, but it is a market that is increasing. A growing number of young Indians are choosing Sikkim for their honeymoon. They tend to be medium spenders.

(2) Foreign tourists

Sikkim attracts a relatively small number of foreign visitors, but international arrivals have increased steadily over the last few years. Europe and North America are the main international source markets for Sikkim. Table 4-3 shows that the UK is the largest generating market, followed by the USA, Germany, and France. The largest market from the Asia Pacific region is Australia, followed by Thailand and Japan. Sikkim accounted for just 0.4% of total international arrivals to India in 2007, and efforts should be made to increase this market share. Eliminating the permit system or at least making it more straightforward as well as easing the restrictions within Sikkim would encourage more international arrivals to the state.

Foreign visitors mostly fall into two categories: backpackers and visitors on pre-booked arrangements from go trekking, take cultural tours, or pursue a special interest.

Backpackers will usually spend less on accommodation but, because they tend to deal directly with vendors such as suppliers of accommodation, guides, etc. rather than going through operators, their expenditure generally goes directly to the service providers. They tend to spend more locally than other

market segments because they stay much longer in one place. A study in Australia shows that backpackers spend on average 2.4 times more than average tourists because of their length of stay (Tourism Tasmania, 2004). They are generally well-educated, interested in experiencing a different culture, enjoy social and adventure activities, and tend to travel independently or with a companion. However, the benefits brought by this market are curtailed in Sikkim because of the time limits imposed by the permit requirements and the difficulty of travelling around the state independently. This is the market that would be most likely to choose homestays to experience living with indigenous people, but because of the restrictions, they have few opportunities to organise this. In Sikkim they may organise a trek through a local operator. Although no study has been carried out, anecdotal evidence suggests that the impact of this market segment is not being maximised.

Table 4-3 Top ten countries generating tourists for Sikkim in 2007

Country	No. of Arrivals 2005	No. of Arrivals 2006	No. of Arrivals 2007
UK	2,348	2,417	2,411
USA	2,024	2,310	2,316
Germany	1,677	1,631	1,563
France	1,637	1,573	1,452
Australia	1,074	1,085	878
Thailand	445	648	707
Netherland	181	481	667
Canada	478	563	630
Japan	626	890	608
Italy	536	Not available	513

Note: Figures for Sikkim 2005 and 2006 are also given for comparison

Source: Tourism Department, Government of Sikkim

Foreign tourists on organised tours have generally prepaid their holiday, and come on an all-inclusive basis. The majority come to Sikkim to trek. According to tour operators interviewed for this study, they are generally between 30 and 60 years of age, usually travel with friends or in a couple, or are from the expatriate market living in India. They are well educated and middle class.

Special interest tourists are usually high spenders willing to pay and put up with difficult conditions to see something exceptional relating to their special interest. These include bird watchers, visitors interested in biodiversity, wildlife, and botany, and visitors interested in culture, religion, and anthropology.

Cultural tours to Sikkim are most often part of longer tours in the region in combination with other destinations. These tend to be focused on visiting the famous monasteries. Some tourists, mostly from Asia but also from other parts of the world, come to Sikkim for pilgrimage to the Buddhist monasteries

4.1.5 Seasonality

There are two main seasons when tourists visit Sikkim: March to middle of June and October to December. The seasons are generally dictated by weather patterns and children's school holidays in the domestic market. Recently there seems to be a shift in demand. Since winter in Sikkim is dry and not so harsh, the number of tourists visiting during the winter months is growing as they are attracted to snowfall and increasingly want to spend their Christmas and New Year vacation in a different environment. As winter also coincides with the marriage season in other parts of India, a good number of honeymooners come to Sikkim.

4.2 Types of tourism that can be enjoyed in Sikkim and the potential for ecotourism

4.2.1 Forms of tourism available in Sikkim

A small survey with Sikkim tour operators was conducted for this study to rank in order of popularity the activities that tourists enjoy in the state. At the top of the ranking comes leisure including general sightseeing. This is mostly enjoyed by the domestic market. The next most popular activity is trekking involving mostly foreign visitors. Monastic circuits and village tourism, of interest to several market segments, were also ranked high. Other forms of tourism available in Sikkim include botanical and wildlife tours, learning Tibetan Buddhism and language, bird watching tours, butterfly watching tours, sanctuary visits, mountain biking, mountaineering, angling, and pilgrimage tours. The Tourism Department has plans to develop snow tourism involving igloos and dog sleigh rides.

4.2.2 Potential for ecotourism

Sikkim has tremendous potential for ecotourism and there is great enthusiasm to develop this form of tourism. In fact, the Tourism Department has branded Sikkim as the ‘ultimate ecotourism destination.’ It is, however, apparent that many stakeholders are unclear about the concept of ecotourism.

The International Ecotourism Society (TIES), based in Washington DC, defines ecotourism as ‘responsible travel to natural areas that conserves the environment and sustains the well being of local people.’ This broad definition allows for a number of market segments to be included from 1) the expert enthusiast passionate about spotting and learning about the fauna and flora of the destination; 2) the tourist that is interested in finding out about the culture of the indigenous people and staying with them at their homes; 3) the trekker who is guided by a local person, has his belonging carried by a local porter and stays at camp sites or lodges owned by the local community; to 4) the general leisure tourist who is drawn by the allure of the Himalayas and who would wish to experience the landscapes, fauna and flora, and cultural attributes of Sikkim. It is important that all the characteristics of ecotourism are involved, namely that it is tourism that takes place in nature – in the case of Sikkim within the forest area – that it does not damage the environment and contributes to the conservation of nature, and that it benefits local people. The aims of the Project are conservation of the forest resources and poverty alleviation within the forest area. Therefore, any form of tourism that achieves these objectives is suitable for development and must be considered in the project formulation.

In Sikkim, ecotourism seems to be either synonymous with homestays in villages or with trekking, which actually falls in the category of adventure tourism.

(1) Village tourism

Many villages are now offering the ‘village experience’ package with accommodation in a villager’s home, local food, guided walks or treks, and cultural shows. They present this as one integrated product for an inclusive price. Pastanga, which is one and an half hour’s drive from Gangtok, charges INR 1,800 a day for its package. This village has won first prize for ‘Best Village Tourism’ awarded by the Tourism Department for the last two years. Nine homestays offering one room each are available and used on a rotational basis. The price includes local food, a guide for village and nature walks, as well as a cultural show. All visitors to the village, day trippers as well as overnight guests, are recorded by Khedi Ecotourism and Ecodevelopment Promotion Society (KEEPS), the NGO that is responsible for Pastanga’s tourism venture. In 2008, 138 people visited the village with some 30% staying one night – in total approximately 40 people. Assuming most of these were sharing a room, 20 to 30 rooms were occupied in 2008 or two to three nights occupancy per room over the year – an occupancy rate of less than 1% in the village that has been voted by the best in the state. The business as it stands is simply not viable. The owners of the homestay receive INR 550, and the rest of the money goes to pay for the other services. A sum of INR 1,800 is relatively high, particularly for backpackers who are the most likely to

be attracted by this type of product. The situation was the same in Lachen in North Sikkim and worse in Dzongu.

Because of a bad experience a couple of years ago, KEEPS refuses to deal with Gangtok tour operators. The only marketing of Pastanga's product is through leaflets that are distributed by the Tourism Department at trade fairs, a CD that KEEPS sells in its office, and a website. No marketing is carried out in Gangtok, located at only a relatively short distance from the village. Furthermore, within one hour of Pastanga there are two major resorts, the 60-room Mayfair Hotel and the 15-room but soon to expand to 35-room Saramsa Resort, and the Saramsa exhibition and convention centre.

There have been attempts by tour operators and their associations to engage with the tourism committee in Pastanga, but these initiatives were met with little enthusiasm. The committee is only interested in offering the full package on its own terms rather than accommodating the needs of a third party, for instance by offering the opportunity of including day excursions to the village in their portfolio of services.

It would make better economic sense to break down the village services into components so that the customer can choose the products that he or she would like to purchase. Homestays are only suitable for a certain category of tourists, and as previously mentioned, Indian families require standards such as attached bathrooms, which none of the homestays in Pastanga offered. However, other services would be of interest to visitors on day trips such as cultural shows, village walks, nature walks, day treks, and traditional lunches or dinners. Villages should be proactive in their marketing and offer a range of products rather than just one rigid package. Pastanga could offer a half-day as well as a full day excursion to showcase the village. This could be sold through tour operators and travel agents in Gangtok, through hotel receptions, and even through taxi associations. They should work out a commission system that is fair and acceptable to all and would allow all the partners to benefit. If the village is serious about generating income from tourism, it may need to invest in a village community centre to welcome the tourists. As a regular flow of tourists ensures that the product becomes established, profits can be reinvested in improving the homestays to the standards required by the market.

Income generation through setting up and running tourism enterprises is the most complex and involved way of alleviating poverty through tourism. To succeed, local communities have to be experienced in operating tourism services and especially in marketing their products. This requires financial resources as well as expertise. Situations where this form of ecotourism works well are when there is a constant flow of tourists through the village or when a partnership is struck up with a strong marketing partner. The homestays that are showing a degree of success, such as those at Khecheopalri and at Hee-Bermiok in West Sikkim are achieving good visitor numbers because they are following sound commercial principles, adopting appropriate pricing policies for the quality they offer and for the markets that they are attracting and are marketing their properties. They are building viable businesses without relying on NGOs or the Tourism Department to supply them with tourists.

It is worrying that the Tourism Department and the NGOs are encouraging villages to set up operations and assisting them with developing their product without helping them develop their marketing capabilities. This raises expectations of the local communities and, when tourists fail to materialise because of weak marketing, it results in disillusionment. Developing more supply of homestays is multiplying failing businesses around Sikkim. The strategy that will be adopted must ensure that the homestays that are already in existence become profitable before creating more.

Local communities in Sikkim should not just rely on establishing businesses but explore other ways of generating income and employment. Other methods through which tourism can contribute to poverty alleviation are described in Annex 5.

(2) Trekking

This is a product that Sikkim is already exploiting quite well. Although classified as adventure tourism, it is a form of tourism which can generate income and employment for local communities. With its excellent natural and cultural assets, Sikkim offers a world class trekking product in the Himalayas but is competing against internationally better known destinations such as Nepal and, nationally, Himachal Pradesh, Ladakh, and Uttarakhand.

There are over 20 trekking routes in Sikkim either open or waiting for government approval. Annex 4 provides a list of the treks available in the state and their degree of difficulty. There are three grades of trek based on the terrain they cross.

- The Gentle trek involves five days in total, usually four to six hours walking with the occasional steep path.
- The Moderate trek takes place in more remote country involving six to seven hours a day for not more than five days.
- The Moderately Strenuous trek takes up to seven consecutive days through wild country including high passes between 3,660m and 4,900m.
- The Strenuous trek is challenging and requires enthusiasts that are physically fit. These are long distance treks involving more than seven consecutive days walking and crossing at least one pass over 4,900m.
- Mountaineering Expeditions are highly specialised activities that require formal training (INTACH, 2002).

Trekking and mountaineering require good medical facilities, rescue services with specialised equipment like helicopters, and communication facilities such as walkie-talkies. The trekking market to Sikkim consists mainly of foreigners from UK, France, and Germany. They are more or less equally split between males and females. According to tour operators, the small but growing domestic trekking market is from West Bengal, Maharashtra, Tamil Nadu, Karnataka, and Gujarat. For the domestic market this is a male dominated activity with a male-female ratio of eight to two.

The most popular trek in Sikkim is the Yuksom-Dzongri trek, which has become crowded with uncontrolled traffic and degraded by litter and over usage. There is a need to open up and promote new routes so that the pressure on the Dzongri trail can be relieved. There are some excellent opportunities in Sikkim to develop an exciting portfolio of routes, even international routes in collaboration with neighbouring countries. While it is currently not possible to trek into Nepal because of political barriers and unrest from the Maoist threat in the area, one day the Great Himalayan Trail covering Sikkim, Nepal and Bhutan could be envisaged, offering the trekking community a unique experience.

(3) Special interest tourism such as bird watching and wildlife watching

Section 3.5 describes Sikkim's rich biodiversity, in particular its wildlife. The 11 officially-recognised Important Bird Areas (IBAs) spread throughout the state include endemic and threatened species. Bird watching could become an important and very lucrative tourism product for Sikkim if it were marketed through the appropriate channels.

The profile of birdwatchers is interesting. It is estimated that in the USA there are about 18 million birdwatchers, 2.2 million in Canada, and 2 million in UK. They are highly educated, relatively wealthy and passionate about bird watching. According to the US publication *Bird Watcher's Digest*, readers of the magazine are 1) well-educated with 33% holding college degrees and 29% postgraduate degrees; 2) 40% are over the age of 65 and 49% between 46 and 65; 3) 94% are home owners; 4) 51% are retired; 5) 20% are professionals; 6) 35% earn more than US\$75,000 annually (average earnings US\$55,000); 7) 65% are involved in environmental and conservation issues and causes, which many support financially;

and 8) 56% have travelled to watch birds. Scotland generates around UDS 400 million a year from this market.

(4) General sightseeing tourism

This is a market that should not be neglected, as it is by far the largest to visit Sikkim. Nature and culture tourism products should be available to general leisure tourists. Most sightseeing excursions already involve visiting natural areas, for instance Tsomgo Lake, or to see local culture like the Rumtek Monastery. It is important to understand the requirements of this market and how to tap it effectively.

- National parks are important brands for general leisure tourists, as they are much more likely to visit a national park than a reserved forest. Therefore, creating more national parks in Sikkim will encourage increased nature visits from this market segment.
- This market is interested in village tourism but not in being lodged at homestays, so day excursions to villages should be organised and promoted to leisure tourists.
- General sightseeing tourists enjoy learning about the area they are visiting, so interpretation centres at tourist attractions, tourist information centres, and museums are important to provide them with information on what to do and see.
- The general sightseeing market is most likely to purchase handicrafts made by local communities and must be given the opportunity to purchase these. Design, size, and quality are important factors and need to be borne in mind when producing handicrafts aimed at this market.
- The wealthier segment of this market can be attracted to stay at high quality eco-accommodation in natural surroundings. They are looking for good quality in a beautiful and relaxing environment. The Jungle Lodges and Resorts (JLR) of Karnataka, established in 1980, offers 12 eco-properties. It aims at the high-end tourist offering a high range of activities to suit all types of guests, from those looking for active activity pursuits to those who just want to relax. JLR has won a string of awards including Best Ecotourism Company in India from the Government of India, and its flagship Kabini River Lodge was voted by the up-market British publication *Tatler Magazine* as one of the top five wildlife resorts in the world. JLR is a unit of the Government of Karnataka's Tourism Department and is currently managed by State Forest Department officials.

(5) Volunteerism

Another form of tourism that could be developed in Sikkim but currently does not exist is volunteerism. Volunteering is defined as 'the practice of people working on behalf of others without being motivated by financial or material gain'. Volunteering is generally considered an altruistic activity, intended to promote good or improve human quality of life (Wikipedia).

Volunteerism in the tourism sector refers to tourists who willingly give their time and effort to work on community projects. They pay for their transport to the area and their accommodation. A good example of a successful volunteer programme is the Rural Organisation for Social Elevation (ROSE) in the village of Kanda in Uttarakhand. The brainchild of Mr. Jeevan Verma, it was founded in 1981. Tourists live with Mr. Verma's family, work on community projects in the village of Kanda alongside the villagers such as the installation of twin-tank latrines, the construction of earthquake-proof homes, community educational programmes on sanitation and employment generation for the rural unemployed, or they teach in the local school. They enjoy cultural interaction with the community while contributing in kind and financially to their well being.

4.3 Tourism supply and infrastructure in Sikkim

This section looks at the supply side of tourism in Sikkim and provides a quality assessment of infrastructure available to operate the tourism sector.

4.3.1 Access and transport

Although Sikkim Airport will not be opened for approximately another four years, Bagdogra Airport in West Bengal is four hours from Gangtok and provides connections to all the major metros in India. A helicopter service has been introduced from Bagdogra Airport, run by the state government's Sikkim Tourism Development Corporation. For foreigners, there are just two entry points to Sikkim: through the Rangpo and Melli checkpoints. Some tour operators are requesting that an entry point be opened at Resti to facilitate traffic to the East District from Kalimpong.

Although the road network coverage is improving, there are still few roads in the North District compared to the other districts. The conditions of the roads are quite variable: the vast majority are narrow, winding two-lane country roads, often running at a steep gradient. These are frequently prone to landslides and falling rocks, especially during the monsoon season. The hilly terrain raises transport costs, and travel to the North District is particularly expensive. In fact, transport costs in Sikkim are higher than in other parts of India.

Tourists cannot hire cars to drive themselves, so taxis are the only mode of transport unless on trips organised by tour operators. It is very difficult for tourists to travel independently in Sikkim. On routes that cross several districts, they have to change to a car that is registered in the district at each district boundary, which is complicated to arrange. Therefore, tour operators who are accustomed to the system are usually the best option for tourists wanting to travel around the state. A new rule recently introduced allows tour operators with officially recognised luxury cars to use these throughout Sikkim. Currently there are 12 luxury cars. Stakeholders interviewed for this study would like to see a change in the rules so that they are able to operate private coaches. Currently, coach transport is nationalised.

Sikkim is held hostage by political unrest in neighbouring West Bengal. Tourists have to cross West Bengal from Bagdogra airport to reach Sikkim. For instance, in July 2009, an indefinite strike was declared, which involved the blocking of roads including those into Sikkim. The only way that tourists can enter or leave Sikkim is by helicopter, which has limited capacity.

4.3.2 Entry and exit facilitation

There is no requirement for Indian tourists to obtain a permit to enter Sikkim anymore; however there are certain restricted areas in the North and the East of the state where permits must be obtained by all visitors.

Foreign tourists must obtain an 'Inner Line Permit' to enter Sikkim and are allowed to stay in the state for 15 days. This can be renewed 3 times for a total of 60 days. Additional permits are needed for the restricted areas. There seems to be confusion about where the Inner Line Permit can be obtained. On the central government's tourism website, it is announced that the permits can be obtained at Indian missions abroad. A form can even be downloaded from the Indian consulate website in the United Kingdom. However, anecdotal evidence shows that neither the Indian consulates in London or in Tokyo knew about the requirements, or were willing to issue the permit; rather they were advising travellers to obtain it at any airport in India. This also proved not to be the case. Such bureaucracy and confusing information is a definite deterrent to visiting Sikkim without going through a tour operator. Faced with this uncertainty, a majority of foreign visitors will choose other destinations that are easier to get to.

4.3.3 Accommodation

The accommodation sector has grown substantially in recent years. To encourage the development of the sector, the government gives a 30% subsidy in the form of a grant on capital investment for tourism venture. According to the Tourism Department, there are approximately 500 accommodation units in Sikkim including hotels, lodges and resorts, and guest houses.

The greatest concentration of beds is in the East District, which is estimated to have 354 units and 12,750 beds. The West District has 132 units with 2,900 beds, the South 87 units with 1,740 beds and the North, 127 units with 1,600 beds.

The majority are at the mid-range to budget level, although some properties are now catering for the high-end market including the recently opened five-star Mayfair Hotel, the Royal Plaza Hotel, the heritage Hotel Nor-Khill in Gangtok, the Norbugang Resort, Hotel Mount Panchim in Pelling as well as a few good quality resorts. Outside these tourism centres, there are few options for the tourist looking for a certain level of luxury.

A major problem for the economy of Sikkim and the employment of Sikkimese citizens lies in the fact that many of the hotels are leased to entrepreneurs from outside the state, mostly from West Bengal who usually bring in managers from other parts of India because qualified labour is not available locally.

In recent years, a number of homestays have opened with varying degrees of success. Those that are succeeding in maintaining a viable business and offer a good quality standard are within areas where there is a regular and high tourist flow and have links with intermediaries such as tour operators and travel agents. Some that have a nearby captive market such as engineers working on the hydro projects guarantee high occupancy for the duration of the project. But many homestays are failing because their facilities are not up to the standards required by tourists, they have no marketing channels to promote their services, and their ability and resources available to market are very limited.

The government also leases out accommodation units to the private sector or runs them itself. The Tourism Department leases out tourist lodges at locations of tourism importance aimed at the budget market. These are run by local communities. It is constructing other buildings, including a log hut at Memanchu Lake, with a total investment of INR 40 million. The government also plans to lease it out to the community. There are plans for a 250 room-hotel in Gangtok. The Sikkim Tourism Development Corporation runs two hotels and leases three to the private sector as well as a restaurant. The Forest Department leases one property to the private sector and has a number of other properties that can be used by the public but are mainly used to accommodate officers on official forestry business.

4.3.4 Intermediaries

Intermediaries comprise tour operators and travel agents. They are a vital link in the tourism supply chain. The Government of Sikkim has registered 128 tour operators, six of which are also recognised and registered by the central government. Many are small firms specialised in organising excursions for general sightseeing tourists. These firms tend to market at the local level as well as rely on drop in clients. There are also larger firms with a stronger marketing reach mostly through links with national and international tour operators. Along with the efforts of the Tourism Department and of a few large hotels, these firms market Sikkim outside the state.

4.3.5 Tourism infrastructure, services, and amenities

The 1998 Sikkim Tourism Development Master Plan, formulated by Tata Economic Consultancy Services for the Tourism Department, identified the need for Tourist Information Centres (TICs) in each district to be managed with the participation of the private sector, more shopping facilities for the domestic market, souvenir shops for the international market, national and international communications facilities, currency exchange facilities, improved water supply, solid waste management systems, medical facilities, improved sanitation, as well as the building of 'pay and use' toilets.

A review with Sikkim stakeholders of progress made over the past 11 years reveals that some recommendations have been achieved but many have not. Shopping, for instance, is well-developed in

Gangtok, especially at the refurbished MG Marg pedestrian area, but outside the capital the retail sector, which would interest tourists, still needs to be developed. There are some souvenir shops, particularly in Gangtok, but it is reported that many souvenirs on sale are imported from out-of-state rather than made in Sikkim. There are very few sales outlets for Sikkim craftsmen to showcase their products. The government-run Cottage Industries trains young people at several locations in Sikkim, but it is not market-oriented. TICs have been established at each district headquarters, but the private sector is not involved in their management. Communication infrastructure is now relatively good in the state, and money exchange facilities are available in the major tourist centres. Some progress has been made in the availability of water supply, waste management, medical facilities, and the sanitation situation; however, this is patchy and a lot more improvement and development is needed. For example, in Lachung in the North District where there is a hotel construction boom, a serious deficiency in sewage evacuation and treatment is causing a major problem.

In the past, the Tourism Department erected infrastructure at attractions such as cafeterias, view points, resting areas, and paths. Too often, these were not built to fit in with the environment, and inappropriate materials such as concrete were used. These created visual pollution in areas of pristine beauty. These become defaced with graffiti and are badly maintained, accumulating litter and dirt. The Tourism Department is conscious of its past mistakes, and the current policy is to build with eco-sensitivity in mind, using appropriate material and, where concrete has to be utilised, to cover it with wooden slates or local stone. However, several new structures built by various government departments seen during the field trips for this study are very large and are usually located in areas that are natural beauty. These dominate the landscape that tourists come to see, causing visual intrusion on the environment and damage to the mountainside, which is destroyed during the construction.

4.3.6 Employment and education opportunities in the Sikkim tourism sector

It is estimated that the Sikkim tourism sector employs around 20,000 people directly and indirectly. Industry stakeholders complain that the manpower available in Sikkim is not up to the standards they require. There is a government-run Hotel Management Institute, which is soon to move to a new campus. However, many of the students are from out-of-state and do not tend to remain in Sikkim on graduation. Sikkimese candidates with high potential are usually attracted to study at more prestigious colleges in India or abroad and on graduation are unlikely to return to Sikkim to pursue their career. It is also reported that there is a certain reluctance among Sikkimese youth to consider a career in hospitality, as it is perceived to be low status. As a result, there is an influx of labour from Kalimpong, Darjeeling, Nepal, West Bengal, and Bihar to man the industry.

An Adventure Tourism and Ecotourism Institute has recently been built based on a central government model. Once it becomes operational and is properly established, it will provide much needed education and training in these areas.

4.3.7 Economic impact of tourism in Sikkim

Tourism has become an important economic sector in Sikkim, and while economic impact studies have never been conducted, the Tourism Department estimates that tourist spend per head per day amounts to INR 899 for domestic tourists and INR 1,500 for international tourists. With an estimated average length of stay of 4 nights, a very rough calculation shows that direct spend should total INR 1,783 million or USD 37.25 million.

This figure does not reflect the true value of tourism's contribution to the economy of the state. The multiplier effect of this direct spend has to be taken into account. The impact on other economic sectors in Sikkim with which the tourism sector interacts, such as agriculture and construction, also has to be measured and aggregated, and the amount which leaks out of the economy through imports used in the production and operation of tourism must be deducted. This provides a better reflection of the real value

of tourism to the state.

The tourism sector in Sikkim is losing a lot of value through importing food and construction materials as well as through businesses that are in the hand of out-of-state entrepreneurs and from employing out-of-state migrant labour. Therefore, it is likely that the tourism multiplier value is very low in Sikkim.

A lot of attention is now being focused on developing the tourism sector, as Sikkim does not have the resources to develop heavy and medium industry. It can therefore only rely on light industries based on agriculture, forest resources, and tourism assets. It is important for the future of the Sikkimese economy to ensure that the tourism sector is as profitable as it can be and provides the quality products that the market requires using as much as possible resources grown or manufactured in Sikkim.

4.3.8 Tourism marketing of Sikkim

The Tourism Department has a budget of INR 10 million, or less than USD 210,000, to market the state. This is very low to be effective. Uttarakhand, for instance, received in 2006 INR 90 million from an agreed INR 140 million to market the state, and the master plan recommended a budget of INR 140 million in the first year of the promotion strategy, rising to INR 170 million by year five.

The Tourism Department spends the marketing budget on attending selected tourism trade fairs in India and abroad, on contributing funds to selected festivals organised in the state, and on advertising Sikkim as an ecotourism destination. It sometimes also contributes to familiarisation trips, known as *fam trips*, organised by the private sector for journalists and tour operators. The Tourism Department runs 15 TICs, some located out-of-state in Delhi, Calcutta, Darjeeling, Siliguri, and at Bagdogra Airport. It produces brochures and leaflets, which are distributed through the TICs and at trade fairs.

Stakeholders complain that not enough public sector resources are allocated to market Sikkim. No long-term or medium-term marketing strategy has been formulated with activities derived from annual plans based on the funds received for that year.

The private sector actively markets Sikkim through its associations as well as through individual efforts. The Sikkim Association of Adventure Tour Operators (SAATO) has organised an annual convention for the past four years. The first, located in West Sikkim, attracted 178 tour operators from abroad, and the second in South Sikkim, 190 operators. The last two meetings were held in several Southeast Asian countries and in Europe. SAATO publishes a magazine once a year, which is widely distributed, and hosts fam trips twice a year on average. The Travel Agency Association of Sikkim (TAAS) is a large organisation representing some 400 members. It attends travel fairs in India and also produces and disseminates brochures and leaflets. Hotel and resorts publicise their businesses and also attend trade fairs.

4.3.9 Competition to Sikkim

Sikkim is one of several destinations offering the Himalayan experience. Internationally, Sikkim competes with Nepal, Tibet, and Bhutan, nationally with Himachal Pradesh, Kashmir and Uttarakhand, and in the Northeast region with Darjeeling and Kalimpong in West Bengal and Arunachal Pradesh. A more detailed description of the tourism performance of each of these competitors is presented in Annex 6.

In comparison to several of its competitors, Sikkim offers a stable and peaceful environment. However, to compete effectively, Sikkim needs to offer a distinctive product, provide excellent quality, and ensure that the appropriate markets are well informed about the opportunities available to enjoy the distinctive tourism assets of the state.

4.4 Institutional management of the tourism sector in Sikkim

The importance of tourism has been recognised by the state government, and the sector has been identified as key for the Sikkimese economy. The need for conservation of both the natural and cultural environment of Sikkim is also emphasised. Therefore, the focus of tourism development must be on ecotourism rather than on mass tourism.

4.4.1 Policies that affect the tourism sector

Despite the government's commitment of encouraging the development of tourism, a tourism policy has never been drafted to provide stakeholders with a vision and a direction to follow. Although a tourism master plan was formulated in 1998, tourism has developed in a rather uncontrolled way. Tourism was included as a sector for development in the 9th and 10th Five Year Plans which focused on marketing Sikkim. In the current 11th Five Year Plan (2007-2012), the emphasis is on promoting Sikkim as an ecotourism destination and 'initiation of ecotourism in forest areas for poverty alleviation' appears in the plan for the forest, wildlife and biodiversity sector.

Two main government acts have direct impact on the tourism sector: the Sikkim Registration of Tourist Trade Act (1998), updated by the Sikkim Registration of Tourist Trade Rules (2008), and the Sikkim Wildlife (Regulation of Trekking) Rules (2005).

The Sikkim Registration of Tourist Trade Act focuses mostly on ensuring that all businesses that are involved in the tourism sector – from hotels and restaurants to travel agents – and tour guides are registered and pay a registration fee. There are very few guidelines in the act except for warning against running illegal activities on the premises, storing explosives, or, in the case of travel agents, demanding tips. Registration is currently the responsibility of the Trade Licensing Department of the Urban Development and Housing Development Department. This responsibility is in the process of being transferred to the Tourism Department.

The 2005 Regulation of Trekking Rules emphasises primarily the protection of the wildlife area. It provides guidelines on actions that are prohibited and ensures that workers employed in the field by trek managers are genuine Sikkimese subjects. It decrees that permits and fees are to be obtained and paid for before starting on the trek and provides for a series of penalties for offenders, empowering forest officers, the EDCs, and the JFMCs to detect offenses and arrest offenders if they try to abscond.

4.4.2 Public sector institutions with influence on the tourism sector

The Tourism Department is the main government department responsible for developing and managing the tourism sector. Its main responsibilities are policy formulation, tourism planning, tourism marketing and developing attractions. It is soon to take over registration of tourism businesses. The Sikkim Tourism Development Corporation runs the helicopter service from Gangtok to Bagdogra Airport as well as hotels and a restaurant but has no other influence in the sector.

The Forest Department, which controls 81% of the land in Sikkim, ensures that tourism does not cause environmental damage in the forest area. It is responsible for wildlife parks, sanctuaries, trekking areas, and other attractions in the forest. Since most of the ecotourism resources are under the jurisdiction of the Sikkim Forest Department, an ecotourism cell has been set up in the department. It is imperative that the department works in close coordination with the Tourism Department.

Several other departments manage specific areas linked to tourism such as the Cultural Affairs and Heritage Department, the Ecclesiastical Department, the Rural Management and Development Department (RMDD), and the Education Department. The Sikkim Industrial Development and Investment Department deals with loans to private entrepreneurs, and the Finance Revenue and

Expenditure Department scrutinises proposals and approves schemes. A Tourist Police Force is being introduced, and 150 officers have been approved responsible for assisting tourists.

4.4.3 Private sector institutions in the tourism sector

The main private sector institutions in the tourism sector include SAATO which has 18 members, TAAS which has more than 100 members, and the Sikkim Hotel and Restaurant Association (SHRA) with more than 400 members. These associations are quite active in the market. While there is a certain amount of communication and collaboration with government, there is also frustration that the associations' views are not often heeded and that they have little control or influence over the development of the sector.

4.4.4 Non-governmental organisations with influence on the tourism sector

There are several NGOs with activities in the field of tourism, in particular ecotourism. One of the most active organisations is the Ecotourism and Conservation Society of Sikkim (ECOSS). Its objectives are to develop and promote ecotourism for the benefit of mountain communities, increase awareness, and encourage research. It is involved in a number of projects such as the village tourism project at Rey Mindu, which develops homestays and cultural activities. There are four District Level Tourism Committees and nowadays almost every village has a Village Level Tourism Committee. The interest in participating in the Sikkim tourism sector is now very high. There are several community-based organisations (CBOs) acting as local management committees, amongst others the Dzongu Ecotourism Development Committee, the Khedi Ecotourism and Ecodevelopment Promotion Society at Pastanga, and the Uttarey Tourism Development Co-operative Society Ltd. These organisations are enthusiastic and want to work for their community, but they lack marketing knowledge and techniques.

4.4.5 Tourism development plans and projects

The Tourism Department has an active engineering department running many development projects. Major investments include the recently completed exhibition and conference complex at Saramsa on the Forest Department land that includes excellent conference facilities, landscaped gardens, a musical fountain and a stage to put on shows. Unfortunately, this facility is seriously underutilised, mainly booked for wedding parties, and there is confusion over which department should manage and maintain it. There is a need for a marketing strategy to be formulated and implemented to ensure that the exhibition and convention facilities are known to companies that organise Meetings, Incentives, Conventions and Events (MICE). The association representing these companies is the India Convention Promotion Bureau (ICPB). Other investments include the recently completed Indian Himalayan Centre for Adventure and Ecotourism at Chemchey in the South District, which will provide education and training on ecotourism and adventure tourism as well as on spas and wellness tourism.

The department has been heavily involved in developing village tourism since 2007 and has projects in five villages. Another 30 proposals will be submitted to government to develop more villages. The projects include creating homestays and village guest houses, developing interlinking footpaths in villages, illumination, and the building of toilet blocks which are designed to be used by tourists and the local community. There is also provision for capacity building programmes and exposure trips. However, with only an inclusion on the Sikkim Tourism website, marketing is left to the villagers themselves.

Other projects underway or in the pipeline include a proposal for the development of five helipads at strategic locations in the state, and the development of a number of trek routes with base camps, amusement parks, and theme parks. The department is constructing large cultural houses at Yangang in South Sikkim to reflect the culture of the six communities that live in villages of the area and these are near completion. At Rabden Tintak in West Sikkim, a recreation park is being built with tree houses, and the biggest prayer wheel in the state turned by water current. Several beautification projects and the

development of lakesides, an amphitheatre, and a number of ropeways are planned. Car parks at selected tourism attractions such as Tsomgo Lake are being created or rehabilitated. In Gangtok, the department is planning for a 250-room hotel. A plan is being proposed for the establishment of the Khangchendzonga Ecotourism Park at Naga in North Sikkim. There is also a proposal to build 12 roadside facilities, each including a cafeteria, shops, public conveniences and a garage on a 2.5 acre area of land. The department is currently seeking funds for this project and may finance two facilities itself. A technical study has been completed on the development of a skywalk at Bhaleydunga Mountain at an elevation of 10,102 feet, similar to the one that exists at the Grand Canyon in the United States. The proposal also includes hotels and a ropeway. The total value of the project is estimated at INR 12 billion, or approximately USD 250 million. However, the study does not detail payback time and return of investment.

A Tourism Master Plan has been commissioned to replace the master plan formulated by TATA Economic Consultancy Services in 1998. A team from Singapore has been selected and will start the formulation process at the end of 2009.

The engineering section of the Tourism Department received more than INR 700 million or over USD 14.5 million in 2008/09 from central government. This budget has steadily risen from 2004/05 when the department received INR 155 million or USD 3.2 million. The increase in budget is directly attributed to Sikkim's excellent tourism performance track record. Sikkim has won the award as the best performing state in the Northeast for the past seven years. The state government contributes relatively little, mostly on an ad hoc basis. The Border Roads Development Programme provides funds, which are used to develop infrastructure.

The Rural Development Department is developing the Char Dham at Solophok Hill near Namchi, a large Hindu shrine complex, which will attract the pilgrimage market, and a rural amusement park near Gangtok.

4.5 Challenges impeding the development of ecotourism in Sikkim

A number of hindrances and constraints impeding the development of the tourism sector have been highlighted in the previous sections. This section focuses mainly on the challenges of developing ecotourism in Sikkim. The following obstacles were identified during the analysis phase of this study.

4.5.1 Challenges relating to the nature of ecotourism and its social impact

- **No tourism or ecotourism policy:** Although the government is keen on developing the sector within well-defined conservation parameters, a vision creating an adequate framework within which ecotourism can become established with a clear direction to grow is missing. The ecotourism concept has been defined by international organisations and is generally accepted. However, stakeholders in Sikkim use the term 'ecotourism' to fit in with their own specific agendas. An ecotourism policy would provide a clear definition based on internationally accepted norms which all stakeholders in Sikkim would abide by. While stakeholders agree that Sikkim should be 'the ultimate ecotourism destination', which in itself represents a type of vision statement, when it comes to activities and development initiatives, there are no guidelines to help achieve this vision. This is reflected in some of the ventures that have been developed in the name of ecotourism. For instance, as previously mentioned, the Tourism Department made mistakes in the past using inappropriate materials in construction. Once built, these are poorly or not maintained at all. Annex 7 shows examples of such constructions. An ecotourism policy would provide guidelines on the materials that should be used for tourism infrastructure and insist that planning permission be sought before construction commences so that criteria defined in the policy are met.

- **Lack of understanding of the business of ecotourism by government stakeholders, NGOs, and local communities:** It is apparent that many stakeholders advocating the development of ecotourism are unclear about the realities of the sector, the requirements of demand for this tourism product, and the importance of developing a strong chain linking supply with demand. Many consider ecotourism to be a social net that will alleviate poverty without understanding that ecotourism is first and foremost a business that follows commercial objectives. To provide benefits for local people, ecotourism has to return a large enough profit to be sustainable. This means providing the products at the appropriate quality level that tourists will purchase, building relationships with partners, and formulating and implementing marketing strategies.
- **NGOs are naive about the impact that ecotourism will have on the well-being of local communities:** Many NGOs encourage local communities to set up ecotourism businesses or services and build up their expectations in the hope that tourism will bring a steady income. They provide training and mentoring and may also be in a position to access funding to help them develop the products such as setting up homestays and guiding services. They often pick communities in areas with little income generation opportunities but with ecotourism potential thinking that tourists will come if the local community is ready to serve them. Usually these are not established tourism destinations. They need to be developed, adapted to the expectations of the markets that the destination can potentially attract, and then properly marketed. Establishing a tourism destination is a process that takes time and requires investment and strong marketing which neither the NGOs nor the local communities generally have. They focus too much on building up supply but not on developing demand. When demand fails to materialise, the product on which so much expectation has been placed deteriorates through lack of use and maintenance. The local communities become disillusioned and abandon their ecotourism aspirations. The Tourism Department's current village tourism strategy is increasing the number of villages offering ecotourism products. The marketing component, however, is being totally ignored and supply is being increased, creating competition amongst villages and lowering profitability.
- **The ecotourism market is relatively small – for the purposes of this project, the concept should be expanded to include adventure tourists as well as general leisure tourists interested in the nature of Sikkim:** Ecotourism can be enjoyed by different categories of tourists, from adventure tourists who want to enjoy a physical experience in nature, leisure tourists who want to spend time in a natural environment, see stunning sights, spot wildlife and interesting flora, and interact with local communities, to the special interest visitor who will specifically visit an area where the object of his or her special interest can be studied. Therefore, focusing solely on tourists that will visit villages and stay with families is very narrow and limits the market to aim for. The majority of visitors to Sikkim are leisure tourists, and their requirements should be understood. They should be offered products that will suit them, for instance, day excursions to villages where they can enjoy the village experience and return to their hotel at the end of the day, or opportunities to stay in comfortable accommodation suitable for their families in a natural environment.
- **The opportunities to alleviate poverty through tourism are not properly exploited:** In Sikkim, the focus seems to be entirely placed on encouraging local communities to establish and run tourism enterprises. There are a number of other ways of involving the poor in the sector to allow them to generate benefits from tourism and these are not being properly exploited in Sikkim. Annex 5 presents the different ways that the poor can benefit from the tourism sector.
- **Data is unreliable, and no impact studies are carried out:** There is little understanding at the Tourism Department and at the Forest Department of the impact of introducing ecotourism on local communities. There should be regular assessments of ecotourism initiatives and projects. A market research division needs to be created at the Forest Department to monitor and measure ecotourism.

4.5.2 Challenges relating to facilitation

- **Several permits are required to visit Sikkim and certain areas within the state – some areas of tourism interest are out of bounds to foreign visitors:** The procedures to obtain the permits are poorly publicised, and missions abroad are not aware of them so are unable to issue permits. To travel around Sikkim, several permits have to be obtained from different offices especially to visit the North and certain areas in the East. There is no single location where all permits can be issued, and tourists have to find out for themselves where these can be delivered. The establishment of a ‘single window’ facility is in the Tourism Department’s five-year plan. The Tourism Department plans to continue lobbying government for the relaxation of permits. Foreigners visiting the north must travel at least in a pair, which excludes individual travellers. Certain areas are out of bounds to foreigners but not to Indians.
- **Movement of vehicles within Sikkim is restricted:** Although there has been some easing of restrictions with the introduction of the luxury car rule, vehicles carrying tourists should be allowed to travel around the state without limitation. Tour operators should be allowed to operate coaches. Currently only government coaches are allowed.
- **Connectivity can be interrupted:** Sikkim is dependent on Bagdogra Airport for connectivity to the rest of India, and there are only three entry points for Indian visitors and two for foreign visitors. Visitors are sometimes impeded in their travel to the state because of landslides on the roads or political unrest and strikes in West Bengal. Strikes in Darjeeling effectively traps tourists and residents of Sikkim. The only way out is the helicopter service to Bagdogra Airport, which has limited capacity. Tourists unable to find a seat are doomed to miss their flights or their train connections. This uncertainty is disastrous for Sikkim tourism and will certainly deter tourists from selecting the destination.

4.5.3 Challenges relating to the business of ecotourism

- **Very weak marketing for village tourism initiatives – no marketing links with industry partners:** Tour operators in Gangtok are unaware of the opportunities that are available to include village tourism in their product offer and how they can reserve homestays that are suitable for their business. There have been cases where NGOs have advised local communities not to trust tour operators because they take commission. The reality is that if the village is not located in an area where there is a strong flow of tourists, then they need to be linked with operators who have direct connection with the market. The local tourism management committees do not have the resources or the capability to promote village products in a highly competitive market place.
- **Quality of homestays is often not up to standard:** Although homestays can be relatively simple, they have to meet certain criteria and quality standards before tour operators will include them in their package. A Delhi tour operator who specialises in offering tours staying at homestays all around India was invited to Pastanga to see if he would include the homestays there in his portfolio. Unfortunately, none were considered up to standard. Other homestays that were visited during this study do not have bathrooms, and tourists have to share facilities with the rest of the village.
- **Tariff of homestays in Sikkim is high:** Homestay tariffs are high in Sikkim compared to other parts of India and even neighbouring countries like Nepal. They are pricing themselves out of the market, which makes them uncompetitive. A pricing policy appropriate to the market that will be attracted to this type of tourism should be adopted, and prices should be broken down into their components rather than prices quoted for packages of services.
- **Difficulty of organising cultural shows:** One of the main cultural attractions in Sikkim is the colourful folklore performances of local indigenous people. However, there are few opportunities for tourists to see these. It is difficult for tour operators to organise performances at short notice as there are few, if any, associations.
- **Lack of opportunities to buy souvenirs and handicrafts – handicrafts are not produced**

with tourists needs in mind: There are very few places where tourists can buy souvenirs, and the ones that exist are located in Gangtok. Although many villagers are producing handicrafts, and the government is providing training through Cottage Industry centres, handicrafts are generally not suitable for tourists to bring back; for instance, large carpets or Tibetan tables are impossible to bring home. There is a need for sales outlets at villages or at information centres, and for capacity building in design and in production of handicrafts that are suitable for tourists.

- **No appropriate interpretation centres and orientation centres:** While there are a number of TICs run by the Tourism Department, there are no interpretation centres at locations of tourist interest to explain the site and to present the stories linked to the site. Kapi, for instance, is the most important site in the history of Sikkim. There is a sign board, but an interpretation centre would succeed in attracting tourists to stop and learn about the area. It would be a good opportunity to present the other attractions and facilities available in the area as well as the treks and nature walk starting in Kapi and the homestays where tourists could find accommodation. Food and drink could be sold in an attached cafeteria with clean public conveniences for visitors to use. There could also be a retail section where local handicrafts would be available. At Mangan, an orientation centre would be appropriate to explain to visitors arriving in the main city of the North what there is to see and do in the district, for instance the attractions at Lachung, Lachen, and Dzongu.
- **No appropriate museums:** There are no museums at local levels to explain the history of the area and present the way of life of its inhabitants and the natural assets that can be seen. It would be of great interest to tourists to spend time learning about the background of the area they are visiting. It would also generate income from entrance fees.
- **Capacity building is necessary:** Capacity building of stakeholders about tourism and ecotourism is necessary. This includes officials from the Forestry Department, the Tourism Department, and other related departments, particularly those that have been seconded from other government services. The capacity building programme should include members of other organisations at the local level such as the EDCs and the JFMCs. Private sector service providers such as taxi drivers must be sensitised about their responsibilities towards protecting the environment and informing their clients. There is a need for more capacity building of hospitality workers, homestay owners, guides, etc.
- **Leakages:** The tourism and ecotourism sector use too many imported goods and employ too many workers from outside the state, thus reducing the benefits to Sikkim's economy.

4.5.4 Challenges relating to general infrastructure and tourism infrastructure

- **No control or planning of tourism development and inappropriate building of tourism infrastructure:** There is too much construction of tourism infrastructure around the state, which is causing visual pollution and environmental damage. Even infrastructure built within the last five years is poorly maintained and a blight on the landscape. Annex 7 shows tourist amenities that were inaugurated in 2006 and are already very run down. This is the result of poor construction using inappropriate building materials rather than poor management.
- **Roads need improvement:** Although roads are improving, there is still a long way to go, particularly on the smaller roads. They are prone to landslides, and many are not carpeted. Signage, particularly to tourist attractions and sites, is lacking.
- **Few roadside facilities:** There are very few places on the main roads of Sikkim able to cater for a group of tourists. Ideally, there should be a facility every two to three hours where travellers can buy food and refreshments, use the facilities, shop, and rest. The Tourism Department is planning 12 such facilities, but until now they have not secured funding for their construction.
- **Few public conveniences and 'pay and use' toilets:** There are few public conveniences and very few 'pay and use' toilets. Those that exist are poorly or not maintained at all, even the 'pay and use' facilities, and leave visitors with a very bad impression of Sikkim.
- **Congestion and damage on popular trekking routes:** The more popular trekking routes, such as the Dzongri trek in West Sikkim, are showing evidence of damage because of the sheer

number of trekkers. Congestion is also ruining the ecotourism experience of trekkers who do not want to be visibly following or be followed by other trekking groups. To relieve this situation, other trekking routes need to be scoped and developed.

- **Environmental clean-up in nature areas is urgently required:** On trekking routes, at nature sites, and even at sanctuaries that are protected, there is evidence of littering. At Yumesamdong, also known as Zero Point, which is a destination at nearly 5,000 m, there is a lot of litter which ruins the experience of this magical place. Annex 7 shows the situation.
- **Waste management in tourist areas and at tourist sites is urgently required:** A management system needs to be introduced at areas where tourism is starting to cause a strain. Lachung, for instance, has a serious sewerage problem which needs to be resolved.

CHAPTER 5 Development needs and income generation in forest areas

This chapter gives an overview of the development needs of forest fringe communities in Sikkim and describes the challenges and opportunities related to their livelihoods and their income generation activities that were identified by the study team. The study team conducted thematic group discussions with 289 people in the four districts in Sikkim. The questionnaire surveys and key informant interviews included questions on perceptions of infrastructure, social services, livelihoods, forest products, and development needs from 118 respondents. The analyses presented here are based on the anecdotal perception of the respondents.

5.1 Development needs

5.1.1 Livelihoods

This section attempts to discover the current situation of livelihoods in Sikkim. The study collected various information related to livelihoods: source of income, agricultural land holding, agricultural and horticultural production, livestock, the source of energy, the source of funds, the source of information, and utilisation of forest products. The results revealed the following

- About a half of respondents answered that their major income comes from farming.
- Almost all the respondents own their land and mostly cultivate it themselves.
- Ginger, potato, and large cardamom are the major commercial crops.
- More than a half of the households generate income from livestock.
- People rely heavily on fuelwood (99%) as a source of energy for cooking.
- People use personal funds, money lenders/traders, or relatives as sources of funds.
- Panchayat and Dzumsa are commonly used as information sources.
- People collect fuelwood, fodder, and litter/leaves from forests.

(1) Source of income

Table 5-1 shows that 46% of the respondents replied that their major income came from farming. In North, South and West Districts, farming is the largest source of household income. Government employment is the major source of income in the East, where the district capital of Gangtok is located. Other sources of income include wage labour⁵⁴, small business, and animal husbandry.

Table 5-1 Major sources of household income of respondents

Site	Farming	Government job	Animal husbandry	Wage labour	Small business	Other	Total
East	19%	54%		4%	12%	12%	100%
North	50%	21%	8%		13%	8%	100%
South	71%	3%	19%	3%		3%	100%
West	41%	8%	16%	24%	5%	5%	100%
All	46%	19%	12%	9%	7%	7%	100%

Note: Number in bold indicates the percentage of respondents that chose the most frequently selected response.

Source: Study team

⁵⁴ One example of a government scheme is the central government's employment scheme sanctioned by the National Rural Employment Guarantee Act 2005 (NREGA), which provides opportunities to individuals for 100 days of unskilled wage labour at the minimum wage rate. In Sikkim, the wage rate is INR 100 per day. Under the scheme, all adult members of a rural household are given this opportunity. (<http://www.solutionexchange-un.net.in/NREGA/FAQs.html#1>)

(2) Agricultural land holding

In Sikkim, land is legally registered in the owner’s name. As shown in Table 5-2, more than 75% of the respondents cultivate only their own land in all the Districts.

Table 5-2 Status of agricultural land holding

Site	Cultivation of own land	Cultivation on rental land (Type of rental arrangement)	Ratio
East	Yes	Yes (Sharecropping)	4 %
	Yes	Yes (Fixed rental fee)	4 %
	Yes	No	73 %
	No	No	19 %
Total			100 %
North	Yes	No	88 %
	No	No	13 %
Total			100 %
South	Yes	Yes (Sharecropping)	16 %
	Yes	Yes (Fixed rental fee)	10 %
	Yes	No	74 %
Total			100 %
West	Yes	Yes (Sharecropping)	24 %
	Yes	Yes (Fixed rental fee)	5 %
	Yes	No	68 %
	No	No	3 %
Total			100 %

Note: Numbers in bold indicate the percentage of respondents that chose the most frequently selected response.

Source: Study team

About one third of the respondents cultivate rented land either on a sharecropping or a fixed rental fee basis together with their own land in the South and West. Sharecropping, in which the landlord and tenant share the outputs of agricultural production according to an agreed ratio, is commonly practiced in Sikkim. Another tenancy arrangement is the fixed rental fee arrangement, where the tenant pays a fixed rent at the end of each production period. Under this system, all production risks are borne by the tenant while the landlord is risk-free. This is rarely practiced in Sikkim with the exception of small landholders with excess labour for farming.

(3) Agricultural and horticultural production

Table 5-3 describes commercial agricultural and horticultural production by the surveyed households. Ginger, potato and large cardamom are the major commercial crops at the survey sites. Respondents in the East, South and West reported that large cardamom had been their main source of cash income. However, its production has declined significantly due to cardamom diseases in the last few decades. Therefore, more than a half of the respondents reported that ginger and potato are now the major products for income generation. It is also reported that pests and diseases of maize, ginger, potato, and other vegetables are causing crop damages. In the North, cardamom and ginger cannot be grown due to its cold climate conditions. Apple is the major fruit grown in the North, but productivity has been declining for the past a few years.

Table 5-3 Commercial agricultural and horticultural production

(% to total number of households surveyed at each sample site)

Site	Ginger	Potato	Large Cardamom	Vegetables	Fruits	Maize	Flowers
East	27%	4%	31%	4%			4%
North		42%		13%	21%		
South	32%	26%	10%	10%	3%	10%	
West	38%	16%	5%	3%		5%	5%
All	26%	21%	11%	7%	5%	4%	3%

Source: Study team

Table 5-4 presents the percentage of respondents growing agricultural and horticultural crops for household consumption. Maize, flowers, vegetables, potato, and fruits are the major crops for domestic consumption. Maize is the most commonly produced crop at all the sample sites. In the North, none of the respondents are growing rice or pulses due to the cold weather in the region. Instead, maize and wheat are the main crops.

Table 5-4 Agricultural and horticultural crops for household consumption

(% to the total number of households surveyed in each sample site)

Site	Maize	Flowers	Vegetables	Potato	Fruits	Wheat	Tomatoes	Rice	Pulses
East	62%	54%	65%	50%	46%	27%	27%	50%	15%
North	88%	71%	50%	13%	58%	83%			
South	84%	90%	48%	35%	39%	6%	39%	6%	16%
West	92%	81%	73%	62%	32%	35%	43%	43%	43%
All	82%		60%	42%	42%	36%	30%	26%	21%

Source: Study team

(4) Livestock

73% of respondents answered that they earn their income from livestock⁵⁵, indicating that animal husbandry is also an important means of income generation. The West has the highest rate of households (86%) that practice animal husbandry for income generation. Table 5-5 shows the percentage of respondents who selected each livestock animal as their first and second major sources of income.

Table 5-5 Types of major livestock for income generation

(% to total number of households surveyed at each sample site)

Site	Cow		Goats		Pigs		Chicken		Yak		Ox	
	First source	Second source	First source	Second source	First source	Second source	First source	Second source	First source	Second source	First source	Second source
East	47%	12%	35%	24%	6%	6%	12%	29%				
North	92%	15%						15%	8%	8%		23%
South	100%			63%		4%		4%				8%
West	72%		9%	31%	13%	28%	3%	16%				6%
All	78%	5%	10%	37%	6%	14%	3%	17%	1%	1%		

Note: Respondents were asked to choose two major livestock animals which generated income.

Source: Study Team

⁵⁵ The answers to one survey question indicated that, in the East 65%; North 54%; South 77%; and West 86% of respondents generate income from livestock.

Cows are the most common source of cash income in all the sites, followed by goats, pigs, and chicken⁵⁶. Cows are preferred to other livestock because they can be used in multiple ways: for production of manure, milk, and dairy products. Some respondents mentioned that they prefer goats to pigs because they reproduce more quickly than pigs. Thus, they can derive income within a shorter time span from goats. There is a cultural taboo attached to owning and rearing pigs among people of the Brahmin and Chettri groups. Thus, income generation from pigs is negligible in the East and South.

(5) Source of energy

Table 5-6 shows the percentage of surveyed households that use each type of energy source for cooking⁵⁷. The respondents rely heavily on fuelwood. LPG is another major source of cooking energy at the survey sites. However, respondents use LPG only during the summer season, and annual consumption is approximately two to three cylinders. According to respondents, consumption of LPG is constrained by its high price and unavailability. A few households in the East and South use biogas. A household in the East reported that one biogas plant⁵⁸ produced enough gas for preparing three meals a day for a five-person household.

Table 5-6 Sources of energy for cooking

(% to total number of households surveyed in each sample site)

Site	Fuelwood	Dung	LPG	Biogas
East	100%		77%	8%
North	100%	4%	100%	
South	97%	3%	52%	6%
West	100%		62%	
All	99%	2%	70%	3%

Source: Study team

Table 5-7 shows the percentage of respondents paying for energy for cooking. Fuelwood is purchased by the majority of the respondents from their relatives, neighbours, or the Forest Department, since the collection of fuelwood from reserved forests is prohibited. This implies that the respondents' demand for fuelwood exceeds the supply available from their private lands.

Table 5-7 Sources of energy purchased by respondents

(% to number of households surveyed in each sample site)

Site	Fuelwood	Dung	LPG	Biogas
East	62%	8%	73%	
North	83%	4%	96%	
South	55%		55%	
West	70%		57%	
All	67%	3%	69%	0%

Source: Study team

The majority of the respondents in the West buy fuelwood because most of them are wage labourers who have very little private land to fulfill their demands of fuelwood.

⁵⁶ Cow milk, cheese, and butter are examples of products sold by the respondents. Goats provide milk and meat, while chickens are used for selling meat and eggs. Oxen are used for meat and rented to others for ploughing.

⁵⁷ Kerosene is not included because, among the surveyed respondents, kerosene was used only to light lamps in the absence of electricity and for lighting fuelwood, and not for cooking purposes.

⁵⁸ Biogas plants were installed in about twelve households including some of the respondents' in a village roughly four years ago by Khadi and Village Industries Commission (KVIC). KVIC is a statutory body under the Ministry of Micro, Small and Medium Enterprises, Government of India, charged with planning and implementation of village industries development programmes (http://update.kvic.org.in/activities_biotechnology.htm).

Data also shows that the majority of respondents want to use following energy sources if they could afford it: LPG, fuelwood, and Biogas. Since a biogas plant does not function in cold weather, people are willing to purchase it if the improved technology overcomes its drawback.

(6) Source of funds

The major source of funds for personal requirements in the four survey sites are either personal funds, relatives, or money lender/trader⁵⁹ (Table 5-8). This indicates that respondents rarely borrow from banks. Many expressed reluctance to borrow from banks due to their high interest rates. The members of Self Help Groups (SHG) tend to borrow from their respective SHG.

Table 5-8 Sources of funds of respondents

(% to total number of households surveyed in each sample site)

Site	Own money	Relatives	Money lender/trader	Self Help Group	Loan from banks	Neighbours
East	73%	42%	19%	15%	8%	
North	75%	46%	54%		25%	
South	81%	74%	32%	58%	6%	
West	62%	81%	46%	19%	19%	
All	72%	64%	38%	25%	14%	0%

Source: Study team

The results indicate that the majority of the people tend to avoid investment for their own business. Moreover, households procure loans mainly for the construction of houses, medical treatment, and education.

(7) Source of information

Table 5-9 indicates that the Panchayat is the main source of information on government schemes and projects in the East, South, and West. 'Other', chosen by all respondents in the North, refers to Dzumsa, a traditional local governance system. Government schemes are implemented through the Panchayat or the Dzumsa at the local level. Thus, the local governments play an important role in the dissemination of relevant information and in increasing local residents' engagement. Thus, involving the Panchayat member into FMC, EDC, and PSSs is the key factor in order to ensure the sustainability of the intervention.

Table 5-9 Sources of information on government schemes and projects

(% to total number of households surveyed in each sample site)

Site	Panchayat	Radio/TV	Neighbour	Government officials	Other	Total
East	54%	15%	4%	23%	4%	100%
North					100%	100%
South	97%			3%		100%
West	92%			5%	3%	100%
All	66%	3%	1%	8%	22%	100%

Source: Study team

⁵⁹ In the North, many respondents mentioned the head of the local monestery as their money lender. According to them, the region has a traditional money lending system through which the monastery lends money at a certain rate of interest.

(8) Utilisation of forest products

Table 5-10 shows the percentage of respondents collecting each type of forest product from their private lands for their own consumption. The results indicate that assistance to the agriculture sector including animal husbandry will have considerable impact on livelihood development in the area. Fuelwood, litter/leaves, and fodder are collected at high frequency. Other products collected include wild edibles, medicinal plants/herbs, bamboo stems and bamboo shoots. Since engaging in income generation activities utilising products from reserved and state forests is prohibited (FEWMD, 1988a), the survey focused on collection from private lands.

Table 5-10 Forest products collected by respondents for own consumption

(% to total number of households surveyed in each sample site)

Site	Fuelwood	Litter/ leaves	Fodder	Wild edibles ²	Bamboo stems	Medicinal plants/ herbs	Bamboo shoots	Other
East	88%	73%	81%	54%	81%	54%	46%	
North	92%	79%	71%	100%	38%	54%	25%	4%
South	97%	97%	90%	68%	81%	71%	81%	3%
West	97%	89%	89%	68%	76%	59%	43%	
All	97%	86%	84%	71%	70%	60%	50%	2%

Note: Examples of wild edibles include edible ferns, stinging nettle, wild mushrooms, and cane shoots.
Source: Study team

Information on the collection of forest products from private lands for sale was difficult to obtain. Respondents seemed reluctant to provide the information most likely because the extraction of forest products from reserved forests is prohibited, and even the extraction from private forests requires permission from the Sikkim Forest Department. Nonetheless, according to observations and informal interviews with stakeholders, the members of forest-fringe communities generate income by selling timber or wild edibles collected from their private lands. For example, in the North juniper and rhododendron are collected for production of incense.

5.1.2 Development needs

This section examines the development needs raised by the respondents. Development needs in general and in farming are discussed to consider further intervention. The results can be summarised as follows

- The provision of employment opportunities for youth and the construction and improvement of roads are the priorities.
- Diseases/pests are the most severe issue in farming.
- The improvement of socioeconomic infrastructure such as roads and water is highlighted.

(1) General development needs

Table 5-11 shows the development needs identified by the respondents. The respondents were asked to select four urgent needs out of a predetermined list of choices and to rank them by priority. Choices include employment, road, water, water for agriculture, electricity, education, health, common facilities, garbage and others.

‘Employment opportunities for youth’ and ‘more roads and road improvement’ rank at the top for both in the East and North. Residents of the East emphasised that the improving the connectivity of roads is of higher priority than upgrading them. In the North, since the high rate of school dropouts among youth was observed, the employment opportunities gained the highest attention. In the South, many

Chapter 5 Development needs and income generation in forest areas

ranked 1) support for agriculture and animal husbandry⁶⁰ and 2) cure for diseases and pests of cardamom and vegetables as their top priority, followed by ‘employment opportunities for youth’. Respondents in the West ranked ‘safe drinking water’ as their most essential need.

The results demonstrate that respondents feel the strongest need to improve their livelihoods by creating more employment and by enhancing existing income generation activities such as agricultural and horticultural production or animal husbandry. In addition, roads are perceived by the respondents as a vital infrastructure both for their daily lives and for economic activities such as commerce and tourism.

Table 5-11 Important development needs identified by respondents

Site	Choices	Rank 1	Rank 2	Rank 3	Rank 4
East	Employment opportunities for youth	23%	19%	23%	
	More roads & road improvement	46%	15%	8%	8%
	Safe drinking water	8%	8%	15%	
	Water source for agriculture	4%	19%		12%
	Availability of electricity			4%	
	Better access to education	8%	4%	4%	12%
	Improvement of education service		8%	4%	15%
	Better access to health service	8%		19%	4%
	Improvement of health service	4%	15%		
	Common facilities		4%	12%	
	Garbage measures		4%		12%
	Other		4%	8%	23%
	Total		100%	100%	100%
North	Employment opportunities for youth	29%	8%	8%	4%
	More roads & road improvement	21%	13%	8%	
	Safe drinking water		8%	8%	
	Water source for agriculture				
	Availability of electricity	4%	13%	4%	8%
	Better access to education	13%	4%	13%	21%
	Improvement of education service	4%	4%		
	Better access to health service	17%	21%	13%	8%
	Improvement of health service	13%	21%	17%	8%
	Common facilities			4%	4%
	Garbage measures		4%	8%	21%
	Other		4%	13%	13%
	Total		100%	100%	100%
South	Employment opportunities for youth	19%	6%	19%	
	More roads & road improvement	13%	6%	3%	
	Safe drinking water	16%	3%		
	Water source for agriculture	10%	26%		3%
	Availability of electricity	3%	10%	10%	
	Better access to education			10%	3%
	Improvement of education service		3%	3%	10%
	Better access to health service	3%	3%	3%	6%
	Improvement of health service	6%	3%	10%	6%
	Common facilities		10%	6%	6%
	Garbage measures			6%	10%
	Other	29%	23%	10%	13%
	Total		100%	100%	100%

⁶⁰ Support includes the introduction of new breeds, provision of saplings, and establishment of collection centres.

Table 5-11 Important development needs identified by respondents (continued)

Site	Choices	Rank 1	Rank 2	Rank 3	Rank 4
West	Employment opportunities for youth	3%	5%	5%	3%
	More roads & road improvement	11%	14%	5%	5%
	Safe drinking water	30%	3%	8%	
	Water source for agriculture	5%	14%	3%	
	Availability of electricity	5%	19%	5%	3%
	Better access to education	16%	8%	5%	
	Improvement of education service	14%	11%	11%	11%
	Better access to health service		3%	8%	5%
	Improvement of health service		3%	8%	8%
	Common facilities	3%		19%	8%
	Garbage measures	3%	3%	5%	11%
	Other	11%	14%	5%	11%
	Total		100%	100%	100%

Numbers in bold indicate the percentage of respondents that chose the most frequently selected response.

Source: Study team

(2) Development needs in farming

Table 5-12 shows the major issues related to farming faced by the respondents. ‘Diseases/pests’ was ranked first by the highest proportion of the respondents in the East (35%), South (71%) and West (59%), reflecting the severity of problems they have experienced due to cardamom diseases and the consequent decline in cardamom production in the regions.

Table 5-12 Major issues in farming faced by respondents

Site	Issues in farming	Rank 1	Rank 2
East	High transportation costs to market	9%	4%
	Price fluctuation	17%	17%
	Diseases/pests	35%	9%
	High cost of cardamom replantation	4%	13%
	Scarce wage labour	4%	4%
	Out-migration to cities		
	Water availability	4%	4%
	Non-availability of chemical fertilizer/pesticide		9%
	Other	26%	26%
	Don't know		13%
Total		100%	100%
North	High transportation costs to market	43%	22%
	Price fluctuation	4%	4%
	Diseases/pests	13%	26%
	High cost of cardamom replantation		
	Scarce wage labour		4%
	Out-migration to cities		4%
	Water availability		
	Non-availability of chemical fertilizer/pesticide	30%	9%
	Other	9%	22%
	Don't know		9%
Total		100%	100%

Table 5-12 Major issues in farming faced by respondents (continued)

Site	Issues in farming	Rank 1	Rank 2
South	High transportation costs to market	6%	3%
	Price fluctuation		
	Diseases/pests	71%	23%
	High cost of cardamom replantation		3%
	Scarce wage labour		6%
	Out-migration to cities		
	Water availability	10%	6%
	Non-availability of chemical fertilizer/pesticide	6%	32%
	Other	6%	6%
	Don't know		19%
Total		100%	100%
West	High transportation costs to market	5%	5%
	Price fluctuation	3%	
	Diseases/pests	59%	11%
	High cost of cardamom replantation		3%
	Scarce wage labour	3%	
	Out-migration to cities		
	Water availability	14%	8%
	Non-availability of chemical fertilizer/pesticide	5%	54%
	Other	11%	16%
	Don't know		3%
Total		100%	100%

Note: The respondents were each asked to select two major issues out of a predetermined list of choices and to rank them in order of importance. Only farmers answered this question. The number of respondents in each district are: East: 23, North: 23, South: 31, and West: 37
Source: Study team

In the North, the highest share of respondents reported 'high transportation costs to market' as being the most significant issue, followed by 'diseases and pests', indicating the need to provide easier access to markets.

'Non availability of chemical fertilizer/pesticide' was also ranked as the first and second priorities by a fair number of respondents in the North, South, and West. This reveals the dilemma farmers face for not being able to use chemical fertilizers or pesticides against diseases and pests.

Approximately one-third of the respondents in the East chose the 'other' option as the second important issue, citing the tendency of community members to depend on government subsidies⁶¹. This implies that a decrease in production and income could accelerate dependency on government schemes.

In short, the survey revealed that the communities' development needs lie in the empowerment of forest-fringe communities for the purpose of becoming self-reliant in their livelihood maintenance and forest conservation. Therefore, further investment in human resource development and the capital base is necessary to achieve the economic stability of and livelihood improvement in the forest fringe communities.

⁶¹ Subsidies are provided through such central government schemes as the Targeted Public Distribution System (TPDS), which allows BPL households to purchase items such as food grains, sugar, edible oil, and kerosene at subsidized rates. (<http://indiabudget.nic.in/es97-98/chap54.pdf>).

5.2 Income generation activities in forest fringe communities

5.2.1 Major stakeholders and SHG

(1) Major stakeholders for promoting income generation activities

In 1999, the central government launched the Swarna Jayanta Gram Swarojghar Yozana (SGSY) scheme to SHGs in Sikkim to create opportunities for self employment and to improve their living standards. Under the scheme, people are organised into SHGs. They are provided subsidies, training, and are linked with banks. In addition, micro infrastructure such as rural marketing centres is constructed (Panchayat Raj in Sikkim and others). Key informant interviews revealed that, in addition to the Forest Department, various institutions such as Rural Management and Development Department (RMDD), Horticulture and Cash Crops Department, Directorate of Handicraft and Handlooms (DHH), Panchayat, Social Justice and Welfare Department, and NGOs have formed SHGs and have been supporting them.

a) Department of Rural Management and Development (RMDD)

The RMDD is implementing the above-mentioned SGSY, a central government financed-scheme aiming at livelihood improvement of the poor through creating employment. For the implementation of the scheme, RMDD encourages the poor to form SHGs and provides grants for starting up revolving funds to those groups that have already completed six months of activities. If the operation of the revolving fund is judged satisfactory, the RMDD may provide a second batch of start-up funds six months after the provision of the first batch. In Sikkim, 2,201 groups have been formed since the inception of the SGSY in 1999, and 1,518 SHGs have received start-up grants from the RMDD, amounting to INR 12.3 million. In addition, 614 groups have received subsidies worth a total of INR 60 million to take up economic activities. The RMDD provides orientations and training courses for such skills as computer skills, driving skills, and knitting, targeting SHG members (RMDD, personal communication, July 3, 2009).

The RMDD also conducted a baseline study through which it built poverty maps to produce disaggregated state-level poverty statistics. This study revealed the locations of poverty hotspots where the poorest of the poor, or those living below poverty line (BPL), live. The results of the poverty mapping are presented in Annex 1.

b) Horticulture and Cash Crops Development Department

The Horticulture and Cash Crops Development Department supplies SHGs with seeds, seedlings, bulbs, and rhizomes of orange, guava, orchid, lily, rose, among others. According to the Department, it also provides training on seed sowing. However, since none of the SHGs answered that they have received the training, the Department needs to strengthen their provision of technical support. (Department of Horticulture and Cash Crops Development Department, personal communication, July 7, 2009)

c) Directorate of Handicraft and Handlooms (DHH), Lachung, Government of Sikkim

The DHH Lachung in the North has been providing a two-year skills training program on traditional handlooms such as carpet-weaving, blanket-making, and production of a local quilt called *gyaba*. Currently, DHH Lachung has 13 trainees. According to the Director, most trainees who have completed the training have not been able to put the skills they acquired into practice for income generation due to the limited size of the handicraft market in Lachung.

d) Panchayat

Panchayats support SHGs by organizing exhibitions for displaying and selling SHG products (RMDD, n.d.) They also provide funding for other general SHG activities.

e) Banks

Major banks such as State Bank of India, Central Bank of India, Union Bank of India, United Bank of India, Bank of India, United Commercial Bank and SISCO bank are linked with the SGSY programme and provide loans to individuals and SHGs.

f) NGOs

Some NGOs are actively involved in income generation activities in Sikkim. Himali Vikash Sansthan and Voluntary Health Association of Sikkim have formed SHGs and provide support for skills development and economic empowerment. Training on 1) bookkeeping, 2) record keeping, 3) account keeping, 4) maintenance of cash ledgers, and 5) bank subsidies have been organised exclusively for SHGs (Senior Programme Officer, Voluntary Health Association of Sikkim, personal communication, July 28, 2009).

(2) SHGs

No income generation activities have been systematically implemented by the members of JFMCs, EDCs, and PSS's in Sikkim. Most of the activities are carried out by CBOs with government and NGO support. Some activities are implemented by SHGs.

a) Structure

SHGs have been formed through government initiatives, and their income generation activities have been documented⁶² (DESME, 2006; Lama, 2001). At present, a total of 2,116 SHGs have been formed in Sikkim (RMDD, personal communication, July 3, 2009). SHGs consist of roughly ten members for each group. An SHG consists of an Executive Body and a General Body. The functions of the Executive Body are to maintain records and a bank account in a transparent manner. The Executive Body is usually formed with a President, Vice President, Secretary, and Treasurer, all of whom are the elected representatives of the General Body. However, the composition of the Executive Body can be modified according to the conditions specific to each SHG.

b) Funds

There are a number of ways for SHGs to obtain funds to finance or invest in their commercial activities. One SHG opened a bank account to manage their funds with monthly contributions of INR 30 from all the members. Another reported having received INR 14,000 from its Panchayat as an initial deposit. In other cases, SHGs obtained a grant of INR 5,000 from the Sikkim Rural Development Agency (SRDA)⁶³ with a collateral of INR 5,000 kept in their bank account. Some SHGs provide small loans to their members at a nominal rate⁶⁴.

⁶² One interview was conducted at the questionnaire survey site in the East District and another at the Stakeholder Meeting site in the West District. A telephone interview was conducted with a member of SHG in the South District. This interviewee was a participant of the Stakeholder Meeting in the South District.

⁶³ SRDA is under the Department of Rural Management and Development, Government of Sikkim.

⁶⁴ One SHG interviewed was providing loan at the monthly interest rate of 1%.

c) Training

Ten percent of the SGSY budget is allocated to training. Immediately after the formation of groups, they are trained on various skills required to conduct income generation activities such as computer skills, driving, and knitting. Other skills development courses are also provided to develop the minimum skills for self employment. Prior to the disbursement of the sanctioned subsidy amount to SHGs, they are given training on marketing, the selection of income generation activities, accounting, product pricing, and working with banks (Panchayat Raj in Sikkim).

5.2.2 Activities

Most of the income generation activities carried out in Sikkim are based on agriculture, horticulture, animal husbandry and dairy science, and handicrafts (DESME, 2006). Income generation activities conducted by CBOs are comparatively wider in range than those carried out by SHGs. Some of the activities and their products are listed below:

- Agriculture: maize, pulses, finger millet, buckwheat, and soybean
- Horticulture: vegetables, fruits, cash crops such as large cardamom, ginger and turmeric, and tuber crops such as tapioca, yam, and potato
- Animal husbandry: cows, pigs, chicken, ox, goats, yak, and dzo (a hybrid of yak)
- Dairy science: cheese, milk, butter, meat, renting for ploughing, and eggs
- Non-timber forest products (NTFPs): edible ferns, wild mushrooms, stinging nettle, and medicinal plants⁶⁵
- Handlooms and handicrafts: carpet, cane and bamboo baskets, broom, caps, table-cloths, and bags
- Fermented foods: *kinema* (fermented soybean), *gundruk/sinki* (fermented radish/green spinach), *meso* (pickled bamboo shoots), *jhand* (fermented millet drink), and *chang* (alcohol)

Some of these activities have succeeded in making profits. In the case of floriculture, some SHGs have derived substantial income from orchid production. Other SHGs have made profits from cultivating large cardamom and oranges, and cow rearing according to the key informant interviews.

On the other hand, some activities have not been as successful. For instance, one SHG received free gladiolus bulbs and ginger rhizomes from the Horticulture and Cash Crops Development Department and engaged in floriculture and ginger cultivation. However, they did not grow well, and no training by the Department was provided to improve the SHG members' technical skills. The SHG did not commit to marketing activities because the members were told by the Department that the harvest would be purchased by the Department.

5.3 Challenges and opportunities

5.3.1 Challenges

(1) Introduction of market-oriented economy

While a considerable amount of subsidies from the government flows into Sikkim, the market-oriented economy should be mobilised and stimulated more to improve income generation in the area. For

⁶⁵ Major medicinal plants include the *Nardostachys grandiflora*, *Aconites*, *Artemisia vulgaris*, *Piper longum*, *Picrorhiza kurrooa* (http://www.sikkiminfo.net/medicinal_plants.htm, retrieved on July 16, 2009). Sikkim has more than 242 species of remedial plants (http://www.sikenvivis.nic.in/medicine_main.htm, retrieved on July 16, 2009).

example, food schemes distributing subsidized⁶⁶ commodities lead to the distortion of the market, suppressing incentives for farmers to produce crops. Similarly, the availability of daily wage labour in government schemes does not reflect the real labour market, as daily wage labour is a temporary job opportunity. The income generation activity component of the Project should be designed in line with market-oriented economy so as to sustain and expand income generation activities of forest-fringe communities. Constraints such as high transportation costs to markets, lack of transportation means, lack of proper marketing facilities, and poor skills of SHGs on marketing also need to be addressed.

(2) Lack of technical support

The stakeholders stressed that the government needs to implement tangible measures against the decline in large cardamom production. However, the starting point is to discuss with farmers more sustainable solutions that they can develop themselves and pursue. One option is to shift from the extensive agriculture approach of cardamom production to labour-intensive farming, which would require training on maintenance. Another option is to support the development of new types of businesses such as the introduction of virus-free rhizome.

The stakeholders are also concerned about the state government's initiative to ban the usage of chemical fertilizers and pesticides despite the rapid expansion of the diseases and pest infestation. Nevertheless, since the state has declared itself an organic state, the introduction and promotion of organic manure could increase the market value of agriculture products of Sikkim. The Project can support the introduction of the required technology and the marketing of value-added products.

(3) Banking system

The reluctance of banks to provide loans for income generation activities was mentioned in an interview (Member, Lilium SHG, personal communication, August 4, 2009). The SHG members also reported that they have difficulty borrowing for income generation activities because of the high interest rates charged by commercial banks.

5.3.2 Opportunities

Use of forest resources should be studied further. It is indispensable to understand the attitudes of forest fringe communities towards forest resource management and to identify potential products in order to formulate proper plans and strategies for income generation activities.

The Project will support SHGs develop their members' capacities step by step. First, SHGs will learn to develop their micro plans in a participatory manner based on an analysis on their business environment. Next, potential products will be selected and developed with care. Then, SHGs will each set a marketing strategy for their specific products. SHGs should be the centre of decision-making throughout the process and be held responsible for the business outcomes to build their self-reliance.

Entry point activities (EPAs) such as the provision of small-scale infrastructure as community assets can be applied to address the urgent, common needs of the entire community. Another viable activity would be to invest in marketing promotion.

Microfinance would be an effective tool to support those with capital needs. However, the borrowers' activities should be monitored carefully. The interest rate for the loans should be set lower than those of commercial banks or microfinance institutions but should not be so low as to distort the market.

⁶⁶ Defined as sold below market price

5.3.3 Prospects of income generation activities

Income generation activities are a means of livelihood improvement for forest-fringe communities, and existing income generation activity schemes can be further refined. The Project will incorporate income generation activities as one of its components to enhance the activities of JFMCs, EDCs, and PSSs. Under the Project, the committee members should be provided with technical support, capital for investment, and training. Careful monitoring of household economies will ensure the successful implementation of these activities.

For the effective implementation of income generation activities, SHGs can be formed by members of JFMCs, EDCs or PSS's who have adequate levels of entrepreneurship and management skills. Groups of individual members will form SHGs. However, individual entrepreneurship and activities should also be encouraged. JFMCs, EDCs, and PSS's should extend their support to both SHGs and their individual members in terms of funding and capacity building. Highly-motivated SHGs should be selected so that they could be a business model for others to follow.

Income generation activities to be taken up by each member of the JFMCs, EDCs, and PSS's need to be selected based on the careful assessment of the member's capacity, nature of production and market, and associated risks revealed by market research. The assessment should be done in the process of microplanning of the respective JFMCs, EDCs or PSSs. Because forestry officials are expected to be facilitators of microplanning and implementation, their knowledge on and skills in facilitation, conflict management, and technical matters are essential for the success of income generation activities.

Potential income generation activities in Sikkim are as listed below:

- Production of cash crops such as large cardamom, ginger, and turmeric
- Production of vegetables
- Floriculture
- Animal husbandry such as dairy farming, poultry, piggery, and goat rearing
- Production, processing, and marketing of medicinal plants
- Harvesting, processing, and marketing of NTFPs such as edible ferns, mushrooms, stinging nettles, and bamboo shoots
- Production of fermented foodstuff
- Production of incense from rhododendron and juniper species (North District)
- Production of bio-compost
- Production of traditional handicrafts and handlooms such as carpets, bamboo baskets, and brooms

5.4 Social considerations

In Sikkim's social context, women, scheduled tribes (ST), scheduled castes (SC), and the poor are social groups that require separate consideration for the formulation of the Project. Currently, a number of policies and schemes for ST, SC, and the poor are in operation and are relatively well-funded. Thus, the Project should build on the existing schemes for ST, SC and the poor, and no new project components targeting these groups need to be designed.

On the other hand, gender issues require special attention. The questionnaire survey conducted by the study team found that women participate in decision-making processes only passively in the North and the West. This is contrary to the general belief that Sikkim has traditionally had a higher rate of participation of women in household decision-making compared to other states⁶⁷. The JFM

⁶⁷ Participants of the group discussions facilitated by the study team mentioned that women in Sikkim hold more power in

Notification of the state of Sikkim provides that 'at least 50% of members of JFM general body should be women' and that 'at least 33% of the membership of JFM Executive Committee should be filled from women' (FEWMD, 2001a). The above-mentioned situation in the North and West suggests that social or economic obstacles discouraging women's participation in the management of JFMCs exist. In the North, the low participation rate of women may be caused by the low social status of women in the surveyed village, where the Dzumsa, a traditional local governance system, does not entitle women to become its members (WWF, 2004).

Remedies for these obstacles should be identified and incorporated into the project design. Further, participatory microplanning processes under JFMCs, EDCs and PSS's⁶⁸ need to be enhanced so that equity can be achieved. The Project should ensure active involvement of women in decision-making and activities.

their households than women in other states do.

⁶⁸ The activities of a PSS are based on a Lake Conservation Plan instead of a micro plan.

CHAPTER 6 Rationale for the project

6.1 Significance of biodiversity

6.1.1 Background

Sikkim, Assam, and other north-eastern states of India are distinct in floral and faunal assemblages. They became a gateway between Southeast Asia and South Asia after the tectonic plate collision some 10 to 65 million years ago, which resulted in the formation of the Himalayas (Mani, 1974; Gupta, 2001). For example, floral elements from Myanmar, Thailand, Vietnam, Cambodia, Indonesia, and Malaysia are found in the tropical and subtropical forests of Sikkim. Since the formation of the Himalayas, the Eastern Himalaya has much more rainfall and is warmer than the Western Himalaya. This has been considered by many as filters and barriers in the effective dispersal of flora and fauna. All these geological, climatic, and biological events have made Sikkim the centre of the Eastern Himalaya, which is a global biodiversity hotspot.

6.1.2 Flora and endemism

The Botanical Survey of India and several studies suggest that Sikkim is phytogeographically significant, as it has six global elements: Sino-Himalayan-Japanese, Southeast, Peninsular Indian, Tibetan, Euro-Siberian, and Arctic-alpine (CISMHE, 2006). Sikkim is home to nearly one fourth of the total flowering plants of India. It has 60 flowering species per 100 km², whereas other countries and Indian states in the Eastern Himalaya have 4 to 12 species (Table 6-1).

Table 6-1 Flowering plants and endemics in different regions of the Eastern Himalaya

Indian state in Eastern Himalaya/country	Area (km ²)	No. of flowering species	No. of flowering species/100km ²	Endemic species
Arunachal Pradesh (India)	83,743	5,000	6.0	114
Assam (India)	78,523	3,017	3.8	14
Sikkim (India)	7,096	4,250	59.9	123
Bhutan	47,000	5,500	11.7	60
Nepal	140,800	5,067	3.6	248

Source: CISMHE (2006)

As of now, there are an estimated 4,500 flowering plants (Pradhan et al., 2004; FEWMD, 2007b). Of these, 550 species are orchids, and 36 are rhododendron species. Over 50 plant species are of global conservation importance, meaning that they belong to the threatened, endangered, vulnerable, or rare categories (Nayar and Sastry, 1990). Also, 13 species of plants are endangered. Two species, *Zeuxine pulchra* (Orchidaceae) and *Dennstaedtia elwesii* (Dennstaedtiaceae), have already disappeared from the Sikkim Himalaya.

Sikkim's endemic plants are predominantly herbs, and only ten are shrubs among which the *Orchidaceae* and *Asteraceae* dominate. Almost all have medicinal value. The state's deep river valleys and high mountain peaks, which can limit species dispersal, seem to have contributed to the richness of its plant endemics. Conversely, physical barriers, isolation, and microclimatic conditions may facilitate speciation.

6.1.3 Faunal diversity

Sikkim is as rich in flora diversity as in faunal diversity (Table 6-2), because the evolutionary distribution of both invertebrate and vertebrate animals is influenced by vegetation (food and shelter)

and climate (ambient temperature). This relationship is occasionally referred to as plant-animal interaction. There is scant information on invertebrates in Sikkim except on over 690 species of butterflies (Haribal, 1992).

More than 50 species of fish occur in Sikkim's river systems (Tamang, 2001; CISMHE, 2006), which consist of the Tista River and 18 major tributaries. Some 16 species of amphibian have been reported to occur, including the Himalayan salamander (*Tylototriton verrucosus*) (Ganguli-Lachungpa, 1998). There are 78 species of reptile (Chettri and Bhupathy, 2007). There are 550 bird species (Ali, 1959; Ganguli-Lachungpa, 1998), of which 11 are either endangered or threatened with extinction (Pradhan et al., 2004). The Eastern Himalaya has 19 endemic bird species, of which 10 are reported to originate from Sikkim (Islam and Rahmani, 2004). A study on the richness, abundance, and breeding habits of bird species suggests that areas between altitudes 900-2,800 m, which are essentially forests, are of significant conservation value (Acharya, 2008). Sikkim harbors 154 species of mammals, of which 12 species are either threatened or endangered (Avasthe and Jha, 1999; Thapa, 2008). In the past, the Shapi, or the eastern Himalayan Tahr (*Hemitragus jemhalicus schaeferi*), endemic to Sikkim, is reported from above Rate River (Satdharay) and other northern parts. The well-known Sikkim stag, *Cervus elphas wallichii*, is extinct since it was last sighted in the Pangolakha area. Recently, Sikkim has witnessed the movement of large mammals such as tigers and takins from Bhutan and West Bengal.

Table 6-2 Richness of faunal species in Sikkim

Faunal group	No. of species	No. of endangered/vulnerable
Butterflies	690	
Fishes	50	
Amphibians	16	1
Reptiles	78	
Birds	550	11
Mammals	154	12

Sources: Haribal (1992), Tamang (2001), CISMHE (2006), Ganguli-Lachungpa (1998), Chettri and Bhupathy (2007), Ali (1959), Pradhan et al. (2004), Avasthe and Jha (1999) and Thapa (2008).

The long-term conservation of the clouded leopard, musk deer, red panda, snow leopard, Kiang, Tibetan antelope, Tibetan wolf, and Argali are crucial to safeguard the faunal wealth of Sikkim, because they represent all the landscapes of Sikkim including the Tibetan marginal land.

6.1.4 Ecosystem diversity

Biodiversity, a contraction of the phrase 'biological diversity', has accommodated genes, species, ecosystems, and the ecological and evolutionary processes. Collectively, it amounts to the management of ecosystems (GFE, 1991). The overall aim of ecosystem management is to protect species and their habitats and ecological functions and processes while providing a sustainable flow of goods and services for people. To apply the ecosystem approach, our review suggests that the ecosystems of the Sikkim Himalaya can be broadly grouped into forest, alpine, freshwater and agrobiodiversity.

(1) Forest ecosystem

As Sikkim's vegetation is immensely influenced by altitude, rainfall, and ambient temperature, they have effectively formed distinct assemblages that are expressed as forest types and broadly classified into tropical, subtropical, temperate, and alpine (Table 6-3) (Singh and Chauhan, 1998; FEWMD, 2004).

Table 6-3 Vegetation types in forest ecosystems of the Sikkim Himalaya.

Vegetation type	Characteristic species	Altitude (m)
Tropical forest	<i>Dillenia pentagyn</i> , <i>Dysoxylum floribundum</i> , <i>Gymnema arborea</i> , <i>Lagerostroemia patviflora</i> , <i>Shorea robusta</i> <i>Toona ciliate</i>	250-900
Sub-tropical forest		
i) Broadleaved	<i>Albizia procera</i> , <i>Alnus Nepalensis</i> , <i>Bauhinia purpurea</i> <i>Castanopsis indica</i> , <i>Macaranga denticulata</i> , <i>Michelia champaca</i> , <i>Schima wallichii</i>	1,000-2,000
ii) Pine	<i>Pinus roxburghii</i> , <i>Engelhardtia colebrookia</i> , <i>Quercus leucotrichophora</i>	1,000-1,800
Temperate forest		
i) Broadleaved	<i>Acer campbellii</i> , <i>Engelhardtia spicata</i> , <i>Machilus edulis</i> , <i>Michelia cathcartii</i> , <i>Quercus lamellose</i> , <i>Taxus baccata</i>	1,700-2,700
ii) Mixed Coniferous	<i>Abies densa</i> , <i>Acer campbellii</i> , <i>Betula utiis</i> , <i>Rhododendron arboreum</i> , <i>Abies densa</i> , <i>Taxus baccata</i> , <i>Tsuga dumosa</i> , <i>Larix griffithianum</i>	2,700-3,000
Sub-alpine forest	<i>Betula utilis</i> , <i>Sorbus foliolosa</i> , <i>Rhododendron campanulatum</i>	> 3,000

Source: FEWMD (2004)

(2) Alpine Ecosystem

Alpine ecosystems include grasslands, scrub, and meadows (Table 6-4). The most striking alpine feature in Sikkim is the Trans-Himalayan high-altitude meadows above 4,800 m. A portion of the Tibetan Plateau, equal to about 900 km², belongs to Sikkim, which contains the Chho Lhamo Plateau, Lhonak Valley, Lashar Valley, and Yumesamdong (Ganguli-Lachungpa, 2002).

Table 6-4 Vegetation in alpine ecosystems

Vegetation Types	Characteristic Species	Altitude (m)
a) Moist Alpine		
i) Deciduous Scrub	<i>Berberis sp.</i> , <i>Lonicera sp.</i>	3,600-3,900
ii) Dwarf Rhododendron	<i>Rhododendron lepidotum</i>	> 3,600
iii) Alpine pasture	<i>Allium</i> , <i>Anemone</i> , <i>Delphinium</i>	> 4,000
b) Dry Alpine		
i) Dwarf Juniper	<i>Juniperus recurva</i> , <i>J. wallichiana</i>	> 3,600
ii) Dry alpine Scrub	<i>Ephedra gerardiana</i> , <i>Meconopsis sp.</i> , <i>Ribes sp.</i>	> 4,000

Source: FEWMD (2004)

(3) Freshwater ecosystem

Sikkim's freshwater system is comprised of 84 glaciers, 227 high-altitude lakes and wetlands, and 104 rivers and streams (IPRD, 2008). Lakes are predominantly located in the high altitudes above 3,000 m. Wetlands and rivers are suitable habitats for fish, amphibians, resident and migratory bird species, and mammals. Three species of otter (*Lutra lutra*, *L. perspicillata*, and *Aonyx cinerea*) may be used to monitor the health of river ecosystems, as rivers are being rapidly tamed to generate hydropower in Sikkim.

(4) Agrobiodiversity ecosystem

The state's rich floristic diversity is a germplasm resource for many cultivated plant varieties and races. Biodiversity and agrobiodiversity are characterized by the proximate interaction between natural

systems and human dimensions. The diversity of crops and local livestock breeds is the result of a century worth of human breeding efforts that depended on locally differentiated resources (Sharma et al., 2006). The agro-ecosystems have been innovated, adapted, managed, and evolved over 600 years by traditional communities (Table 6-5). The traditional shifting agriculture system has been converted gradually to the sedentary system over centuries, which is a combination of compartments such as agroforestry, forestry, livestock, and farmlands.

Table 6-5 Agrobiodiversity and agro-ecological zones in the Sikkim Himalaya

Agro-ecological zone	Diversity of crops/fruits/tubers	Agroforestry tree species
Sub-tropical (hot humid and dry)	Avocado, banana, barley, buckwheat, finger millet, guava, kiwi, lentil, maize, mandarin orange and other citrus fruits, mustard, niger, passion fruit, peach, pear, plum, pulses, pumpkin, rice beans, rice, sesame, soybean, tapioca, turmeric, wheat, and yams and tubers	<i>Albizia lebbeck</i> , <i>A. marginata</i> , <i>A. odoratissima</i> , <i>A. procera</i> , <i>Bauhinia purpurea</i> , <i>B. malabarica</i> , <i>B. vahlii</i> , <i>B. variegata</i> , <i>Brassiopsis speciosa</i> , <i>Callicarpa arborea</i> , <i>Castanopsis hystix</i> , <i>C. indica</i> , <i>Chukrassia tabularis</i> , <i>Cordia</i> sp., <i>Delbergia latifolia</i> , <i>Echinocarpus aristatus</i> , <i>Elaeocarpus lanceae</i> , <i>Erythrina sticta</i> , <i>Erythrina stricta</i> , <i>Ficus benghalensis</i> , <i>F. hookeri</i> , <i>F. elastica</i> , <i>F. roxburghii</i> , <i>Firminiana colorata</i> , <i>Gamblea ciliata</i> , <i>Garcinia stipulata</i> , <i>Garuga pinnata</i> , <i>Grewia elastica</i> , <i>Litsea polyantha</i> , <i>Melia azadirach</i> , <i>Melia azedirach</i> , <i>Morus alba</i> , <i>Orozylon indicum</i> , <i>Psidium guajava</i> , <i>Quercus galuca</i> , <i>Q. thomsoniana</i> , <i>Rhus similiata</i> , <i>Schima wallichii</i> , <i>Shorea robusta</i> , <i>Sterculia villosa</i> , <i>Styrax serrulatum</i> , <i>Symplocus candata</i> , <i>Terminalia myriocarpa</i> , and <i>T. tomentosa</i>
Temperate (warm, humid and dry)	Amaranths, barley, brassica species (rayo, tori, seto mula, rato mula), buckwheat, cardamom, chenopods, finger millet, foxtail millet, horse gram, maize, orange, peas, pigeon pea, pulses, rice (lekali), rice bean, and wheat	<i>Acer oblongum</i> , <i>A. pectinata</i> , <i>Actinodapne</i> sp., <i>Alnus nepalensis</i> , <i>Canarium bengalensis</i> , <i>Castanopsis tribuloides</i> , <i>Celtis tetrandia</i> , <i>Engelhardtia acerifolia</i> , <i>E. spiacata</i> , <i>Eurya acuminata</i> , <i>Ficus. benjamina</i> , <i>F. clavata</i> , <i>F. infectoria</i> , <i>F. nemoralis</i> , <i>Juglans regia</i> , <i>Leea robusta</i> , <i>Leucoseptrum cannum</i> , <i>Lyonia ovalifolia</i> , <i>Machilus edulis</i> , <i>Machilus</i> sp., <i>Maesa chisia</i> , <i>Morus indica</i> , <i>Nyssa sessiliflora</i> , <i>Osbeckia paniculata</i> , <i>Prunus nepalensis</i> , <i>Sauraria graffithii</i> , <i>S. nepalensis</i> , <i>Schima wallichii</i> , <i>Sterculia villosa</i> , <i>Symplocus theifolia</i> , <i>Toona ciliata</i> , <i>Vibernum cordifolium</i> , and <i>Zanthoxylon acanthopodium</i>
Cool Temperate (cool, moist, humid and dry)	Amaranths, apple, barley, brassica species (rayo, tori, seto mula, rato mula), cabbage, cardamom, cardamom, lekali millet, maize, nakima, niger, pear, peas, potato, rice bean, soybean, walnut, and wheat	<i>Acer campbellii</i> , <i>A. levigatum</i> , <i>Andromeda elliptica</i> , <i>Barberis aristata</i> , <i>Beilschmiedia</i> spp., <i>Bombax</i> sp., <i>Brassiopsis speciosa</i> , <i>Castanopsis tribuloides</i> , <i>Ficus ciliata</i> , <i>F. hookeri</i> , <i>F. nemoralis</i> , <i>F. roxburghii</i> , <i>F. toona</i> , <i>Laurocerasus undulates</i> , <i>Leucoseptrum canum</i> , <i>Litsea</i> sp., <i>Machilus</i> spp., <i>Magnolia cambelii</i> , <i>Meliosma wallichii</i> , <i>Michelia champaca</i> , <i>Michelia excelsa</i> , <i>Pterygota alata</i> , <i>Q. pachyphylla</i> , <i>Q. spicata</i> , <i>Quercus lamellosa</i> , <i>Rhododendron</i> sp., and <i>Vibernum grandiflorum</i>

Source: Sharma et al. (2006)

6.1.5 Strengthening of biodiversity management

The biodiversity component of the proposed project should be implemented in conformity with the recently-approved protected area management plans. The significance of biodiversity is recognized by the general public through exposure to the rich variety of life forms and through their judgment of the

value of biodiversity. The effective management of biodiversity is key to sustaining the diverse and dynamic nature of the biosphere and to generating and disseminating information on which the public can base their value judgment. This in turn increases the global value, and therefore, the economic value of biodiversity. Thus, management instruments already in place such as laws and regulations, policies, and plans should be applied and implemented in a more effective manner.

All acts, regulations, and policies of the Government of India and the Government of Sikkim have emphasised the protected area system and the co-management of forest resources as the mainstay of biodiversity conservation. They all invariably recognize that participatory biodiversity conservation, which is a dynamic process involving many stakeholders, promotes the protection of flora and fauna, and enhances ecosystem management.

Upgrading the protected area system to strengthen biodiversity management would help enhance its economic value. The conservation of protected areas and non-consumptive utilisation should be promoted because there are few options for the sustainable consumption of biodiversity resources. These should include various stakeholders including high-altitude pastoralists, government management agencies, NGOs, and the private sector needs to be promoted.

Here are the steps that should be taken for strengthening biodiversity conservation: 1) upgrading of protected areas to maintain ecological stability in both forest and alpine ecosystems; 2) better management of protected areas and reserved forests to consolidate the conservation value of their biodiversity; 3) establishment of a mechanism that ensures sustained access to biodiversity resources and the sharing of benefits derived from their utilisation by forest and alpine resource users; and 4) knowledge-based support to increase institutional capacity and enhance human resource development. To realize these steps, the proposed project should support the enhancement and implementation of the eight approved protected area management plans along with the working plans for reserved forest management.

6.2 Development needs regarding forest resources management

6.2.1 Forest fringe communities

In the rural areas of Sikkim, agricultural and horticultural production, which are the main source of livelihood for many people, are declining due to disease and pest infestation. Rural villages lack job opportunities, especially for youth. On the other hand, there are various government schemes and programmes for Scheduled Tribes, Scheduled Castes, and people below the poverty line. Many people earn their living through engaging in daily wage labour offered by such interventions. The government also provides subsidies for food and goods. Many people are dependent on these government interventions. A few people have even suggested to the study team that the situation is de-motivating the people to make serious efforts to improve their livelihoods. However, some people expressed during group discussions organised by the study team that they want to break away from the cycle of dependence on public schemes. The proposed Project would help villagers wishing to break out of state dependence and also reduce poverty in rural areas through the utilisation of forest resources and promotion of ecotourism and other community-based livelihood activities.

Most rural villages depend on the forests, as more than 80% of the total area is forestland. In fact, the government considers all the villages in Sikkim as forest fringe communities. In many areas, dependence on forests resources is high. Most areas lack flat land suitable for cultivation. Demand for fuelwood is high in the alpine communities, as heating is required throughout the year. In the alpine areas, animal husbandry and collecting of forest products such as medicinal herbs are the only major sources of income apart from the construction work offered by the Border Road Organisation (BRO). As such, investing in forest management and biodiversity conservation through the proposed project is

relevant to Sikkim from the viewpoint of poverty reduction and the development of its rural area.

In Sikkim, the concept of sustainable forest management seems absent. On the one hand, scientific data on forests and biodiversity that enable the sustainable management of forest resources are not readily available. On the other, the use of forest resources is extremely restricted. The current regulations are so restrictive that forest fringe communities have hardly any scope to live on forests, which is the most significant resource for them in many cases. In order to fully realise the development potential of rural areas, sustainable management of forest resources needs to be introduced and popularized throughout the state.

The proposed project will conduct surveys and develop an information base on forests and biodiversity, study the use of forest resources, identify management regimes that ensure the sustainable use of the resources, and recommend ways to rationalize the current regulations based on the outcome of the project initiatives. The Sikkim Forest Department, together with JFMCs, EDC's, and PSS's, will implement forestry and biodiversity management activities based on the scientific information upgraded by the Project. In areas where consumptive use of forests need to be restricted, alternative non-consumptive income generation activities including ecotourism will be promoted. In this context, the development and maintenance of the forest and biodiversity information base will enhance the non-consumptive values of the forests and biodiversity in Sikkim.

6.2.2 Forest, Environment and Wildlife Management Department

The overall capacity of the Sikkim Forest Department has room for substantial improvement. Several issues observed by the study team indicate the need for strengthening of its capacity. First, the department has limited information on the state's forests and biodiversity. Forest maps are either inaccessible or unavailable. Geo-referenced information on land use and forest resources is scarce or outdated. An information base that enables the proper planning, execution, and monitoring of forest management and biodiversity conservation should be established.

Second, the technical capacity of the Department is not well-developed in certain respects. Management plans for the reserved forests and protected areas are insufficient or lacking. For example, the only working plan that exists is the one of the South District developed in 2000. Even this, however, has fundamental weaknesses, as the Plan relies entirely on satellite images. There are no research activities conducted on silviculture or biodiversity despite the insufficiency of scientific information. There are no training institutes or comprehensive training courses to equip the department officials with the skills and knowledge to carry out forest management, biodiversity conservation, and forest fringe community development activities effectively.

Third, documentation and information management requires improvement. Published documents provide inconsistent facts and figures. Information on the organisation, including the functions performed by each section, and records and statistical data on the activities performed by the department are not readily available. Additionally, whatever data is available on the forests are in many cases inconsistent or confusing, as they are not presented with adequate explanations. It seems that documentation is not done properly nor is information managed in an organised manner.

Fourth, the organisational structure is not helpful for managing the forestlands and interacting with forest fringe communities in an integrated manner. There are multiple lines of vertical command from the central level to the field level with limited horizontal coordination. Rather than having an integrated office at the district and the village levels, the Department works in thematic circles such as Territorial, Wildlife, NTFPs, and Social Forestry, which all have their own officials for divisions, ranges, and blocks. Moreover, the demarcation of ranges and blocks are inconsistent among the various circles. Department officials have also suggested that the workload is not evenly distributed among the different sections.

Fifth, there is a limited number of staff in the field. Many officials do not stay in the areas to which they are assigned. Many officials who would better serve the forests and the local people if they were in the field are seen in Gangtok.

Sixth, facilities and transport means are insufficient for the officials to perform fieldwork. Office facilities, vehicles, motorcycles, and accommodation are inadequately provided, particularly at the range level and below. Moreover, the department officials suggested to the study team that they are not receiving adequate allowances and means to implement their tasks effectively and efficiently.

The points raised above are by no means comprehensive. Nevertheless, the issues clearly point to the need for strengthening the organisation. The proposed project is necessary to enhance the capacity of the Sikkim Forest Department so that it can better manage the forests and conserve the unique biodiversity of the state. The project should accelerate structural change and improve the productivity of the department.

6.3 Requirements for the effective development of ecotourism in Sikkim

Section 4.5 highlighted the obstacles that are impeding the effective development of ecotourism in Sikkim. This section identifies what is needed to solve these problems.

To develop a vibrant and successful ecotourism product in Sikkim that will bring improvement to the livelihood of forest fringe communities without damaging or compromising the environment, the project will need to address a number of concerns. These include issues related to

- Building awareness about the nature of ecotourism and its impact on the economy and society of Sikkim;
- Difficulties of operating tourism in Sikkim;
- Developing ecotourism products suitable for a range of market segments to maximise earning opportunities;
- Developing and improving tourism infrastructure;
- Promoting the ecotourism product and creating market linkages;
- Waste management and environmental clean-up in tourism areas; and
- Capacity building.

6.3.1 The need to build awareness about the nature of ecotourism

Confusion reigns among Sikkim stakeholders about the concept of ecotourism, and too often the term is used to suit their own objectives. There have been mistakes made in the name of 'ecotourism' such as inappropriate construction in pristine and traditional environments. Therefore, it is imperative that the term is clearly defined and that guidelines are drafted to direct and control tourism activities that take place in nature and involve local communities.

This should be set out in a policy document that is formulated with the participation and in consultation with all stakeholders. Once agreed, the policy should become the guiding light for all ecotourism development, activities, and ventures. The policy and the impact of developing ecotourism on the economy and society of Sikkim would need to be widely publicised so that all citizens are informed about what ecotourism means to the state and about their responsibility towards preserving and promoting Sikkim's ecotourism assets.

6.3.2 The need to overcome the difficulties of operating tourism in Sikkim

These difficulties fall into three categories: 1) the aggravation of obtaining multiple permits outside and within Sikkim, 2) the additional restrictions placed on foreign visitors, and 3) the difficulty of travelling around Sikkim. While the rules on permits and travel restrictions are under the responsibility of government agencies other than the Forest and Tourism Departments or under the responsibility of the army, the authorities must be made aware about the impact that these measures have on the ecotourism sector. Potential revenue is lost because tourists are unsure about the rules and, in the case of foreign tourists, because of perceived deterrents of multiple permits, limited length of stay, prohibited areas, and group sizes. At least the system of obtaining permits should be improved through such measures as facilitating missions abroad to issue the permits before tourists travel to India, and setting up a 'single-window' facility so that all permits can be obtained at the same place. Foreign tourists should be allowed to travel to the same destinations in Sikkim as Indians visitors and not have to travel in pairs. While the transport situation is starting to relax with the introduction of the luxury car rule, there should be further liberalisation to allow operators to freely offer transport around the state in a single vehicle and to use coaches to transport their guests.

6.3.3 The need to develop ecotourism products suitable for a range of market segments

Currently, ecotourism in Sikkim is mostly focused on village tourism offering homestays and cultural performances, and on the adventure tourism trekking product, which is particularly popular with foreign visitors. However, it is clear that nature and culture are the main assets that Sikkim has to offer and the principal reasons that the general leisure visitor, the adventure tourist, as well as the special interest enthusiast come to the state. Therefore, there is a need to develop and adapt products based on Sikkim's exceptional nature and culture that do not damage the environment and that provide local communities with opportunities to generate income from different market segments. The following activities could be developed:

- Establishing good quality ecolodges in areas of natural beauty or of cultural interest aimed at high-end tourists would attract wealthy domestic and international visitors who would otherwise just stay at Sikkim's main tourist centres. This would serve two purposes. First, while professional management would be needed to run the operation, at least during the first few years, the ecolodges would directly train and employ local people and purchase products and services from the local community, such as guiding services, cultural performances, and food supplies. The emphasis would be on training local staff at the lodge and sending those with potential to management colleges. Ultimately, the local community would have enough experience and would be able to manage the lodges themselves. Second, establishing the lodges would encourage the development of ecotourism in the surrounding areas. Marketing the lodges would also market the areas that they are located at. For instance, locating one of the lodges at Dzongu would put it on the tourism map and support the currently failing homestays, as more visitors find out about area, visit, and search for more affordable accommodation. A comparable model for this development initiative is the Jungle Lodges and Resorts of Karnataka, which is a real high-end ecotourism success story in India.
- Villages located near main centres such as Gangtok and Pelling that already provide some tourism services must be encouraged to adapt their product to capture the general sightseeing market by organising and offering regular day excursions. This will create regular income for the local communities rather than only relying on income from packages that require overnight stays.
- The existing homestays need to be improved before they can be marketed by tour operators. It is important that operators are able to communicate their requirements to the villagers and that a

financing system is established to assist villagers that are interested to work with them to fund the required improvements.

- The more popular trekking routes are becoming congested and suffering damage. Sikkim can be a major player in the Himalayan trekking market if it expands its range of trekking opportunities, especially if world class routes are created. This would relieve the pressure on current trails like the Yuksom-Dzongri trail.
- Areas appropriate for other adventure sports such as mountaineering and rock climbing should be developed with appropriate facilities like rescues services and climbing walls, and be properly marketed.
- With its great variety of endemic species, Sikkim can attract visitors interested in botany, birds and other wildlife. Most areas where these can be seen have been identified; however, in many cases, facilities need to be developed
- Volunteer tourism must be developed in Sikkim. This would provide local communities with income as well as assistance.

6.3.4 The need to create and improve tourism infrastructure

Appropriate infrastructure to assist tourists must be developed throughout Sikkim to provide them with interpretation and information, directions as well as comfort.

- Establishing interpretation centres at sites of tourism importance would present attractions to visitors, provide comprehensive background information, and enhance the tourism experience. These centres would also serve as comfort service areas with clean public conveniences, small scale catering facilities, and retail outlets for books and souvenirs, and most importantly for the sale of handicrafts made by the local communities living near the attraction. Guides for the site would be booked at the centre, and other tourism services such as accommodation, restaurants and entertainment available in the area could be publicised.
- At the main urban district nodes like Gangtok, Mangan in North Sikkim, and Pelling in West Sikkim, orientation centres should be established. These would serve to inform tourists about destinations and attractions that can be visited within the district. It may also provide a booking service for accommodation at these destinations.
- Public toilets are needed at attractions. These could be ‘pay and use’ but must be scrupulously maintained. Toilets should not be built at attractions that are isolated, as these are likely to become quickly neglected.
- There is a need to establish museums at areas of interest to explain the history, the way of life, and the cultural heritage of the local resident communities as well as the natural sites of the area. These may be extensions of the interpretation centres or specific buildings like traditional model houses.
- Selected heritage villages must be improved to make them more ‘tourist friendly.’ The requirements here include signage, facilities to showcase local handicrafts, space to perform cultural performances, improvement of village walkways, etc.

6.3.5 The need to promote the ecotourism product and create market linkages

Marketing is one of the main weaknesses of Sikkim's tourism management, in particular in the case of village tourism initiatives.

- It is vital that tourism marketing capacity in the state is strengthened. This requires that well-thought out and well-financed marketing strategies are formulated, that year-on-year budgets are respected, and that most importantly, they are implemented through annual operational plans. Through its professional operational expertise, the private sector has a strong feel for the needs of the market, the best marketing channels to employ, and the tools and techniques that should be used, which are skills that are crucial for the effective marketing of ecotourism in Sikkim.
- For the existing homestays to achieve profitability, they must be linked to strong operators who are in touch with the market. However, the product they offer must be adapted to the requirements of the operators so that they are comfortable to include homestays in their packages and would not worry that their reputation could be damaged. Operators from Sikkim and from outside should be invited to voice their requirements⁶⁹.

6.3.6 The need for waste management and environmental clean-up in tourist areas

Waste management and environmental clean-up systems and initiatives at tourism destinations and attractions must be established to protect the environment and the assets that are the motives that bring tourists to the area in the first place. This should involve the JFMCs, the EDCs, and the PSSs where the destinations and attractions are located.

6.3.7 The need for a capacity building programme

A capacity building programme is vital if ecotourism is to be developed successfully in Sikkim.

- Training programmes must be established for Forest Department employees as well as Tourism Department employees to expose them to the realities of ecotourism development and operations. Often, officers at these departments come from other government departments and have little idea about the tourism sector.
- JFMCs, EDCs, and PSS's also need training about the realities of ecotourism, especially to understand their role in protecting the environment.
- To ensure that local communities are able to operate their own ecotourism enterprises at a future date, candidates showing strong potential and desire to forge a career in the tourism sector should be identified and sent for training at hospitality and tourism education institutions. On their graduation and return to Sikkim, these will be future tourism and hospitality managers in their areas.
- Villagers offering ecotourism services should be sent on exposure visits to successful initiatives in other Indian states to learn from their experiences.
- Short courses on ecotourism activities and operations could be organised for the private sector operating at the community level. These should be repeated in all areas that are selected for development, but not at all villages in Sikkim.

⁶⁹ Example of a tour operator that specialises in offering homestay holidays: <http://www.homestayskerala.com>

CHAPTER 7 Project plan

7.1 Objectives of the project

(1) Overall objective

Contribute to the enhancement of environmental conservation and reduction of poverty in the state of Sikkim

(2) Project purpose

Promote conservation of biodiversity and forests, and improvement of the livelihoods of forest fringe communities in the state of Sikkim

7.2 Project components

7.2.1 C1 Preparatory work component

This component will prepare for the implementation of project activities. It involves the reorganisation of the Forest Department structure, the establishment of the project implementation structure, the preparation of the project implementation manual, and the development of the annual work plan and budget. All subcomponents except for the reorganisation of the Forest Department will be implemented in Year 1. This subcomponent will ideally be completed prior to the commencement of the Project.

C1-1 Reorganisation of the Forest Department

This subcomponent aims to enhance the organisational structure of the Forest Department so that it can accommodate the large volume of work that will be generated by the Project. In preparation for establishing the project implementation structure, the Forest Department will need to reorganise its structure and rationalise its staff allocation. The reorganisation is expected to establish a more efficient and effective base for implementing various forestry and biodiversity conservation activities in an integrated manner. The new structure will not only serve the purpose of implementing the project activities but will enhance the overall productivity of the Forest Department in its execution of various activities.

As explained in detail in Section 7.3, instead of setting up a separate entity specifically for the Project from the state level down to the village level, the existing structure and staff will be reorganised and utilised as much as possible for the implementation of the Project. The Project will establish a specialised Project Management Unit (PMU) at the state level and will not establish any additional implementation unit at the range and block levels. It will, however, establish a DFU (District Facilitation Unit) at the district level to assist Forest Department officials in implementing project activities at the district, range, and block levels. The Forest Department must strengthen its execution capacity particularly at the district level and below by reorganising its organisation into an area-oriented structure and by allocating more staff at the district level and below. The ideal area-oriented structure is proposed in Section 7.3.

This subcomponent shall be implemented by the Forest Department prior to the establishment of the project implementation structure. It will require the strong leadership of the senior officials⁷⁰.

⁷⁰ Although this subcomponent is included in the project plan, it should be completed prior to project implementation. The study team recommends that the completion of the content of this subcomponent be made a prerequisite for approving the

C1-2 Establishment of project implementation structure

This subcomponent will establish the PMU and its oversight body. The Forest Department will set up the PMU consisting of the Governing Body, Executive Body, DFU, and the High Power Steering Committee (HPSC), whose composition and functions are explained in detail in Section 7.3. The PMU will operate as a society. The drafting of the rules that will govern its operations, issuance of government notifications, registration of the PMU as an autonomous society, and other necessary administrative work will be carried out, and the approval of relevant authorities will be sought. The Forest Department will accommodate the required human resources of the PMU by placing its officials and recruiting contract-based staff members.

Once the PMU is established, consultants with expertise in project management will be procured. The tender documents, including the terms of reference, will be drafted by the PMU. The PMCs will be selected through international competition.

The activities of this subcomponent are as follows:

- (a) Establishment of the PMU, including the placement of Forest Department officials;
- (b) Establishment of the HPSC;
- (c) Drafting of and acquiring approval of the governing rules for the PMU;
- (d) Registration of the PMU as a society;
- (e) Recruitment of contract-based staff for the PMU; and,
- (f) Procurement of the project management consultants.

C1-3 Preparation of implementation manual

This subcomponent will develop the project implementation manual⁷¹. It will also familiarise the Forest Department officials who will be engaged in the Project with the basic aims, activities, and procedures of the Project.

C1-3-1 Development of project implementation manual

The project management consultants will be tasked to develop the project implementation manual under the supervision of the PMU. The manual should cover topics such as 1) the project implementation structure; 2) the roles and responsibilities of personnel involved in the Project; 3) project activities and their basic implementation procedures; 4) planning, monitoring, and evaluation procedures of activities; 5) budget of the Project; and 6) budgeting and accounting rules.

C1-3-2 Familiarisation of the Project

An orientation session on the Project will be given to all concerned staff using the project implementation manual. A one-day workshop will be organised in the four district capitals.

C1-4 Development of annual work plan and budget

The PMU will prepare for the implementation of project activities through this subcomponent. It will develop the initial annual work plan and budget for Year 1 by component and subcomponent, and by

implementation of the Project. Without the reorganisation of the Forest Department proposed here, the implementation of the Project will face great difficulties.

⁷¹ Manuals for specific project components and subcomponents will be developed separately.

district based on the project plan attached to the loan agreement between the GOI and the GOJ.⁷²

7.2.2 C2 Forest and biodiversity conservation

This component aims to enhance the global, social, and economic value of biodiversity and improve livelihoods in and around protected areas, buffer zones, and reserved forests. It seeks to achieve this objective through the establishment and implementation of sound management plans and the dissemination of biodiversity information for promoting public awareness on the significance of biodiversity. Although the component focuses on the management of public lands, it will also support sustainable forest and biodiversity management outside the reserved forests and protected areas.

This component is designed to strengthen the development and implementation of the management plans for the Khangchendzonga Biosphere Reserve and the seven wildlife sanctuaries, and of the working plans for reserved forest management. Effective implementation of the plans will require a well-defined natural resource information base and human and financial resources. The recently-approved protected area management plans identify the resource gaps that need to be filled for the effective implementation of the plans.

The component focuses on 1) the enhancement of the spatial and resource information base for planning, implementation, and monitoring of forest and biodiversity management; 2) the establishment and improvement of zoning and of plans for the management of reserved forests and protected areas; 3) the promotion of public support for biodiversity conservation through research, ex-situ conservation, and extension; and 5) capacity development of the Forestry Department. In addition, inter-institutional linkages will be built among the Forestry Department, State Pollution Control Board, Sikkim University, Wildlife Institute of India, Indian Institute of Remote Sensing, Indian Council of Agricultural Research, and Ecodevelopment Committees (EDCs). On the ground, forest and biodiversity conservation will be carried out through the joint forest management schemes described under C4: Joint forest management.

C2-1 Enhancement and management of forest and biodiversity information base

To safeguard forest and biodiversity resources through scientific and systematic planning, accurate land-based spatial information needs to be collected and assembled for utilisation. Detailed topographical maps with altitudinal relief will be prepared, and standard survey techniques for biodiversity surveys and forest resource assessment will be applied to develop baseline information. The impacts generated by the implementation of the management plans on the natural and socioeconomic conditions of the state can only be monitored and evaluated accurately by employing a scientific information base. The accurate assessment of the impacts of any intervention is the key to sustainable management of forest and biodiversity resources.

The outputs of this subcomponent include 1) updated topographical and land use maps and remote sensing information for planning; 2) completed state-wide forestry and biodiversity surveys; and 3) compiled data on the current status of grazing and global warming, and a strategy for climate change mitigation and adaptation in the alpine ecosystem, where climate change impacts have been observed early on.

C2-1-1 Update of topographical and land use maps

The first scientific land use survey in Sikkim was carried out from 1950 to 1958. The second was

⁷² Development of annual work plan and budget is an annual and recursive process based on the bottom-up micro planning and overall project implementation plan. The plan needs to be approved by the authorities before the planned fiscal year begins.

carried out some 26 years ago from 1976 to 1983. The objective of the subcomponent is to develop land use topo maps to be used for the conservation of biodiversity by updating the existing map sheets. These topo maps will be made by extracting information from satellite imaginaries and through ground truthing. The maps will assist planners and decision-makers, including government agencies, donors, and private entities, not only in land use and biodiversity conservation but also in development planning.

A main laboratory for GIS and remote sensing (RS) will be established at the Sikkim Biodiversity Centre, which is proposed to be constructed at the Himalayan Zoological Park, Bulbuley under the Project (see C2-4-2 and C5). The main laboratory will have a senior forest official as the head and two fully-trained forest personnel. Thirty (30) branch GIS offices in the three divisions and the 27 range offices will also be established for the application and utilisation of the spatial information base in the day-to-day activities of forest officers. This information base network, in combination with in-house communication network (see C5), will increase the efficiency and effectiveness of the Forest Department's public service delivery despite its budgetary and human resource constraints.

The main laboratory will develop, accumulate, modify, and disseminate information for the information base. On the other hand, DFOs, ROs, BOs, and/or information clerks at the branch offices will add and overlay field-collected data by using geographical positioning system (GPS) equipment to record, visualize, analyse, monitor, and report status of their field activities. Field data will be sent to the main laboratory where the data will be consolidated to represent the state-wide status of forest and biodiversity management.

The main output of this subcomponent will be a new digital database on land use in Sikkim and an up-to-date forest cover assessment completed through effective data collection procedures at the district and range levels. Spin-offs of this subcomponent include 1) establishment of a geo-mapping research facility; 2) a set of spatial information that would benefit government agencies, in-state universities, and research organisations; and 3) forestry staff members and university faculty and students trained to handle and analyse GIS data sets.

(a) Preparation of digital maps and procurement of equipment

An A-0 size scanner, an A-0 size plotter, 32 personal computers, and 32 colour laser printers will be procured to equip the main laboratory and 30 branch GIS offices. Software licences such as Erdas Imagine, ArcInfo, ArcView GIS, and other supporting software and operating systems will be purchased.

Data will be prepared on the following: digital elevation contour lines, administrative and cadastral boundaries; forest management and protected area zonation including the division, range, block, and compartment borders; and locations of forest and protected area management facilities and other natural and socioeconomic features of Sikkim. However, GIS information on areas such as those near the national border, which are under strict military control, are neither available nor accessible and must be excluded from the information base. The digitization of maps and other information will be contracted out to professional firms.

Analysis and interpretation of high resolution satellite images of MX-4 P-6, Cartosat, and Quick Bird will be conducted. Thematic information will be extracted to create maps on vegetation types, forest resources, land use, human intervention assessment, landslide assessment, biodiversity assessment, tourism and ecotourism for use by the government and the private sector. Map interpretation will be contracted out to professional firms.

(b) Training and capacity building

Two forest officers who will maintain the main GIS/RS laboratory will be trained for six months, three months in remote sensing and 4 months in GIS. In addition, four ACFs and/or DFOs from four divisions, 54 officers including ROs from 27 ranges, and 104 officers including block officers from 52 blocks will be trained on the use of GIS and remote sensing software and on the use of GPS and datasets for 15 days at the Indian Institute of Remote Sensing at Dehradun. All training activities will be outsourced.

C2-1-2 Inventory and monitoring of biodiversity

The objectives of inventory and monitoring of biodiversity are 1) to develop baseline information on key biological elements in forest, alpine, freshwater, and agro ecosystems for monitoring and evaluation of the impacts of forest and biodiversity management and 2) to identify critical areas that require immediate protection. As the forest and biodiversity information base synthesizes information from both the biophysical and social sciences, it should be accurate and complete. Under this subcomponent, rapid biodiversity surveys, which would display the ecosystems throughout the state, will be conducted. The survey will be carried out using both the coarse filter and fine filter approaches. The outputs will be 1) biodiversity information on four ecosystems to be used in the production of thematic maps for management so that key areas are protected and 2) data to be stored at the GIS/RS laboratory.

(a) Implementation of rapid biodiversity survey

Approximately 1,000 sample plots will be randomly generated throughout Sikkim for a quantitative biodiversity study using the digital spatial information base. The proposed sampling procedures and survey sheets to be filled by enumerators are presented in Annex 8. In addition, known hotspots in forest, alpine, freshwater, and agro- ecosystems will have approximately 300 more plots to present more detailed information. Enumeration and observation of all sample plots will be outsourced to qualified institutions. The work will be conducted under the supervision of the Forest Department, the State Pollution Control Board, Sikkim University, and the Indian Council of Agricultural Research (ICAR). For freshwater ecosystems, a separate random sampling method will be applied under the supervision of the State Pollution Control Board. All collected data will be incorporated into the spatial forest and biodiversity information base.

C2-1-3 Study of impacts of climate change and grazing on the Himalayan ecosystem

The objectives of this subcomponent are 1) to analyse and understand the trajectory of ecosystem dynamics influenced by global warming in alpine areas, and 2) to analyse and understand human-nature interactions related to grazing in alpine, temperate, and subtropical areas. The former information will be used to recommend measures for climate change adaptation and methods for monitoring climate change impacts, and the latter to propose a model for participatory management of grazing. A set of climatological equipment will be procured for data generation and analysis.

Traditionally, grazing is an important animal husbandry practice in all parts of Sikkim. Though grazing has been banned in the state, it has continued to a lesser extent in certain places such as the alpine areas in North Sikkim. The status of grazing in any given location affects its ecosystem and biodiversity; thus grazing must be managed explicitly to conserve them. In addition, ecosystems are presumably being modified by the recent global warming phenomenon. The changes in progress, particularly in high-altitude areas, need to be understood and predicted accurately for the effective management of forest and biodiversity resources.

(a) Study of impacts of climate change on the Himalayan ecosystem

Ecological and socioeconomic surveys in the North District will be carried out in collaboration with the University of Sikkim and other competent institutions. Two senior national researchers will be engaged to conduct the study. The ecological surveys will examine the impacts of the climate change particularly on alpine areas where, for example, significant retreats of glaciers have been reported by local observers. Adaptation processes of the Himalayan ecosystem to the changing climate will also be studied by selecting several indicator species. The socioeconomic surveys will seek to reveal local knowledge regarding glacier change, animal and plant distribution and their productivity, and agricultural and pastoral practices over the past twenty to thirty years. Analyses of the various elements of the physical environment such as soil conditions, dendrochronology, water quality change, and sedimentation in the lakes and moraines will be conducted to estimate the magnitude of change over time associated with global warming.

The study will produce recommendations on adaptive forest and biodiversity management and on appropriate monitoring and evaluation methodologies. Meanwhile, the socioeconomic study will analyse the perceptions of local herders regarding climate change and adaptation to climate change, particularly with regard to the utilisation of alpine meadows, water resources, and NTFPs.

(b) Study of impacts of grazing in the Himalayan ecosystem

Because grazing on public lands is a sensitive issue among stakeholders, establishment of rapport with local communities is a prerequisite for conducting this study. Therefore, this study will begin with interactive meetings with local stakeholders to share with them the objectives of the study and to secure their cooperation.

This study will examine the dynamic relationships between the number of grazing animals and their productivity, and between the natural conditions of grazing grounds and the composition of floral and faunal species and their biomass. The assumptions and hypotheses to be tested will be determined prior to the commencement of the study. Relationships between socioeconomic variables, based on information obtained from grazing operators/herders, variables on floral and faunal conditions of areas subject to grazing will be analysed. The first phase of the study will be carried out in Year 4 of the Project, and a follow-up study will be conducted in Year 8.

The outputs include the following: documentation of change in the social and livestock production system, the dynamics of floral and faunal composition of grazing areas and their vicinities, and the relationship between changes in socioeconomic conditions and biodiversity. An assessment of overstocking will also be conducted.

Three graduates from the School of Sustainable Development and three graduates from School of Life Science, Sikkim University will be engaged in the study in three to four locations. They will conduct the study under the supervision of their senior faculty and officials of the Forest Department.

C2-2 Enhancement of the basis for forest management and biodiversity conservation

This component will aim to develop a solid base for sustainable forest and biodiversity management on which the protected area plans for protected areas and working plans for reserved forests will be implemented.

C2-2-1 Redefinition of protected area boundaries and improvement of the protected area network

With the exception of the Khangchendzonga Biosphere Reserve, which includes Khangchendzonga National Park and its buffer zone areas, all protected areas are small and occupy mountain tops

surrounded by reserved forests, khasmal, or farms and settlements. By extending the protected areas and gazetting them as national parks, three distinct advantages will incur: 1) biological stability will be secured through large parks and their connectivity through reserved forests, khasmal, and gorucharan; 2) revenue will be generated through ecotourism because the designation of an area as a 'national park' would attract travel and tourism trade; and 3) Sikkim's protected area network will meet international standards.

(a) Extension and rationalization of protected and primary forest area boundaries

To redefine and extend the protected area boundaries and to select pristine primary forest areas for protection, the following activities will be carried out: 1) examination of rationale and possibility of expanding protected areas through a detailed study of the distribution, movements, and migratory behaviour of birds and animals, and the distribution patterns of plant species; 2) examination of the socioeconomic conditions and perceptions of the forest fringe communities regarding the redefinition of forest categories and boundaries through surveys and stakeholder consultations, 3) redefinition of protected area and reserved forest boundaries based on results obtained from the study and stakeholder consultations; 4) establishment of management zones in the protected areas consistent with the compartment-based zoning system applied to the reserved forests; and 4) survey, demarcation, and gazetting of redefined protected areas and reserved forests.

The consent and support of forest fringe communities must be obtained to stabilize redefined protected area boundaries. To this end, the redefinition and subsequent management of protected and reserved forests must be mutually beneficial to both the communities and the Forest Department.

The state has large number of monasteries which are devoted to cultural ethos of the people of the state. These contains sizeable amount of natural forest. The religious forests need to be protected for biodiversity conservation since they contain sacred groups and wildlife as well. There are institutions attached to these monasteries and students undergoing religious discourses needs to be encouraged to understand the value of such religious forest.

(b) Establishment of protected area boundary pillars

To arrest land encroachment and the degradation of wildlife habitats in the protected areas, concrete pillars, preferably at 20 m intervals, should be erected in areas where protected area boundaries adjoin private land. In total, 750 pillars will be installed along 15 km of protected area boundaries where a protected area shares boundaries with private land. The Project must consult with and obtain consent from the concerned forest fringe communities prior to the erection of the pillars.

(c) Establishment of new national parks

The Forest Department has recently proposed the establishment of Cho Lahmu Cold Desert National Park (500 km²) and Nimphe Wildlife Sanctuary (200 km²). Using the new information obtained for establishing the management information base, these two protected areas will be re-surveyed by the Forest Department to set the boundaries so that they are notified accurately. The procedures to be followed for establishing the two national parks are the same as the procedures described in (a) above.

(d) Improvement and monitoring of the protected area management plans

The Forestry Department developed ten-year protected area management plans for the period 2008/09-2017/18. The project will support the implementation, improvement, and monitoring and evaluation of the plans to bring the management of the protected areas in Sikkim up to the international level. Periodical review of the plans will be mandated. Based on the reviews, modification, addition, and deletion of planned activities and the application of methodologies will be

considered.

The coordination and integration of the protected area management plans with the working plans for reserved forests should be considered in order to manage the biodiversity resources across protected areas, reserved forests, khasmal, and gorucharan managed by the Forest Department. Experts outside of the Department will be mobilised to monitor and evaluate results of the implementation and to provide recommendations for the improving the plans.

C2-2-2 Management and conservation of flagship species habitats

To manage and conserve flagship species, studies will be carried out to estimate their population density and ranges and to understand their migratory, feeding, and reproduction patterns, their interaction with humans, and their forestry and agriculture activities. Understanding their population dynamics in relation to natural and human interventions is particularly important for the sustainable management of flagship species.

In Sikkim, several flagship species can be identified with respect to their high hierarchical position within the food-chain, public popularity, and iconic status. For example, the snow leopard is the most significant ‘flagship species’ of Sikkim. It has been confirmed to inhabit in Khangchendzonga, but nothing is known of its population density or persistence in the entire state. Information on the distribution and relative density of the snow leopard, the relative abundance of prey species, the habitat quality throughout its range, and livestock depredation and resulting human conflicts should be collected. The red panda, blue sheep, and other middle- to large-size mountain animals are also important flagship species. Identifying and establishing observation points to sight them along trekking routes will add to the economic value of ecotourism operations.

C2-2-3 Enhancement of working plans and establishment of forest management zones

Land use of areas outside the protected area network will be redefined under this subcomponent. The working plan for the North District will be developed, and those for the East, South, and West Districts will be revised and improved.

Zonation for forest management will be carried out based on the forest and biodiversity information base. In addition to analyses of information stored in the GIS-based database, which will be developed at an earlier stage under the same component, detailed inventories involving field observations will be conducted to cluster forest areas by topography, soil condition, climate, location, vegetation, and socioeconomic condition. Compartments and sub-compartments will be defined and redefined, and surveyed and demarcated. Surveys will also be conducted to determine the management regime, including the silvicultural regime for each cluster. Public consultation will be conducted before finalising the zonation. A regular monitoring system of forest resources will also be set up and implemented. The outputs of this subcomponent will be included in the forest and biodiversity information base.

This subcomponent will be implemented in-house by Forest Department officials supported by a pair of international and national specialists on forest management. During the project period, from Year 3 to Year 9, 140 km of forest boundaries are anticipated to be set and marked with pillars at an average interval of 100 m. In addition, a total of 140 compartments, 840 plots of natural forests, and 280 ha of plantation forests will be surveyed. The results will be reflected in the working plans and in the GIS database. The costs for field surveys and boundary demarcation will be provided by the Project under this subcomponent. The costs for establishment, operation, and data procurement related to GIS are budgeted under Subcomponent C2-1-1.

C2-3 Facilitation of inscription process of Khangchendzonga Biosphere Reserve on the World Heritage List

The objective of the subcomponent is to assist Sikkim state in enlisting Khangchendzonga and the Lepchas on UNESCO's World Heritage List. Activities for this objective will include 1) preparation of a detailed document on the outstanding universal value of Khangchendzonga and the Lepchas for its inscription on the World Heritage List; 2) assistance to the state in submitting the document to the World Heritage Convention (WHC) of the United Nations Educational Scientific and Cultural Organisation (UNESCO); and 3) full support to the state in hosting the field mission by the World Heritage Committee.

India ratified the World Heritage Convention in 1977 and thus can submit nominations for properties on its territory to be included on the World Heritage List. It currently has five natural properties on the List: Kaziranga National Park, Keoladeo National Park, Manas Wildlife Sanctuary, Nanda Devi National Park, and Sundarbans National Park. Each nominated site is independently evaluated by two Advisory Bodies: the International Council on Monuments and Sites (ICOMOS) and the International Union of Conservation of Nature (IUCN). The former provides evaluations of cultural sites to the World Heritage Committee, while the latter does the same for natural sites. The evaluation process includes a field mission by committee members to the nominated site to meet authorities and stakeholders, and to assess the management and integrity of the site. Every year between May and April, the IUCN carries out a rigorous, year-long evaluation process before providing its recommendations. The World Heritage Committee meets annually in June or July to decide which sites to inscribe on the World Heritage List. It can also defer its decision and refer a nomination back to the state party for further work, or reject the inscription.

To enhance the biological and cultural significance of Khangchendzonga Biosphere Reserve (KBR) and to accelerate the inscription process, the following activities will be considered for implementation under the Project.

- Improvement of habitats through afforestation and assisted natural regeneration of indigenous plant species
- Awareness-building among the general public and local communities on the importance of conservation in KBR
- Capacity development of *Himal Rakshaks* (Honorary Mountain Guardians) to carry forward the awareness programme among visitors
- Instalment of proper garbage disposal facilities, particularly along the trekking routes and nature trails
- Promotion of eco-friendly accommodation in the forest fringe villages
- Enhancement of conservation activities for the protection of certain flagship species like the musk deer, snow leopard, and red panda, which are unique to Himalayan ecosystem
- Anti-pollution activities to keep the water bodies of the KBR pollution-free
- Construction of visitor interpretation centres to depict the uniqueness of the KBR

A proposal for the inscription of the KBR on the World Heritage List has been submitted to the MOEF by the Government of Sikkim. However, the relocation of a village community residing in the KBR needs to be completed for further consideration by the central government to drive the inscription process forward.

(a) Documentation of case history

A team of in-state consultants in biodiversity and anthropology will be assigned to prepare a document on Khangchendzonga and the Lepchas of Sikkim. Extensive local consultations will be held during the

preparation of the document. The document will be evaluated by a committee of state-level experts. It will then be submitted to the state and central governments, who will forward them to the World Heritage Committee.

C2-4 Ex-situ conservation and promotion of biodiversity conservation

Enhancing the global, social, and economic value of biodiversity through raising public awareness on its significance is an essential part of biodiversity management and conservation. In Sikkim, this has been realized through several independent and ongoing initiatives that have increased public support for biodiversity conservation. The objectives of this subcomponent are 1) to strengthen the ex-situ conservation of biodiversity through promoting public awareness, 2) to establish self-sustaining ex-situ conservation facilities by obtaining public support for their management and maintenance, 3) to establish a centre for forest and biodiversity knowledge generation, management, and dissemination, and 4) to establish an endowment fund to finance forest and biodiversity management, conservation, and research activities by inviting financial contributions from public and private sector institutions.

C2-4-1 Ex-situ conservation of biodiversity

Existing ex-situ biodiversity conservation and propagation facilities include all deer, bird, and butterfly parks, memorial and state parks, commercial nurseries, and hatcheries. Thus, Sikkim has a diverse set of locally-initiated activities conducted by various stakeholders on ex-situ biodiversity conservation and facilities for species propagation. Thus, the Project will focus on strengthening ex-situ biodiversity conservation to maximize the population viability of endangered species. At the same time, it will need to invite the public for active participation in ex-situ conservation activities, as the state's financial constraints have thus far hindered the sustainable operation and maintenance of these initiatives. Specifically, the Project will support the Forest Department's plans to establish a butterfly park and a bird park through public and private partnerships. Under the management of the private sector, these two parks will be expected to become popular attractions for potential visitors who are willing to pay for the biodiversity experience. In addition, this subcomponent will include infrastructure development at the Himalaya Zoological Park at Bulbuley, Gangtok.

(a) Construction and establishment of a butterfly park

The Project will extend its support to the establishment and sustainable management of a butterfly park to promote the ex-situ conservation of biodiversity and public awareness. For the sustainable management and maintenance of the park, the public and private partnership model will be applied to promote the user-pay concept. Unique attractions will be strongly marketed by the Ecotourism Marketing Cell (EMC) established under the PMU. Prior to providing support, the feasibility of park management will be assessed through the examination of the current construction plan, management modalities, financial needs, expected number and types of visitors, fee strategies, methods of outsourcing, and terms of contracts with management organisations.

The concept of the butterfly park has been developed since the late 1990's by the Forest Department. The objectives of the park are to promote 1) environmental and ecological conservation, 2) ecological research, 3) education and awareness, 4) tourism and recreation, and 5) aesthetic experience. A detailed construction plan was developed in 2007, and a partial budget for construction was allocated in 2008. One seventh of the financial requirements have been released by the Government, and the facility is currently under construction. The park is on the main road connecting Gangtok and Mangan at about 30km from Mangan facing to the State Highway, a location that should be attractive to visitors. The planned park will cover a 15ha area with 50ha for the buffer zone and consist of four zones: 1) the tourist zone, 2) the core zone, 3) the research and administrative zone, and 4) the buffer zone (FEWMD, 2009j). A cost estimate for the construction and establishment of the park is provided in Annex 9.

(b) Construction and establishment of a bird park

The Project will support the establishment and sustainable management of a bird park to promote the ex-situ conservation of biodiversity and public awareness. Similarly to the butterfly park, the management and maintenance of the bird park will be contracted out to a private institution experimentally to promote the user-pay concept. The bird park will be marketed strongly by the EMC. Prior to providing support, the feasibility of park management will be assessed.

The implementation of the bird park project was approved by the government of Sikkim in 2006, and a detailed project plan was formed in 2008. The objectives of the park are to promote 1) environmental and ecological conservation, 2) ecological research, 3) education and awareness, 4) tourism and recreation, and 5) aesthetic experience. A partial budget for construction was allocated in 2008, and two-thirds of financial requirements are currently approved by the Government. The proposed site is in Rabdents in West Sikkim on the State Highway between Geyzing and Pelling. It is about 10km from Pelling and 100km from Gangtok. The planned park will have a 19ha area with 50ha for the buffer zone and will consist of four zones: 1) the tourist zone, 2) the core zone, 3) the research and administrative zone, and 4) the buffer zone (FEWMD, 2008). A cost estimate for the construction and establishment of the park is provided in Annex 9.

(c) Creation and management of propagation nursery

Four propagation nurseries will be created in lowland areas and one in highland areas for the purpose of ex-situ conservation and dissemination of important indigenous plant species for cultivation, multiplication, and trading. The nurseries will be used to propagate rare and endangered plant species, difficult-to-propagate species, and species with high medicinal and economic values. For indigenous plants with high ornamental values such as the wild orchid, primulas, rhododendrons, and other wild flower species, a floricultural propagation nursery will be created in Gangtok. Measures to generate income will be considered to cover a part of the management costs.

(d) Construction of main office building of Himalayan Zoological Park and veterinary care facility

The Project will seek to enhance the functions of the Himalayan Zoological Park, which is the largest ex-situ conservation facility in Sikkim. Although the park has succeeded in breeding the red panda and in other significant ex-situ conservation functions since its establishment in 1994, its publicity activities and the quality of ex-situ conservation have been constrained by the limited extent of its facilities. The Project will extend support by providing funds to expand its facilities. One main office building and a veterinary care facility will be built to support the management team of the Himalayan Zoological Garden.

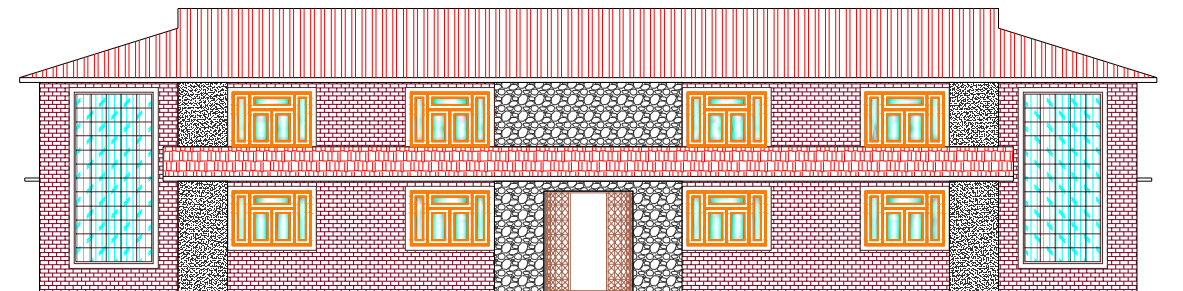
C2-4-2 Knowledge generation and dissemination of biodiversity and best practice information

(a) Establishment of Sikkim Biodiversity Centre

The Sikkim Biodiversity Centre will be established under the Project. A sample design of the centre is shown in Figure 7-1. The Centre will function as a platform for the public to carry out conservation research and related management and extension activities. The Centre will include a research, training, and outreach section, a visitor centre, a GIS and remote sensing laboratory, an ENVIS Centre and its reference library, and a multipurpose space for open seminars and school exhibitions. In addition, the Centre will provide office space to the secretariat of the Sikkim Endowment Fund, the State Biodiversity Board, the Pollution Control Board, and research teams funded by the Endowment Fund and other internal and external sources. A water quality analysis laboratory will be built for the Pollution Control Board. The Centre will be managed by the Forest Department, which may provide

personnel as the Director of the Centre. Two additional full-time staff will manage the Centre. External users such as research teams and conference participants will be charged a fee to finance the Centre's operational costs, and the amount to be charged should be determined accordingly.

The GIS laboratory, which will receive support from the Project, will play the central role of the Forest Department's management and monitoring information system, which will connect frontline officers to the top management. The information system will be developed carefully to maximize benefits of modern technology. The research, training, and outreach section will utilise an interpretation centre, which will be built next the Biodiversity Centre under C3, the ecotourism component.



FRONT ELEVATION

Ground floor area: 5,950 ft² or 553m²

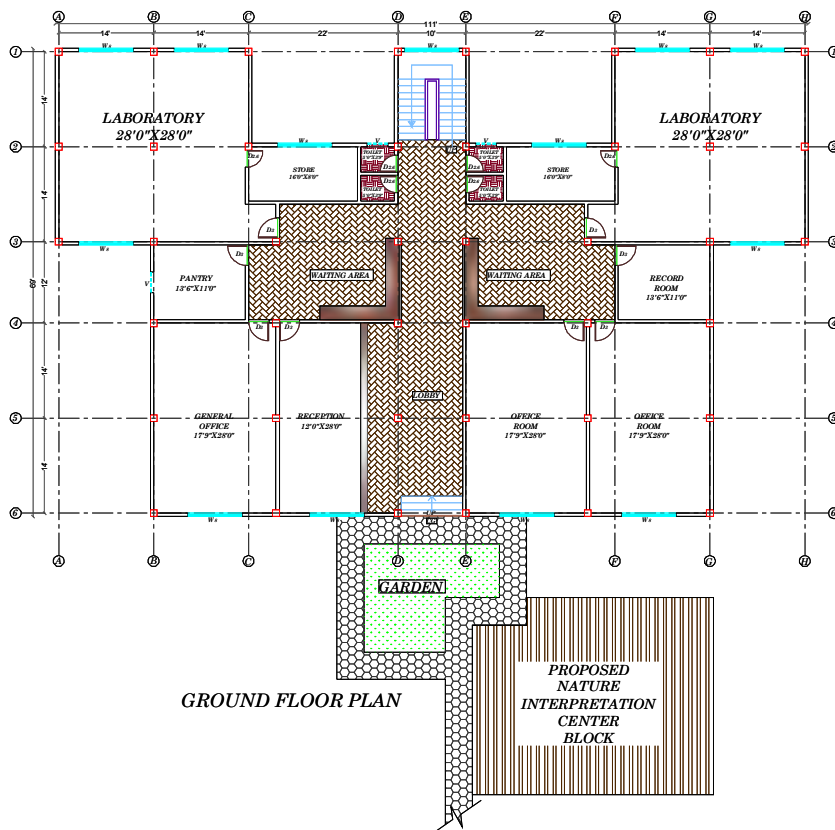


Figure 7-1 Sample design of Sikkim Biodiversity Centre

(b) Grant scheme for enhancement of biodiversity research and extension

A research and extension grant scheme for the enhancement of biodiversity research and extension activities by concerned parties will be managed by the research, training, and outreach section of the Sikkim Biodiversity Centre. The scheme will provide a window of opportunities not only for the Forest Department but also for universities, schools, local governments, the private sector, NGOs, communities, and individuals to engage in the conservation and management of biodiversity and in raising awareness about sustainable resource use.

The grant scheme will be financed by proceeds generated by the Sikkim Biodiversity Endowment Fund. The Project will temporarily provide funds to the scheme before the Endowment Fund becomes operational. The Sikkim Biodiversity Endowment Fund Management Committee (C2-4-3) will serve as the grant committee, which will approve annual budgets, and activities, proposals to be awarded, and schools for student workshops. Examples of activities to be financed and the procedures for the selection of beneficiaries are listed in Table 7-1.

Table 7-1 Eligible activities under the grant scheme

Activity	Objective and beneficiaries	Selection method
College graduates field grant	Research (graduate students)	Competitive and merit base selection (3-5 research/year)
University/college nature workshop	Extension (universities and colleges)	Planned in annual budget
Teachers' nature workshop	Extension (school teachers)	Planned in annual budget
School student workshop	Extension (school students)	Planned in annual budget
Biodiversity Day	Extension (general public)	Planned in annual budget
Annual protected area manager's meeting	Monitoring and evaluation (forestry officials)	Planned in annual budget
Annual JFMC, EDC, and PSS meetings	Experience sharing (members of JFMCs, EDCs, and PSS's)	Planned in annual budget

(c) Production and dissemination of booklets on best practices

Booklets on best practices regarding biodiversity conservation and management and its appropriate utilisation will be produced and disseminated to school children, tourists, and the general public at festivals, fairs, and public events.

C2-4-3 Promotion of biodiversity conservation in religious areas

(a) Promotion of biodiversity conservation at monasteries, secret groves, and other religious areas

In Sikkim, large tracts of forest are secret groves under the management of religious institutions such as monasteries and temples. These secret groves and forests bear not only religious and cultural values but are also highly important in terms of biodiversity because they have long been protected. The Project will support the conservation of such secret groves and other religious areas by providing technical services and by enhancing their plantation and protection activities of religious institutions.

7.2.2 C3 Ecotourism component

The ecotourism component is designed to develop and improve the sector for the benefit of local forest fringe communities while ensuring environmental conservation. It focuses on 1) policy, regulation, and resolving bottlenecks impeding the development of the sector; 2) marketing Sikkim's ecotourism

opportunities and creating linkages between suppliers; 3) developing areas for specific forms of tourism; 4) developing ecotourism facilities; 5) improving the design, production, and sales of handicrafts; 6) devising a waste management collection and disposal system at selected tourist areas; and 7) capacity building.

The ecotourism component of the project has two principal objectives: 1) providing income generation opportunities to local communities living in the forest fringe, and 2) ensuring that the impacts of developing ecotourism do not damage the environment.

The impacts of this component are three-fold:

- Ecotourism is developed in every district of Sikkim following sound environmental and business principles, restrictions impeding the operation of ecotourism are eased, and the sector is well understood by all stakeholders.
- Ecotourism in Sikkim is strongly marketed in India and abroad, and awareness of the ecotourism opportunities available to enjoy is raised in the appropriate marketplaces.
- Many jobs are created for the local communities, and income generation opportunities are improved and multiplied.

The main public sector implementation organisations and partners are the Forestry Department, executing the project through the JFMC, EDC, and PSS schemes, and the Tourism Department. Other state government departments will be brought in for implementation of certain project components. The main partners in the private sector include the Travel Agent Association of Sikkim (TAAS), the Sikkim Association of Adventure Tour Operators (SAATO), and the Sikkim Hotel and Restaurant Association (SHRA) as well as the local communities that are or will become tourism service providers. NGOs will also be involved in certain activities.

This component links with several other components in the project such as the development of national parks in Sikkim; biodiversity and environmental conservation; income generation; microfinance; and capacity building of government officers, JFMCs, EDCs, and PSS's as well as local communities.

In principle, activities such as the establishment of JFMCs, EDCs, PSS's, and SHGs and the provision of training to their members will be implemented through the joint forest management component⁷³. Ecotourism activities of local communities will be treated as income generation activities (IGAs) of SHGs and will be eligible for receiving project support through, for example, the microfinance to be provided through the JFMCs, EDCs, and PSS's.

C3-1 Formulation of a policy and regulatory environment for ecotourism

This subcomponent consists of two main activities: 1) formulating an ecotourism policy, which will be officially notified under the Forest Conservation Act; and 2) resolving bottlenecks impeding the development of the ecotourism sector. It addresses the project objectives of conservation and greater income generation opportunities through the increased number of tourists visiting the state.

C3-1-1 Formulation of an ecotourism policy

The objective of this subcomponent is to ensure that the stakeholders of Sikkim have a common understanding of the concept of ecotourism and that tourism infrastructure is constructed respecting acceptable environmental and cultural standards. The formulation of the policy will be under the responsibility of a committee of foremost Sikkim stakeholders who will draft, publicise, and ensure the

⁷³ Some of the specialised training will be dealt with under the ecotourism component.

official recognition of the policy. A consultant will be appointed to carry out the research, produce the draft, and organise a public consultation process that will elicit the views of interested stakeholders so that they are taken into account. Once approved by the State Assembly, the policy will be notified and incorporated in the Forest Conservation Act.

The impacts of this subcomponent will be that future tourism structures in the forest area and pathways in the mountain are constructed in an environmentally sensitive manner and that visitors and local residents act responsibly in the forest area, thus protecting the nature and culture of Sikkim.

(a) Establishment of ecotourism policy committee and development of the draft policy

The ecotourism policy will be formulated by a specially-convened committee comprising 11 members total. From the public sector, one senior representative from each of the following government departments will be included: Forest, Tourism, Rural Development, and Ecclesiastical. From the private sector, one representative from ECOSS and two representatives from each of the following industry associations will be included: TAAS, SAATO, and SHRA. A series of preparatory meetings in collaboration with the PMU will be held to discuss plan formulation, the appointment of a consultant, and the public consultation process. A consultant will be recruited to study international and national ecotourism policies as well as related national, regional, and state policies that may be linked to the proposed Sikkim ecotourism policy. The consultant will present the research findings to the committee and produce a draft policy document. The public will be invited to contribute ideas and comments about what should be included in the policy. The intent to formulate the policy will be announced through the media so that interested parties can register their ideas and comments. Based on the report, a draft of the policy will be released for public consultation.

(b) Organisation of public hearings in the four districts

Public meetings will be arranged and publicised through the district authorities. A meeting will be held at each of the four district centres to elicit stakeholders' reactions and comments about the policy.

(c) Finalisation of the policy and organisation of a publicity campaign

The final document will be approved by the State Assembly and notified under the Forest Conservation Act. The policy will be printed for distribution to stakeholders and to the media, and a campaign to publicise the content of the policy throughout Sikkim will be launched. The campaign will involve announcements in the media, a media conference, the issuance of press kits for the media and information for the trade, and inclusion on the Forest Department website.

C3-1-2 Improving tourism operating conditions in Sikkim

Operating conditions for the tourism sector are impeded by several obstacles that need to be eased. These include

- the difficulties encountered by foreign tourists to obtain Inner Line Permits outside Sikkim;
- the limited time that foreigners are authorised to remain in Sikkim;
- the Restricted Area Permits and Protected Area Permits that have to be obtained at different offices and the need to obtain trekking permits, which for some treks takes a long time;
- areas that foreigners are not allowed to visit;
- the restriction on group size of at least two people for foreigners who want to visit restricted areas; and
- vehicular restrictions imposed on travelling around Sikkim.

This subcomponent aims to encourage the easing of these restrictions by demonstrating through an

economic impact study the extent of revenue lost to the Sikkimese economy because of these restrictions, which discourage visitors, especially foreign tourists to visit the state. The study will be presented at a conference organised in Gangtok to which senior officers from the central and state governments will be invited. A delegation will follow up the issues at a later date in Delhi.

The impacts of this subcomponent will be simpler permit procedures and less stringent travel restrictions, resulting in an increase in the number of visitors to the state.

(a) Economic analysis

A consultant will be recruited for a period of two months by the same committee responsible for the formulation of the ecotourism policy to prepare an economic impact study. This study will focus on revenue lost due to entry and travel restrictions in place in Sikkim and will provide recommendations and an action plan to solve the problems. He/she will attend the conference described below to present the findings of the research.

(b) Dissemination of study results and organisation of a publicity campaign

A conference will be organised in Gangtok to present the findings of the economic impact study, emphasising the revenue lost due to entry and other travel restrictions. Senior representatives from the Ministries of External Affairs, Home Affairs, Tourism, and Development of Northeast Region (DONER) of the central government will be invited to the conference. Representatives from the Indian Association of Tour Operators (IATO), Adventure Tour Operators of India (ATOI), and Domestic Tour Operators of India (DTOI) will also be invited. From the state, the Forest Department, Tourism Department, Defence Border Roads Organisation (BRO), TAAS, SAATO, SHRA, and the media are invited.

One month after the conference, the national and Sikkim media will be contacted directly or through press releases to highlight the findings of the report and the problems that have been identified to generate further coverage and to capture public attention within and outside Sikkim prior to the visit of the delegation to Delhi. A five-person delegation comprising senior members of the Forest Department, the Tourism Department, TAAS, SAATO, and SHRA will travel to Delhi to discuss with the relevant ministries the prospects of resolving the obstacles impeding the full potential of ecotourism development in Sikkim. This will involve air travel and hotel stay during the five-day trip.

C3-2 Ecotourism marketing

The ecotourism marketing component consists of several subcomponents: 1) the formulation and implementation of a five-year marketing strategy to promote ecotourism in Sikkim, including the organisation of a series of ecotourism events and festivals, funded by the project, throughout the state; 2) the selection of a funding scheme to finance the subsequent marketing strategies; and 3) the execution of an initiative to link tour operators with local communities offering tourism services.

The impact of the ecotourism marketing component will be that greater awareness of Sikkim as a tourist destination is created in national and international market places, resulting in an increase in the number of tourists that come to Sikkim to enjoy ecotourism and adventure tourism activities, thus generating revenue and employment for local communities. The strategies should promote the inclusion of well-known tourist destinations such as Darjeeling into the ecotourism packages organised for destinations in Sikkim.

C3-2-1 Establishing Ecotourism Marketing Cell

This subcomponent details the formation of an Ecotourism Marketing Cell to be established under the

PMU in order to address the weak marketing of Sikkim.

(a) Establishment of the Ecotourism Marketing Cell (EMC)

Tourism professionals will be recruited from the private sector to form the EMC, which will be established under the PMU. During the project period, the cell will facilitate the establishment of the Sikkim Ecotourism Development Corporation in Year 5 of the Project (C3-6). EMC members will be experienced tourism marketers with excellent track records. Their salaries will reflect market rates equivalent to those of corresponding professional levels in private sector organisations. Advertising locally and nationally may be required to recruit them.

The EMC will be headed by a Chief Executive officer and will comprise two sections. Each section will have one manager and one assistant. Most of the initiatives will be outsourced to specialist companies. The organisational chart of the unit is shown in Figure 7-2. The Chief Executive will be responsible for formulating strategy with section managers, reporting to the PMU, and assuming the role of spokesperson for the development of ecotourism in Sikkim.

The Product, Sales, and Advertisement Manager will be responsible for managing linkages between the ecotourism service providers in Sikkim and tour operators and travel agents within and outside Sikkim as well as for advising service providers on how to develop and improve their products. He/she will compile and maintain a sales manual for ecotourism in Sikkim aimed at domestic and international trade. He/she will also be responsible for overseeing the construction of infrastructure proposed for the Project. The manager will also perform publicity functions including the production of collateral material, media advertisement, and maintenance of a website. Most activities will be outsourced to advertising companies. He/she will attend trade fairs with the Marketing, Events, and Festivals Manager and assist sections as and when needed.

The Marketing, Events, and Festivals Manager will be responsible for all activities related to public relations including developing relationships with the media, organising fam trips, seminars, and presentations on Sikkim, and organising and managing an events programme. The manager will also gather information on the tourists that visit Sikkim or could potentially visit Sikkim to understand their behaviour and their needs, on competitors and their performance, and on general marketing trends.

Annex 10 provides an example drawn from the 2007 Uttarakhand Tourism Development Master Plan of activities performed by a typical marketing department of a typical tourism organisation.

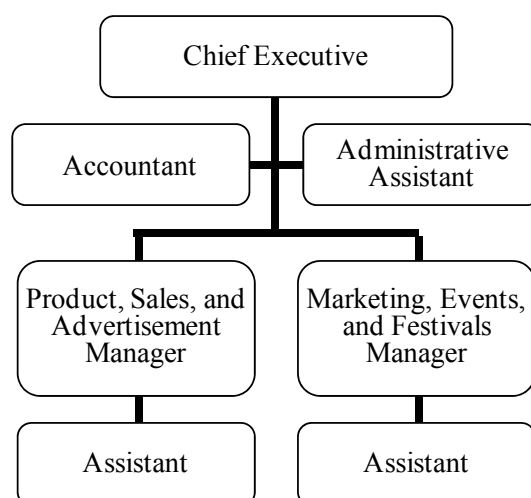


Figure 7-2 Organisation of Ecotourism Marketing Cell

C3-2-2 Formulation and implementation of a five-year ecotourism marketing strategy

A marketing strategy is essential to target and attract the desired tourist segments to the state.

(a) Formulation of the five-year strategy

The strategy will be formulated by the Chief Executive in collaboration with the section managers. It will be reviewed and approved by the board. The five-year ecotourism marketing strategy will include the following:

- A promotion and branding strategy targeting selected markets in India and abroad that would be attracted to enjoy ecotourism in Sikkim
- A PR strategy to build up relationships with the media and with suppliers
- An ‘ecotourism events and festival’ strategy, which will support 6 festivals annually. These could include cultural festivals organised by the various ethnic groups so that they are promoted to tourists well in advance and made ‘tourist-friendly’. Others include ecotourism and sports events such as flower shows, mountain bike challenges, and archery meets. A list of potential cultural festivals to support is included in Annex 11. The proposed budget for each event is INR 50,000. An additional budget will be allocated to this strategy
- A product development and improvement strategy, which will provide local communities offering tourism services with advice and possible access to microfinancing. This will also include an initiative to link tour operators with ecotourism service providers in the local community. This is described in more detail below.
- A market research strategy to provide essential information on the markets visiting Sikkim and potential markets that should be targeted in the strategy.

The activities related to the strategies will be scheduled over the five-year period with responsibilities and resources allocated.

(b) Implementation of the five-year strategy

An annual fund will be allocated for the first five-year strategy to finance the implementation of the activities proposed in the yearly operational plans. Additional funds will be allocated separately to the ‘ecotourism events and festival’ strategy and the initiative to link tour operators with ecotourism service providers. The budget should be allocated according to the following formula:

- | | |
|--|------------------|
| • Product, Sales, and Advertisement Section: | 60% of the funds |
| • Marketing, Events, and Festivals Section: | 35% |
| • Activities of the Chief Executive: | 5% |

However, these percentages are indicative, and the Chief Executive will decide the allocation of final annual budgets as circumstances change and situations unfold, subject to the board’s and the PMU’s approval. A monitoring system that oversees the effectiveness and progress of the strategy will be applied during the implementation phase.

C3-2-3 Selection of a funding scheme to finance the subsequent marketing strategies

To ensure the sustainability of the marketing efforts after the first five-year strategy, a funding mechanism for operational costs and salaries and implementation budgets, must be agreed on and applied in the Years 5, 6, and 7 of the Project.

(a) Research of potential future funding methods for the EMC

This activity will be the responsibility of the Chief Executive, who will compile a series of options for the PMU to consider. Options used in other destinations are presented in Annex 12.

(b) Establishment of a funding system

The EMC will take the appropriate actions to establish the new funding system. These should be introduced as soon as the system is agreed on so that extra funds can be generated even during the project period. Kerala for instance, which has a very healthy tourism industry, receives INR 80 million a year to market the state; therefore Sikkim must generate extra funds to compete on an even keel.

C3-2-4 Creating links between tour operators and local communities offering tourism services

This subcomponent is important for providing connections between producers and suppliers in the supply chain. It will also play an important role in the product development and improvement strategy. Product, Sales, and Advertisement Manager will be in charge of the activities described in this subcomponent.

A total of ten villages will be the focus of the project over its ten-year period. It is important to build successful initiatives when the demand is still relatively weak rather than develop ecotourism in too many or all the villages. Once the number of ecotourists increase in Sikkim, these pilot initiatives will be models to replicate in the future.

These villages will be the focus of the Project's village tourism development initiative. The selected villages will be 1) linked up with tour operators and 2) set up with an environmental collection and clean-up system. In addition, these villages, through their respective JFMC, EDC, or PSS, will be 3) provided with training on ecotourism service provision; 4) given training on handicraft design, marketing, and sales; and 5) set up with a microfinancing scheme to help service providers develop and improve their products. The training of villagers and provision of microfinance are described under C4.

The criteria for selecting the ten villages will be the following:

- There are good tourism attractions within easy reach of the village.
- The village is accessible.
- Some accommodation is already developed in the village, eg, homestays and guest houses as well as some local cultural attractions to show tourists, eg, cultural shows, handicraft centres.
- There is willingness to develop tourism using sound business principles, ie, work with the supply chain.
- Stakeholders are enthusiastic and serious about developing ecotourism.
- There are clear community benefit-sharing opportunities to avoid all services being provided by just a few of the wealthier or more prominent stakeholders.
- The local administration supports the development of ecotourism and provides an enabling environment.
- The village and its surrounds should have sufficient households to make the investment viable.

Villages with ecotourism development potential have been identified and listed in Table 7-2. However, this list is indicative, and other villages may be also considered.

Table 7-2 Villages with ecotourism development potential

District	Villages
East	Pastanga, Rey Mindu, and Aritar
North	Lachung, Lachen, Upper Dzongu, and Lower Dzongu
South	Kewzing, and Lingee
West	Uttaray, Hee-Goan, Martam Bermoik, Rinchenpong, Okhray, Yuksom, Darap, and Khechepaltri

Ten villages will be selected by the EMC for prioritisation over the project period based on the criteria described above. The Product, Sales and Trade Promotion Section of the EMC will survey the villages and evaluate each against the selection criteria in collaboration with the District Facilitation Unit (DFU)⁷⁴. It will then propose the candidate villages to the board and the PMU for their approval. As the Project's primary objective is biodiversity conservation, these villages must be willing to participate in joint forest management and to establish a JFMC, EDC, or PSS.

(a) Organisation of study tour for tour operators to visit villages

A total of 20 tour operators will be invited to Sikkim to visit the ten selected villages. The objectives of these visits will be for tour operators to assess the facilities and the opportunities available in Sikkim and to provide the service providers with advice on how to improve their products to increase their chances of being included in tour operator packages. It is suggested that ten tour operators from Sikkim and the neighbouring areas and 10 tour operators from main tourist generating areas of India be selected. Tour operators from Delhi (3), Kolkata (3), Mumbai (2), and Bangalore (2) are recommended to be invited to Sikkim. Workshops will be organised in each of the villages visited.

The same tour operators will be invited back to the villages one year later to see the improvements. They should visit the villages that they didn't visit during the first trip. If some of the operators drop out of the second visit, they can be replaced with other operators.

C3-3 Development of ecotourism areas with respect to specific market segments

To encourage different markets to visit Sikkim, diverse products must be developed at selected areas in the state: high-quality ecolodges to attract the high-end market, areas for the special interest markets such bird watchers and rock climbers, and products for the active market such as trekkers. The activities in this subcomponent will be under the responsibility of the Product, Sales, and Advertisement Manager of the EMC. The EMC will consult with the DFUs in selecting the sites.

C3-3-1 Construction and management of high-end ecolodges

Four ecolodges will be built within areas offering exceptional ecotourism assets aimed at the wealthier domestic and international markets with an interest in nature and in experiencing local culture. Initially, these will be given to experienced management teams to be run professionally. Depending on the business model adopted for the operation of each lodge, the following conditions must be included in the contract. Selected companies will be responsible for

- marketing the lodge and the local area to domestic and international markets;
- achieving performance targets, which will be reviewed annually, that provide appropriate profits to ensure the sustainability of the venture;
- training local community members to be employed at the lodge;
- integrating local community members selected to pursue management courses into the workforce

⁷⁴ This team will be established under the joint forest management and biodiversity management component.

- in executive positions once they have graduated, thus providing them with a guaranteed job;
- maintenance to be financed through the revenue generated by the lodge; and
- executing exit strategy for an agreed number of years so that trained local community members can take over the management of the lodges.

The market targeted for the ecolodge will be wealthy clients, and the rack rate per night will reflect the high quality facilities and services that will be provided. Revenues can be as high as 20% on sales. Ecolodges that operate at a loss tend to lack finance to expand and to market. Annex 13 provides a summary of a recent study on ecolodge economics and finance.

As the objective of the project is conservation and income generation in forest fringe areas, profits generated by the lodges should be invested in

- community development projects in the areas near the ecolodges;
- conservation projects;
- salaries for staff of interpretation centres, orientation centres, and museums; and
- budget support for the EMC.

The constructions proposed for the ecolodges and for all the structures and buildings proposed in subcomponent C3-4 will follow the same architectural stages, as described below. Only the length of time from site selection to final construction will vary depending on the type and size of construction.

- Selection of site: Research is carried out on the expected flow of tourists, and a site analysis assessing the feasibility of the Project is completed, including the size of areas for the design proposed, soil analysis, and contour survey analysis. The sites to be selected should be under the jurisdiction of the Forest Department. The local residents must be supportive of the idea of this subcomponent and be willing to protect and manage the surrounding environmental assets.
- Data and project requirement analysis: The design requirements are framed as per the basic standard needs of the projects with area determination, and built up area is calculated as per design proposal.
- Conceptual design of the structure and preparation of working drawings and blueprint plans
- Construction phase, site supervision, and monitoring of the project

(a) Recruitment of a hotel management consultant and company

A hotel management consultant with experience in negotiating management contracts will be recruited to advise on the best management contract model to be adopted. He/she will identify a potential hotel management company that may be interested in the venture and will settle an acceptable contract incorporating the conditions detailed above.

A hotel management company's strength lies essentially in its marketing and distribution system. It is crucial that the owner's expectations are closely aligned with the management company's strategic plan, as a brand and as an operating entity. It is also important that the business philosophies and corporate cultures are compatible. On assuming operating responsibility for a property, a hotel management company strives to secure the financial performance, high level of guest satisfaction, and well-being of associates who work for the hotel. The key highlights of a hotel management company are a comprehensive marketing direction, in-depth management systems, extensive training and support, thorough accounts control, and invaluable human resources support.

The management company will assess the property, conduct a market feasibility study, and execute a GAP analysis to ascertain the modifications required to bring it up to brand standards. It will then proceed to exchanging agreement and commercial terms. The basic commercial terms of a contract with the management company can be divided into three components, as shown in Table 7-3.

However, there are other models that can be negotiated. Indian hotel management companies that were contacted during the Study were cagey, if not reluctant, to provide firm figures for the contract terms. In the absence of this data, the figures that are presented here reflect the situation that exists in Europe. Annex 14 provides a full article about the options followed in Europe from which these figures were taken.

Table 7-3 Basic commercial terms of an association

Items	Terms
1. One time signing fee (payable at the time of signing the agreement)	
One time signing fee:	A fixed sum per room
Technical fee:	A % of the project cost (excluding cost of land)
2. Fee towards expenses (payable at the time of signing the agreement)	
Technical fee:	A fixed sum (depending of the stage of the project)
Brand installation:	A fixed sum
3. Recurring fee (starts from the day the hotel begins operations)	
Service fee:	A % on the gross operating income
Central Marketing Initiative:	A % on the gross operating income

Source: President ITC Fortune, personal communication, August 13 and 18, 2009

There are several components to the remuneration received by the management company:

- The base fee, which is the payment for the service performed by the management company: This ranges from 2% to 4% of total revenue.
- The incentive fee, which is a performance fee based on profits made after reaching an agreed level of revenue: This may be a percentage of gross operating profit or a percentage of net operating profit. Typically, management companies receive 10% of gross operating profit, although more complicated formulae may be negotiated with scaled incentives or lower base fees but higher incentives.
- Other charges to the owner: These may include the use of the operator's reservation system, sales and marketing contribution, accounting charges, purchasing cost, and license or franchise fees, typically 1% to 4% of gross room revenue.
- Owners and management companies usually agree on minimum revenue that must be achieved over the financial year. If there is a shortfall, the management company must make this up. This is known as the operator guarantee (Bader and Lababedi, 2007)

One firm may take on the management of all the lodges under one marketing brand, or different management companies may be contracted.

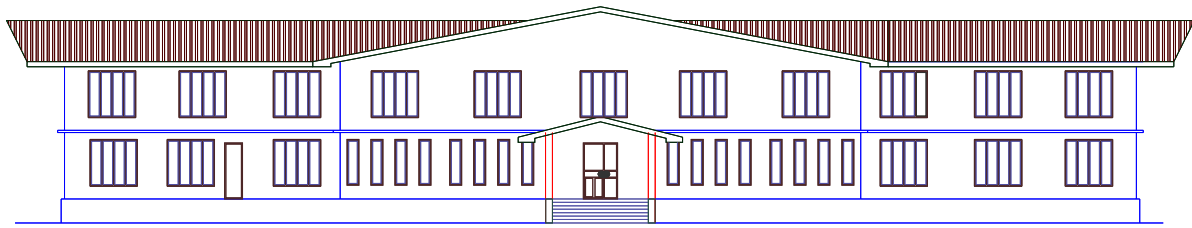
(b) Construction of ecolodges

The management company's architect will review the plans and the location of the lodge and will make recommendations on the design and facilities to adapt them to the markets that will be targeted. An image of the ecolodge with total floor area 2,185m² is shown in Figure 7-3. Suggested locations for the ecolodges are shown in Figure 7-4, and are:

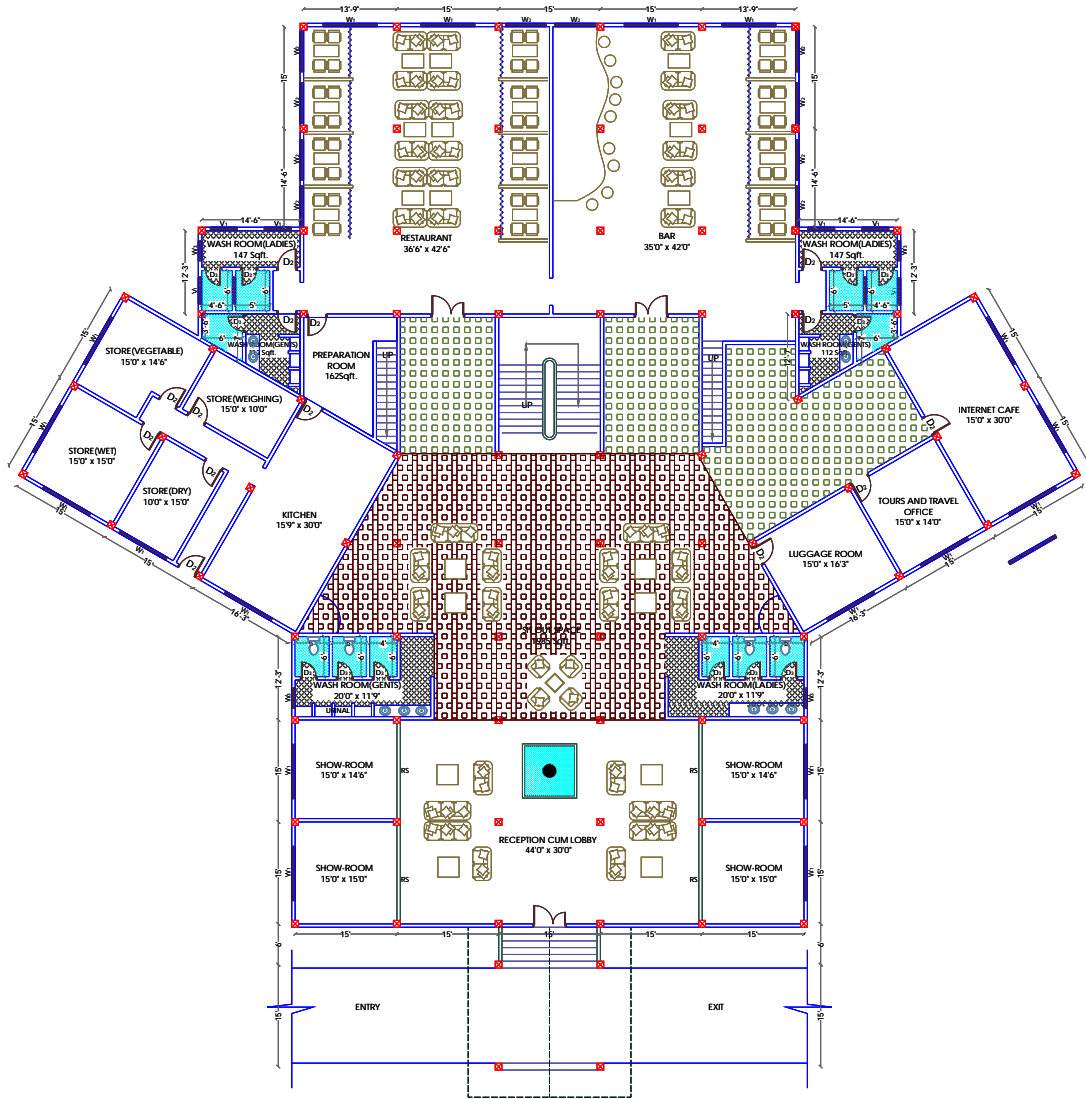
- Upper Dzongu area: protected area at the entrance of the Khangchendzonga National Park, dense forest area, rich biodiversity, home to the original inhabitants of Sikkim, the Lepcha community
- Hee Goan area: culture, trekking opportunities, near the Varsey Sanctuary
- Okhray area: near the Varsey Sanctuary (other side to Hee-Goan), can link to an international standard trek, high potential for bird-watching

- Aritar area: scenic beauty, lake, historically well known spot for relaxation, biodiversity and high potential for bird-watching

It is important that these are built on land owned by the Forest Department so as to not incur additional costs of purchasing land. Selection criteria include scenic beauty, opportunities for visitors to learn about local culture, availability of services such as water and electricity although some renewable energy may be used, and most importantly, that local communities can be involved with the lodge either as employees or as suppliers.



FRONT ELEVATION



GROUND FLOOR PLAN

(Source: Study Team)

Figure 7-3 Sample plan of an ecolodge

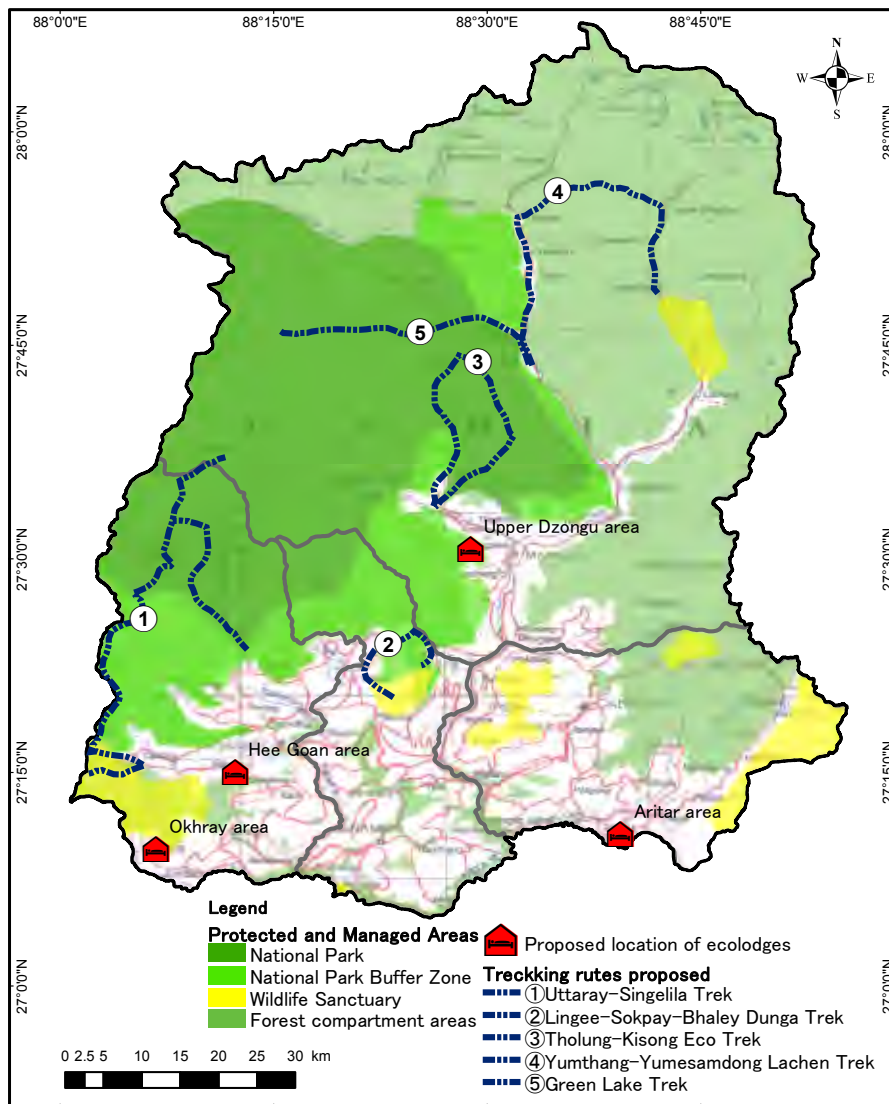


Figure 7-4 Proposed locations of ecolodges and trekking routes for development

An architectural firm will be selected, and the detailed plans will be developed and adjusted. Next, a call for tender for construction will be released, the proposals received will be evaluated by the EMC, and one or several firms will be selected to build the lodges. These will be built in local style using high quality local material. It will take approximately one year from selection of the site to completion of the construction. The building of the ecolodges will be phased over four years.

Each lodge will comprise 20 double bedrooms or separate cottages with en-suite facilities, balcony, common areas, restaurant, bar, spa/treatment centres, health centre, small gymnasium, meditation room, and library. Access, walkways, nature trails, landscaping, and outdoor lighting in the surrounds will be unobtrusive so as to blend in with nature. Opportunities to enjoy activities in nature as well as cultural activities will be offered at the lodges. These should be provided by the local community, ie, nature walks, short treks, rental of mountain bikes, bird and wildlife-watching, angling, village walks, monastery visits, cultural shows, and visit to handicraft centres.

(c) Training of management and service staff

In each proposed area, four local community members selected by each JFMC, EDC, or PSS will be sent to high level management training colleges in India to pursue management degrees, eg, the four-year BA Hotel Management course at Manipal University in Southwest India,. They will eventually be employed by the lodges. However, it should be made clear that selected people are obliged to return to take up their guaranteed position at the lodges. If not, they will be asked to repay the cost of tuition with an additional sum as compensation.

Around 40 local staff will be employed at each of the lodges in most functions. Their selection will be made by the JFMC, EDC, or PSS under the supervision of the management company. Training will be carried out mostly in-house. It will start prior to and during the construction of the ecolodges so that enough local staff are able to start work immediately by the opening. Training will last around six months on and off. The management company should organise the training, but the expenses will be borne through the Project. Some skills training may be necessary at institutions such as at the Sikkim Hotel Management Institute on an ad hoc basis.

(d) Environmental principles in the design, construction and operation of the ecolodges

It is important that the ecolodges are designed and built with sustainability in mind and managed following sound environmental principles. These principles must be applied at each stage of the construction process from site selection to architectural design and the use of building materials and during the operation of the ecolodges such as adopting the optimal use of renewable energy and using the best solid and liquid waste disposal methods. Several experts have formulated guidelines for building and managing ecolodges, most notably Hitesh Mehta and Hector Ceballos-Lascurain. According to Hitesh Mehta, an ecolodge is an accommodation facility that must embody the main principles of ecotourism. Those main principles are

- conservation of neighbouring lands;
- benefits to local communities; and
- interpretation to both local populations and guests.

Hitesh Mehta, editor with Ana Baez and Paul O'Loughlin of the seminal book *International Ecolodge Guidelines*, presents guiding principles for the building and operation of ecolodges, a summary of which is presented below. It is recommended that these are applied during the construction and operations of the ecolodges in Sikkim.

Site selection

A site should be selected whereby the ecolodge itself would not directly affect the focal ecotourism attractions of the area or visually compete with these attractions. Look to see if the site has the backing of a mountain or a large land form and flanking hills to either side. These elements will provide a sense of support, enclosure and balance.

Conservation of surrounding flora and fauna

Take into account the area's biodiversity, any specific ecosystems, and the site's relationship with any nearby farming or fishery resources, minimising all environmental impact. Whenever possible, develop the construction in previously disturbed sites.

Inclusion of indigenous materials

Use endemic and previously existing plant communities for elevation, rainfall, topography and soil type. Include plants that are important to the regional culture and integrate them or their products into the daily experience of the visitor.

Working relations with the local community

Consider organising an initial session with architects, developers, local people and the authorities, so local people feel that they are part of the decision-making process.

Water conservation

Use alternative, sustainable means of water acquisition and reduce water consumption: low-flow showerhead sprayers, aerators, and restrictors; flow-control aerators for taps; water-conserving dual-flush toilets; 'dry' composting toilets; waterless urinals; tap-aerators; and night-timed drip-irrigation systems.

Careful handling and disposal of solid waste/sewage

Regularly sort non-biodegradable wastes (glass, plastics, etc.) for transport out of the protected area to the nearest dumping/processing facilities. Biodegradable waste can be turned into compost for landscaping purposes around the lodge. Avoid using incinerators, as they pollute the air.

Energy conservation

Meet energy needs through passive design and renewable energy resources. Limit the use of air conditioning to areas where the rigid control of humidity and temperature is strictly necessary.

Conscientious construction

During construction, have minimal impact on the natural environment, provide training for workers, and require conservation clauses in the contract with the building contractor. Also, the building site should be clean with minimal disturbance to the surrounding environment, and it should discourage scavenging wildlife. Use traditional building technology and materials wherever possible.

Environmental aesthetic

Buildings should not dominate the landscape and/or surrounding vegetation but blend with local physical and cultural environment through form, landscaping, and colour, as well as through the use of local traditional architecture. Consider the ecolodge a continuation of a protected area, a forest, or a coastal system, and avoid the barriers that could make it an island.

Manmade environmental features

Investigate the feasibility of a constructed wetland system should sufficient funds and space on site permit.

Careful introduction of tourism

Determine the visitor impact on ecosystems at the proposed site and in surrounding areas. The size and capacity of natural areas should be determined on the basis of limiting certain factors, eg, the ecological vulnerability of the area; water and energy availability; and space, access and general site conditions,

including visual compatibility. Propose tourism activities that benefit local communities and the environment.

Furthering education

Offer educational interpretive programmes to both employees and tourists about the surrounding natural and cultural environments. Consult with local elders and historians to draw on themes from local culture (Mehta et al, 2002).

(e) Profit loss analysis of the ecolodge

The annual profit and loss account of an ecolodge once it comes into full operation is shown in Table 7-4. This assumes an average occupancy rate of 25% and a net selling price of INR 8,000. Since the selling price is high, the best locations should be selected for the lodges, and high quality services must be provided in tandem with strong marketing efforts. Based on their track records, HVS International and Uppal Hotels Private, Limited in New Delhi are likely to be interested in managing these lodges.

Table 7-4 Annual profit and loss account of one ecolodge

Assumptions			
1) No. of rooms			20
2) Rates per room per night			10,000
3) Less, commission to agents or discount @ 20%			2,000
4) Net selling price			8,000
5) Average annual occupancy (considering the seasonality in the mountain areas)			25%
6) No. of employees including one manager, as per present industry index in India			30

Items	INR	% to income
A. Income	17,700,000	100%
1) Room sales: 25% of INR 8,000 x 20 rooms x 365days	14,600,000	82%
2) Restaurant, bar, and other sources	3,100,000	18%
B. Expenditure	11,800,000	67%
1) Employees salary	4,000,000	23%
2) Food and bar materials	2,000,000	11%
3) House Keeping	1,000,000	6%
4) Marketing, Sales, Publicity, etc.	2,400,000	14%
5) Miscellaneous Expenses including Maintenance, Staff Uniform, Welfare, etc.	2,400,000	14%
C. Profit before depreciation, interest, taxes, etc. (A-B)	5,900,000	33%

C3-3-2 Development of trekking routes

Trekking opportunities in Sikkim are excellent, but as previously mentioned, traffic is mostly concentrated on one trek. The Master Plan for Trekking, Sikkim (INTACH, 2002) provides a comprehensive overview of the treks that are available and describes a total of 22. Its recommendations are fully endorsed, and this document should be used as the main reference for this subcomponent. Four international standard trek routes will be created and marketed. These may be existing treks that need improvement or new trails. A number of smaller treks linked to villages will

also be developed or improved, many of which have already been identified by local tourism committees.

(a) Selection of potential international-standard routes

It is proposed that 120km of trails with 16 campsites be developed or improved to create four international standard trek routes to relieve the over-congested Dzungri trek. A survey will need to be carried out to select the best potential treks. Four of the following routes (see Figure 7-4) should be considered:

- The Green Lake Trek: Lachen-Zemu-Green Lake; around 18km.: Foreigners are allowed but it takes a long time to obtain permits. These restrictions must be eased.
- The Tholung-Kisong Eco Trek: Bay-Tumlong-Tholung-Kisong Tso Nag; around 30km
- The Yumthang-Yumesamdong Lachen Trek: Yumthang-Yumesamdong-Thangu-Lachen; around 44km
- The Uttaray-Singelila Trek: around 56km. This is already considered one of the world's top treks; however, since the Maoist threat in recent years, the trek has been closed as it entered into Nepal. A new trail has been found routed only within Sikkim, but it needs development.
- The Lingee-Sokpay-Bhaley Dunga Trek: Lige-Sokpay-Panch Pokhari-Bhaley Dunga; around 36km

Other routes with a total length of 80km will be considered for development applying the following selection criteria:

- The trek starts, ends, and crosses through areas populated by local communities so that income can be generated for them.
- There are enough attractions on the way to compete internationally with other routes.
- The route has an appropriate degree of difficulty to attract international trekkers, but is not dangerous.
- The base camp is easily accessible.

The trekking route selection will be carried out by two two-person teams comprising each an expert trekker and a specialist with trekking market knowledge such as a tour operator. They will spend two months reconnoitring potential treks and producing a report. The report must present the development requirements of the best treks in detail, including maintenance requirements and costs as well as safety measures that need to be put in place. These experts will be identified by the EMC and contacted directly.

Careful attention should be placed on finding out from agencies such as the Forestry Department, the Tourism Department, and the Rural Management and Development Department (RMDD) their initiatives and plans to develop trek routes so as not to duplicate efforts or to look for opportunities to collaborate. However, collaboration should only be entered into if the criteria described above are abided by.

(b) Development, improvement, and maintenance of trekking routes

Contractors will be invited to develop the routes. The proposals will be evaluated by the EMC, and one or several firms will be contracted. Trek development will be scheduled over the project period. It is important that these are wilderness treks and that no concrete or paving stones are used, just natural trails. The equivalent of 30 km of treks, requiring 5 days walking and 4 nights camping one-way should be developed. Some of the treks will interlink, providing the possibility of longer routes. A total of 16 campsites will be developed or improved on the routes. Signage will be included. Areas will be cleared to establish camping sites at appropriate places. These will include access to water, the

construction of a shelter for porters, a shelter for the kitchen, and ecological toilets. Maintenance of the trekking routes will be financed by the Forest Department, and maintenance work will be done by EDCs under the joint forest management scheme. Annex 15 provides guidelines on developing trekking routes drawn directly from the 2002 Master Plan for Trekking.

(c) Marketing of trekking routes

One of the main actions will be for the EMC to invite national and international tour operators for an exposure trip so that they are made aware of the new trekking opportunities in Sikkim. This will be funded out of the EMC's public relations budget with contribution in-kind from the industry.

C3-3-3 Development of mountain bike trails

Mountain bike events have been successfully organised in Sikkim and have been popular. Some mountain bike trails are planned or are in the process of being developed.

(a) Selection of mountain bike trails

An expert will be selected to identify 70 km of mountain bike trails in Sikkim. He will spend one month looking over potential routes. A report will be produced, and development requirements will be presented in detail, including maintenance requirements and costs as well as safety measures that need to be put in place. Suggested routes to be considered include the following:

- Singba Rhododendron Sanctuary to Yumesamdong: The construction of this trail in the North District has already been started by the Forest Department, and 150m have been built. The total length will be approximately 28km.
- Hee-Goan to Uttaray: It is reported that 17km of this trail have already been completed. The total length of the trail will be approximately 50km.

Trails in other areas may also be considered. It is important, however, to consult with the Forestry Department, Tourism Department, and RMDD about their initiatives and plans for developing mountain bike trails.

(b) Development, improvement, and maintenance of mountain bike trails

Contractors will be invited to submit proposals to develop the trails. The proposals will be evaluated by the EMC, and one or several firms will be contracted. Annex 16 presents guidelines and technical specifications for developing mountain bike trails used in Scotland. Trails development will be scheduled over the project period. It is important that the trails are built sustainably with little impact on the environment and resist erosion through proper design, construction, and maintenance. Maintenance of the trekking routes will be financed by the Forest Department, and maintenance work will be done by EDCs under the joint forest management scheme.

(c) Marketing of mountain bike trails

The trails will be strongly marketed by the EMC, and mountain bike events and races will be regularly organised. One of the main actions will be to invite domestic adventure tour operators for an exposure trip so that they are made aware of the new mountain biking opportunities in Sikkim. This will be funded out of the EMC's public relations budget with contribution in-kind from the industry.

C3-3-4 Development of rock-climbing areas

To encourage the development of the adventure tourism market and to offer tourists with an alternative

to the trekking product, four rock-climbing areas will be developed, with local people trained as instructors. This product will mainly attract the young domestic market.

(a) Identification and development of areas appropriate for rock-climbing

An expert will be selected to identify areas that are suitable for rock-climbing. It is recommended that the Mountaineering Institute of Sikkim, the Sikkim Amateur Mountaineering Association, or the Himalayan Mountaineering Institute based in Darjeeling be approached to supply the expert for this activity. Development of the areas includes tracing paths, clearing the area, and selecting a flat section for a mobile medical facility.

The selection criteria for areas include the following:

- The area has different grades of rocks to provide climbers with variety and opportunities to progress through increasing degrees of difficulty.
- The quality of the rock is suitable for safe climbing.
- The base and top of the rocks can support climbers.
- The area is close to a local community population large enough to train as local instructors.
- The area must be easily accessible.

(b) Training of local instructors and purchasing equipment

It is proposed that 10 local people in each rock climbing area are trained to become instructors, two of which will be given extra training, including first aid, as senior instructors. Training on marketing will also be imparted. Basic training will take 15 days. The instructors will be fully equipped. An emergency mobile medical facility will comprise a tent with two fold-out beds, stretcher, blankets, emergency medical equipment, and two oxygen cylinders. A doctor should be available and easily accessible during rock climbing sessions.

(c) Marketing of rock-climbing opportunities in Sikkim

The EMC will invite tour operators specialising in adventure sports and rock climbing clubs in India to visit the rock climbing areas and facilities and to meet the instructors. The cost for this exposure trip will be borne through the public relations budget. A targeted advertising campaign to publicise the facilities will be covered through the EMC's advertising budget.

(d) Development of other adventure sports

The Project will also consider the development of other adventure sports such as paragliding and sport fishing. Specialists will be employed on an ad hoc basis to study the feasibility of these activities and to train JFMC, EDC, and PSS members as guides and/or instructors.

C3-3-5 Development of wildlife-watching areas

While Sikkim is acknowledged as a biodiversity hotspot, the market segment that is interested in wildlife such as mammals, birds, and butterflies has not been properly exploited. This subcomponent proposes the development of wildlife-watching areas in the vicinity of the proposed ecolodges.

(a) Implementation of area surveys and selection of locations

Based on the wildlife baseline surveys and research for the development of the biodiversity information base, 20 locations with high probability of sighting mammals along the trekking routes, vicinities of the proposed ecolodges, and other areas will be selected for the establishment of

wildlife-watching areas.

For bird-watching, a total of three areas that are easily accessible within a maximum of one hour's journey from the accommodation will be developed. These areas should be within easy reach of the proposed ecolodges. Members of the Sikkim Ornithological Society will be contracted to carry out a survey of birding areas. This survey should be carried out in two stages. The first part of the study will take place in winter for a period of 15 days. The second part of the survey will take part during the breeding season over a one month period. The purpose is to identify local areas suitable for birding and the types of birds that can be seen.

A total of three areas will be identified for butterfly-watching. An expert from the Bombay Natural History Society and an expert from a specialist tour operator will spend two weeks in Sikkim to advise on the locations and spots that have been identified and whether these are suitable for butterfly-watching tourism.

(b) Preparation of the areas for wildlife-watching

Once an area is selected, it should be prepared carefully to enhance the wildlife-watching experience. However, the development must be unobtrusive, and the emphasis will be on not disturbing nature. Therefore no construction is recommended within the area, including watch towers, which are often built in other birding areas. Twenty kilometres of criss-crossing paths will be cleared per 10km² area so that the enthusiasts can penetrate the area and explore it in full. A firm will be contracted to trace these paths following the advice of the experts.

(c) Training of wildlife-watching guides and purchase of equipment

Once an area is selected, 30 members of the local community will be trained as guides. They will work in collaboration with the ecolodges and through the newly-established association. Training will take place over a 15 day period. The guides will be supplied with good quality binoculars and field guide books.

(d) Marketing of wildlife-watching areas

One of the main actions will be for the EMC to invite domestic and international tour operators for an exposure trip so that they are made aware of the wildlife-watching opportunities in Sikkim. This will be funded out of the EMC's public relations budget with contribution in-kind from the industry.

C3-4 Development of tourist facilities

To improve the visitor experience, appropriate infrastructure will be developed throughout Sikkim to provide interpretation and information on areas of tourism interest, directions, and comfort facilities. Most facilities will employ local communities and will provide outlets to sell local products. Interpretation centres, orientation centres, museums in traditional houses, and public conveniences will be constructed during the project period. The impact of this subcomponent will be improvements in Sikkim's tourism infrastructure and income generation opportunities for local communities.

C3-4-1 Construction of interpretation centres and renovation of forest rest houses (FRHs)

Interpretation centres will be located at areas of tourism interest to provide tourists with information on the site and a small library to consult relevant documents. The centres will also be built with ecological gardens to exhibit important flora and fauna associated with the locations. It will be important to consider the operational and financial sustainability of the centres when deciding their size, location, and management modality. Staff salaries will be paid by the Forest Department, which

may derive funds from profits generated by the ecolodges and leasing arrangements at the centres.

The centres will also include an audiovisual room where film and videos can be shown about the site and where meetings and workshops can be held. Handicrafts and souvenirs will be sold at retail outlets within the centres, which will be run by local SHGs under a lease arrangement. There will also be a cafeteria run by local people under a lease arrangement. Public conveniences will be available at all centres for visitors.

There are currently about 27 forest rest houses (FRHs) throughout Sikkim. Many rest houses are situated in scenic areas with potential to attract ecotourists. However, many FRHs are dilapidated and need to be renovated.

(a) Selection of locations to build the interpretation centres and to renovate FRHs

Nine large interpretation centres are proposed for construction, and 9 FRHs are proposed for renovation. The recommended locations for the interpretation centres are shown in Table 7-5. A survey and analyses will need to be carried out to select the best locations for securing sufficient numbers of visitors and users and the operational and financial sustainability of the centres. The number of the centres and FRHs may be reduced depending on the results of the survey and analyses.

Table 7-5 Proposed locations for interpretation centres

District	Locations
East	Arita, Rumtek, Tsongo Lake, Himalayan Zoological Park, and Bulbulay
North	Dzongu, Kabi, Lachung, and Yumthang ¹
South	Rabong, Yangyang, Namchi, and Lingee
West	Hee-Gong, Hilley, Okhray, Rinchingpong, Soreng, and Uttaray

Note: 1) In Yumthang, there is a heritage building from the British times belonging to the Forest Department, which will be converted into an interpretation centre

(b) Construction of interpretation centres

Contractors will be invited to submit proposals to build the structures. The proposals will be evaluated by the EMC, and one or several firms will be contracted upon approval by the board and the PMU. It takes approximately six months from site selection to final construction for the small interpretation centres and eight to ten months for the larger centres. The construction of the interpretation centres will be phased over a three-year period, with several centres built in parallel.

(c) Renovation and upgrading of FRHs

Nine FRHs will be selected for renovation and upgrading based on their potential to attract ecotourists and visitors. They will be renovated in such a way that allows two rooms to be reserved for Forest Department officials and staff and at least eight rooms secured for visitors. Management of the renovated FRHs should be outsourced to secure the appropriate maintenance and sustainability of the operation.

(d) Training of local community members to manage and work in interpretation

The six larger centres will be run by one manager and assistant managers and the nine smaller centres by one assistant manager. A night watchman will be recruited for protection at each centre as well as a cleaner. Therefore, six managers and 15 assistants will need to be trained. Training required includes customer service, administrative duties, telephone technique, and dealing with enquiries. They should be knowledgeable about exhibiting techniques. The Indian National Trust for Art and Cultural Heritage

(INTACH) provides specialised expertise on architectural heritage, natural heritage including ecotourism, material heritage, intangible cultural heritage, and heritage education and communication. This organisation should be considered along with other similar organisations. Managers will require some extra management training as well. Instructors will be invited to Gangtok to provide the training over a ten-day period.

C3-4-2 Construction of public conveniences at tourist attractions

Public conveniences will be constructed as one of the entry point activities under C4. Thus, related costs are estimated under this component. The construction of public conveniences will be based on micro plans developed by JFMCs, EDCs, and PSS's and the Forest Department.

Public conveniences will be built at spots where tourists congregate. These will be 'pay and use' and must be scrupulously maintained. An NGO with excellent experience in developing toilets that can be easily maintained in a rural setting will be contracted. Sulabh International is an NGO that has developed low-cost technologies for individual toilets, pay and use community toilet complexes, community toilets with biogas energy, and effluent treatment. It has conceived a two-pit pour-flush toilet, which does not require scavenging to clean. Its equipment is now used all over India. Sulabh International's research in developing these toilets has been commended in the 2006 Human Development Index. The organisation also conducts management and maintenance of the toilets, which are financed through the pay and use system. Sulabh International along with other similar organisations should be considered. Suggested locations for establishment of public conveniences are shown in Table 7-6.

Table 7-6 Proposed locations for public conveniences

District	Locations
East	Within the monastery at Rumtek ¹ , Pastanga as the base to the Khedi trek
North	Lachen, Lachung
South	Lingee
West	Hilley, Uttaray base camp for the Singelia trek

Note: 1) Public conveniences must be made available to tourists only, not students

At the busier tourist spots such as Rumtek and Lachung, a three-unit complex with wash basins built in western style – two for women and one for men, and two urinals – is recommended. In the less busy areas, a two-unit complex – one for women and one for men, and two urinals – is recommended.

Management can be provided by the NGO. Sulabh International, for instance, undertakes the design, supervision, and maintenance of the toilets, provided the funding agency constructs it as per their specifications and pays 20% of the civil cost. They offer to maintain the toilets on a pay per use basis for a period of 30 years, provided minimum usage rates are maintained (JPS Office Delhi, personal communication, August 18, 2009).

C3-5 Introduction of a solid waste management at tourist areas linked to the priority villages

To ensure cleanliness at tourist sites, a waste collection and disposal system will be introduced at and around the prioritised villages. This will involve 1) a comprehensive study for baseline information, and 2) solid waste management (SWM) functional elements. This subcomponent will not only provide a clean environment for tourists to enjoy the destination but will also improve the living conditions of the local community and provide income generation opportunities. Once established, it may be replicated in other villages along the collection route.

C3-5-1 Comprehensive study for baseline information on solid waste management

A comprehensive study will be necessary to generate primary information on SWM and its commercial potential in the tourist areas that have been selected. Data required will include the number of the floating population, the quantity of solid waste generation and its sources, composition and characteristics of such waste, identification of suitable sites for waste processing and safe disposal, as well as socioeconomic conditions and willingness to pay and participate in the SWM activities. The study will cover the 10 prioritised tourist villages and the surrounding tourist spots. A report will be produced covering the details of the existing SWM system for each tourist location.

(a) Collection and analysis of baseline data

Baseline data will be collected through field survey and investigations. These will include the collection of solid waste samples from 25 different locations and a sample survey at households and other commercial establishments to assess the socioeconomic conditions, willingness to pay, and quantity of solid waste generation. About 850 samples will be collected. Solid waste samples will be analysed to determine the physical, chemical, and biological composition and characteristics of waste. The consultant will be engaged for a period of 90 days and will prepare a report and an action plan.

C3-5-2 Operating solid waste management functions

The operation of SWM will be outsourced through a competitive bidding process. Specialized waste collection vehicles, equipment, and protective clothing will be leased to selected operators from the Project. The performance of the operators will be monitored periodically to ensure the financial sustainability of SWM operations.

The major functional elements involved in a SWM system are segregation, storage, collection, transport, processing, and safe disposal of the waste. Additional information is provided in Annex 17. Solid waste must be collected from households, commercial establishments, trek routes, and tourist spots. Biodegradable and recyclable solid waste must be sorted and segregated. Temporary storage of dry solid waste will be encouraged and bins supplied. The tour operators and trekkers will be responsible for bringing all the recyclable waste that is generated during the trekking period back to the base camp.

The biodegradable fraction of the domestic waste will be processed by household-level composting. Suitable locations for such composting processes will be identified with the help of JFMCs, EDCs, PSSs, and the RMDD. Manure produced from the composting processes for both the domestic and commercial establishment sources will be utilised locally as fertilizer for gardening and plantation purposes. The recyclable waste will be sold to the recyclable waste supply chain for processing and recycling. It will be taken by truck to Siliguri once a week. The SWM operators will charge beneficiaries for their services.

Public awareness and capacity building will be carried out through JFMCs, EDCs and PSSs to inform and train local communities about solid waste management, collection, composting, and storage. Sikkim tour operators offering treks and ROs will attend a workshop on the SWM system and on their responsibilities towards environmental clean-up and maintenance. Effective mechanisms to enforce the Sikkim Wildlife (Regulation of Trekking) Rules (2005) will be developed and implemented to improve SWM on trekking routes.

(a) Training on solid waste management

Consultants will be engaged to carry out SWM training of staff members of the waste management operators, and members of JFMSs, EDCs, and PSS's.

Waste collection: Staff members of the SWM operators will attend a one-day workshop on the use of waste collection vehicles, tools and equipment, and protective measures needed to counter professional health hazards, and how to plan routes for collection judiciously.

Waste segregation: Through the JFMCs and EDCs, local communities will be trained to keep waste segregated at source. Training will be on-site and continuous over a seven-day period at the 10 villages. This will take place in Year 3 of the project and again in Year 5. The consultant will spend 80 days on the project. Approximately 200 households per village will be involved in the training. However, other households living nearby may also be invited to see the demonstration.

Local-level composting: A one-day workshop will be conducted in each of the villages with selected members of the JFMCs, EDCs, and PSS's on local-level composting. They will be expected to share the knowledge they acquire with other village residents.

(b) Organisation of public awareness campaign

A one-day workshop will be conducted in Gangtok to inform trekking tour operators and ROs about the waste collection system on trek routes. The purpose of the workshop is to provide guidance on how the waste generated during trekking can be properly managed by using the best practices followed elsewhere.

(c) Procurement of equipment for the waste management system

Four specialised trucks, bins, backpacker's bins, carrying trolleys or wheel barrows, protective clothing, and safety equipment for the backpackers are required for the operations of SWM. The four specialized tracks may be replaced as necessary during the project period. This set of equipment will be leased to the SWM operators. In addition, 120 bins will be placed for temporary storage of solid waste to avoid littering. These bins will be strategically located mainly in the public places such as shops and stalls, hotels and restaurants, trekking base camps.

C3-6 Establishment and management of Ecotourism Development Corporation

C3-6-1 Establishment and management of Ecotourism Development Corporation

Ecotourism Development Corporation, a special purpose company for management and operation of ecotourism related facilities, will be established under the Company Act 1956. Forest Department will provide capital of the Corporation and hold its ownership. The Corporation will take the form of corporate body, and will be responsible for operation and management of ecolodges, interpretation centres, and other facilities developed by the project. The corporation will be in place in the 5th year of project implementation. EMC will facilitate and support the establishment of the Corporation.

7.2.3 C4 Joint forest management

This component aims at improving the management of forests and the conservation of biodiversity through the engagement of forest fringe communities. It will also provide opportunities for these communities to enhance their livelihood through forestry, ecotourism, and other income generation activities (IGAs). The expected outcomes include the following: increased tree cover; enriched forests and alpine vegetation; sustainable management of forest resources adopted and popularized; flora and fauna better-protected from threats such as fire, indiscriminate exploitation, and overuse by tourists; improved village facilities; diversified livelihood options including the development of ecotourism; reduced state dependence; and improved income of forest fringe communities.

This component will adopt the joint forest management approach practiced widely in India including Sikkim. Existing JFMCs, EDCs, and PSS's will be taken up or new ones created at the village level for project intervention. The primary unit of intervention will be the revenue village and forest village (for the sake of simplicity, the two village types will be referred to as the revenue village). The revenue village will be the basic unit for JFMC/EDC/PSS establishment⁷⁵. A total of 180 revenue villages will be selected for project intervention. The committees to be set up will serve as the foundation for village-based management of forests and biodiversity in reserved forests and protected areas. They will also be involved in the activities proposed under the forest and biodiversity conservation component and the ecotourism component.

The selection of activities will be carefully done by the forest fringe communities and the Forest Department based on the constraints and opportunities associated with the natural and physical conditions of each community, market potential of the selected forest products, and profitability of the IGAs and ecotourism activities. Because this component seeks to mobilise the social and economic incentives of the forest fringe communities, their sense of ownership of the activities will be the determining factor for selecting the villages for intervention. Therefore, the activities to be taken up under this component are not predefined at this stage of project formulation. Once the project commences, market research will be conducted by the Project to examine the economic potential of the IGAs within the given conditions. Results of the research will be used to inform participatory appraisals for determining the IGA activities in selected villages.

To implement this component effectively, a cluster approach will be adopted. This approach is designed to build on the spatial socioeconomic linkages of rural communities observed in Sikkim. By finding and selecting motivated forest fringe communities, and by recognizing and utilizing the positive spread effects that a public intervention in one community has on its neighbors, the cluster approach will help maximize the efficiency and effectiveness of public service delivery. Through interactions with forest fringe communities, the Project will assess their motivation levels, select a village for the initial intervention, and then monitor the spread of the positive impacts to the surrounding communities to select candidate villages for subsequent intervention.

The cluster approach aims to motivate communities efficiently by 1) selecting a central village for initial intervention; 2) forming a cluster of villages comprising the central village and surrounding villages; 3) demonstrating the outcomes of the initial intervention to the surrounding villages; and 4) encouraging the surrounding villages to get involved in the project activities. In effect, the community members of the central village are expected to share their experience in project activities with the surrounding villages. This in turn will facilitate the extension of the activities to the surrounding villages for subsequent interventions. The incremental expansion of interventions will require fewer resources compared to the initial intervention.

The Project will create village clusters each consisting of approximately ten revenue villages. As there are 454 revenue villages in Sikkim, it is assumed that 45 village clusters will be established⁷⁶. For each

⁷⁵ The current notification stipulates that the Gram Panchayat ward be the basic unit for the committees. However, the basic units of existing committees are not uniform in reality. The study team recommends that the revenue village be adopted as the basic unit mainly because 1) the Gram Panchayat, which covers a large area and/or population, would be too vast to handle effectively; 2) the ward in many cases are only a part of a village, and the unity of the local community may be lost if it is adopted as the basic unit; 3) if the ward is taken as a unit, the Forest Department will eventually have to work with more than 900 units of committees which seems beyond the capacity of the department to manage; and 4) a revenue village usually falls within a single watershed, which is convenient for managing area-based resources such as forests. The link between the Gram Panchayat and the committees will be maintained by including a Panchayat member in the executive committee.

⁷⁶ The study team assumes that investment through this component will be more or less evenly distributed over Sikkim. The number of clusters created and villages targeted in a given geographical area will depend on the number of existing revenue villages. However, this principle may be modified if there are good reasons to do so. For example, greater emphasis may be given to villages in alpine areas where the population is more dependent on forest resources or to areas prone to threats such

cluster, one village will be selected as the Initial Intervention Village (IIV). The surrounding villages will observe the project activities, including joint forest management, and their outcomes. Some villages will subsequently wish to join the project activities. Such villages will be called Spread Effect Villages (SEVs) and will be the target of subsequent project interventions. This component will aim to work with 45 IIVs and 135 SEVs⁷⁷. This translates into four target villages per cluster and 180 villages in total.

The foremost criterion for the selection of target villages will be their willingness to participate in joint forest management activities. The Project will not intervene in any villages that do not demonstrate this willingness. However, it will continue to encourage their participation through inviting them to learn about the activities undertaken and progress made in project villages. They may be included as target villages by the Project if and when they express interest in taking part in joint forest management. A conceptual diagram of the cluster approach is given in Figure 7-5.

The interventions for the three types of villages under the cluster approach are described below.

- **Initial Intervention Villages (IIVs):** These villages will be carefully selected to ensure the successful implementation of joint forest management activities and their demonstration effects. The project will develop these villages as models for other villages in the cluster. One IIV per cluster will be selected.
- **Spread Effect Villages (SEVs):** The Project will attempt to systematically spread the effects of project interventions on the IIVs to their surrounding villages. For this purpose, the Project will identify at least two village residents who have leadership, vision, and commitment ('village pioneers') from each of the surrounding villages. The village pioneers will be invited to observe the project activities of the IIVs. The village pioneers will go back to their villages with information on the IIV. The purpose of this plan is to motivate surrounding villages to participate in joint forest management. The Project will intervene in such villages by involving them as SEVs. If the Project cannot identify villages motivated to participate in the Project's joint forest management as SEVs, the concerned cluster may be dropped from the list of project intervention sites.

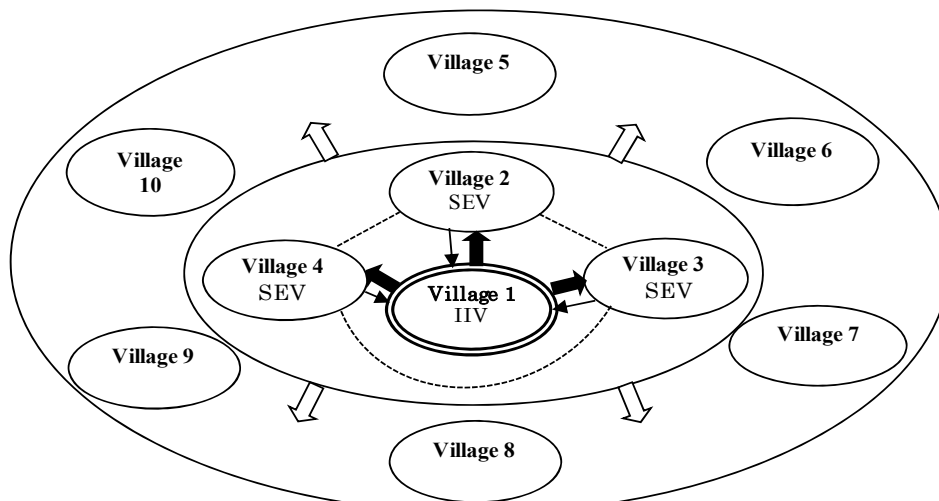


Figure 7-5 Conceptual diagram of the cluster approach

as fire and illicit exploitation by creating more clusters. This would mean creating clusters with a smaller number of villages for such areas and creating clusters with a larger number of villages in other areas.

⁷⁷ The study team assumes that one IIV and three SEVs will be selected in each cluster. The number of SEVs in each cluster may be adjusted according to the magnitude of the spread effect on the surrounding villages.

- Other villages: It may be difficult to identify village pioneers or to motivate a village to participate in the project activities within the available period of time. In such villages, the Project will continue to encourage village residents to observe the activities and outcomes of the IIV and SEVs.

The Project will start interventions in the target villages in four batches, with a one year interval. The first batch will take up 45 IIVs. The second, third, and fourth batch will take up 45 SEVs each. The duration of the intervention will be five years for all target villages.

Table 7-7 Intervention and number of target villages by batch

Year	1	2	3	4	5	6	7	8	9	10	Annual intervention/village
1st		45 IIVs									225
2nd			45 SEVs								225
3rd				45 SEVs							225
4th					45 SEVs						225
Annual intervention/village		45	90	135	180	180	135	90	45	0	900

C4-1 Preparation work

C4-1-1 Preparation of JFMC/EDC/PSS management manual

A short-term consultancy service will be procured to prepare a management manual for JFMCs, EDCs, and PSS's. The purpose of this manual is to provide guidance to the members on the effective management of their organisations and the implementation of activities. The terms of reference of the consultancy service will be drafted by the PMU.

The manual will be prepared in both Nepali and English. It will contain the following topics and guidelines as well as other subjects deemed necessary.

- Formation of committees
- Roles and responsibilities of committee members
- Financial and administrative procedures of committees
- Microplanning guidelines with outline of procedures and formats
- Guidelines on implementation of activities such as entry point activities
- IGA guidelines
- Monitoring system for committees

In particular the IGA guidelines should contain the following:

- Objectives of IGAs and SHGs in a JFMC, EDC, or PSS
- Formation of self help groups (SHGs) and eligibility criteria for membership
- Roles and responsibilities of members
- Financial management guidelines for SHGs
- Operation guidelines for SHGs
- Microfinance guidelines
- Performance evaluation indicators for SHG activities

- Support to SHGs by JFMC, EDC or PSS
- Monitoring of SHG activities and operation

For preparation of the manual, the VSS Management Manual prepared by the JICA-funded Orissa Forestry Sector Development Project can be referred to as an example.

C4-1-2 Marketing study

A marketing study on the products that may be produced through IGAs of the village residents will be commissioned. The Project will promote IGAs through existing or newly-created SHGs under JFMCs, EDCs, or PSS's. The IGAs to be taken up by committee members will basically be identified through the PRA conducted at the microplanning stage and decided by the members of SHG. However, the success and sustainability of IGAs depend very much on the market and marketing strategies, which will require examination by experts.

The study will aim to identify products with high potential for income generation and to devise marketing strategies for those products. Regional variations in the socio-economic and environmental characteristics across Sikkim will be taken into consideration in identifying the products, ie, the results of the research should be compiled in a way that suitable products can be chosen for each target village. The terms of reference of the study will be drafted by the PMU. The study will be completed by the end of the first half of the Year 2 so that the results of the study can be utilised for the selection of IGAs and the marketing of products by the SHG members.

The expected outputs of the study are 1) a shortlist of products with high market potential that can be produced through IGAs by members of JFMCs, EDCs, and PSS's; 2) marketing strategies for the shortlisted products covering production, collection, processing, pricing, distribution, and promotion; and 3) training modules to enable the JFMC, EDC, and PSS members to implement the strategies identified.

Another objective of this study will be to devise strategies to improve handicraft designs, local produce branding and packaging, and marketing. A list of items to be included in the terms of reference to meet this objective is proposed below. Similar terms of reference for other types of products such as agricultural products should be drafted at the time of project execution.

The consultant will be recruited by the EMD and will spend 90 days on the project with the following duties.

- Carry out a survey of existing Sikkim handicrafts with specifications for improvements, where necessary, based on the expectations of the tourism market.
- Make field trips to the priority villages to assess the skill levels of local craftsmen and women.
- Consult with the Directorate of Handicraft and Handloom of Sikkim, which houses an institute as well as workshops, a sales emporium, and a museum.
- Advise on improving designs of existing craft items where necessary.
- Determine new types of handicrafts that can be developed based on the examination of traditional crafts, skills, and local materials of the various ethnic groups in Sikkim, and prepare authentic designs of these new items.
- Formulate training programmes on improving existing items and producing new ones.
- Train the master craftsmen at the institute of the Directorate of Handicraft and Handloom.
- Determine the most suitable types and locations of sales outlets for the handicrafts and the distribution channels for moving items from producers to outlets.
- Advise on fair pricing standards for the handicrafts and local produce.
- Advise on the establishment of demonstration areas for visitors to view the crafts being produced, perhaps in the model handicraft shops or in the traditional village house museums.

- Advise on marketing handicrafts and local produce.

C4-1-3 Formation of district facilitation teams

To implement the project activities effectively in the 180 target villages throughout Sikkim, a district facilitation unit (DFU) will be formed in each district. The DFU will consist of Forest Department officials at the district level, project management consultants, and community organisers hired by the Project. Under the current Forest Department structure, Divisional Forest Officers (DFOs) and Assistant Conservators of Forests (ACFs) will be those responsible for management and operation of the DFUs. The DFUs will be the implementation unit of project activities at the village level. They will be guided by and report to the PMU. The core duties of the DFUs will be the following.

- Plan and execute project activities at the village level.
- Monitor the progress of the activities in the target JFMCs, EDCs, and PSSs.
- Coordinate and provide linkages between the JFMCs, EDCs, and PSSs within the district.
- Provide guidance and support to the frontline staff such as Range Officers (ROs) and Block Officers (BOs) in implementing the project activities.
- Report to the PMU regarding project activities.

The Community Organisers will be hired by the PMU for the project period. They must be in place by the first quarter of Year 2 or before the Project starts to implement the activities in the target villages. The Community Organisers will act as facilitators among JFMC, EDC, and PSS members, between the villagers and the frontline Forest Department Staff, and between the target villages and the DFU offices. The Community Organisers should have an academic background in rural development with at least three years of field experience related to rural development. Two Community Organisers, one male and one female, will form a team. One team will be expected to look after three clusters. As 45 clusters are expected to be established throughout Sikkim, 15 teams or 30 Community Organisers will need to be recruited. The Community Organisers will report to the head of their respective DFU.

C4-2 Establishment of committees for joint forest management

This subcomponent aims at establishing the base for joint forest management at the village level. The target villages will be selected and a JFMC, EDC or PSS established in each village. New committees will not be established if one already exists in the village. A total of 180 JFMCs, EDCs, and PSS's will be brought under the project over a four-year period. These committees will serve as the foundation for village-based management of forests and biodiversity in reserved forests, protected forests, and protected areas. Some of these committees will also be involved in some of the activities proposed under the forest and biodiversity conservation component and ecotourism component.

The main stages of project implementation at the village level will be 1) rapport-building and establishment of a committee; 2) PRA and microplanning; 3) implementation of activities; and 4) monitoring and review. Figure 7-6 illustrates this flow. The first and second stages will be carried out under this subcomponent.

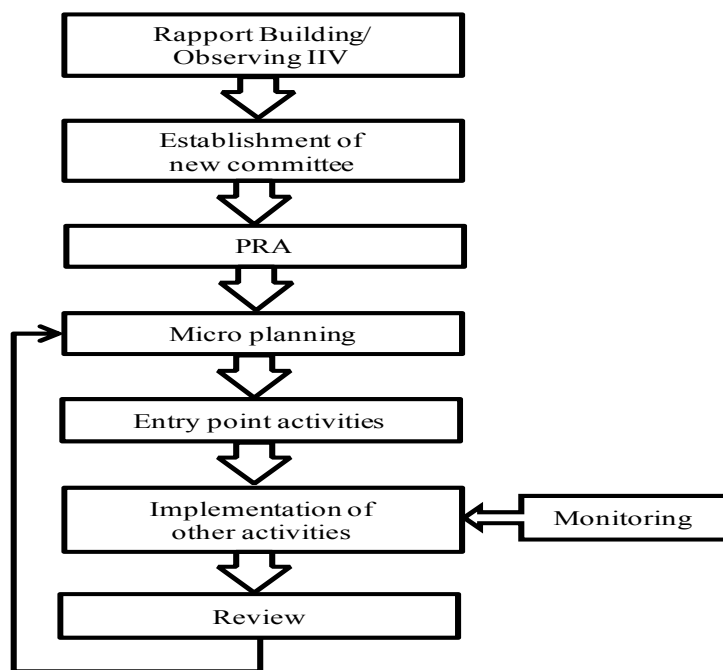


Figure 7-6 Flowchart of project implementation at the village level

The frontline Forest Department officers, namely ROs, BOs, HFGs, and FGs, will be in charge of conducting the above mentioned stages of project implementation at the cluster and village levels. The Community Organisers of the DFUs will provide support to the frontline Forest Department officers, especially when interacting with village residents, for example, in microplanning. Participation of the communities should be ensured in all the phases of planning, implementation, management, and monitoring. In particular, careful attention and intensive support should be given to the village residents for microplanning.

C4-2-1 Selection of villages for JFMC/EDC/PSS activities

Selection approach

The target villages will be selected in such a way that the cluster approach can be applied. As explained earlier, the Project will create 45 clusters (Table 7-8). The revenue village will be the basic unit for the establishment of JFMCs, EDCs, and PSS's⁷⁸. In a typical cluster, four villages will be selected: one IIV and three SEVs⁷⁹. There will be 45 IIVs and 135 SEVs, or 180 villages in total. The range established by the Territorial Circle of the Forest Department will be the basis of creating village clusters. The range is the closest effective administrative unit to the cluster to be created through this component. There are 27 ranges in Sikkim among which 26 ranges are considered as units for intervention. Locations of the ranges and other forest management units throughout Sikkim are shown in Figure 7-7. One range is excluded due to its protected area status and small population, as shown in Table 7-8.

⁷⁸ If a JFMC/EDC/PSS already exists in a given area and its unit is not the revenue village, the existing unit may be kept.

⁷⁹ As explained in an earlier footnote, the number of SEVs may be modified depending on the spread effect of the intervention in the IIV on surrounding villages.



(Source: FEWMD and Study Team)

Figure 7-7 Forest management units of the Forest Department

Table 7-8 Numbers of revenue villages and clusters to be established in ranges

Division	Range	No. of revenue villages (RVs) * ¹	No. of clusters	No. of RVs per cluster	Population	Population per cluster
Total		445	46 (45)*²	10	469,751	10,212
East Division		130	16	8	190,753	11,922
1	Gangtok	30	3	10	55,416	18,472
2	Kyongnosla * ²	1	1	1	83	83
3	Pakyong	16	2	8	22,763	11,382
4	Pathing	8	1	8	6,652	6,652
5	Phadamchen	5	1	5	7,396	7,396
6	Ranipool	17	2	9	21,008	10,504
7	Rongli	16	2	8	23,155	11,578
8	Singtam	31	3	10	42,359	14,120
9	Tumin	6	1	6	11,921	11,921
North Division		52	7	7	37,085	5,298
10	Chungthang	3	1	3	4,520	4,520
11	Dzongu	14	1	14	8,850	8,850
12	Lachen	2	1	2	2,955	2,955
13	Lachung	2	1	2	2,826	2,826
14	Mangan	17	2	9	10,687	5,344
15	Phodong	14	1	14	7,247	7,247
South Division		145	13	11	122,853	9,450
16	Lingmo	12	1	12	9,016	9,016
17	Melli	32	3	11	31,912	10,637
18	Namchi	35	3	12	30,426	10,142
19	Namthang	13	1	13	8,643	8,643
20	Rabong	32	3	11	27,314	9,105
21	Temi	21	2	11	15,542	7,771
West Division		118	10	12	119,060	11,906
22	Dentam	14	1	14	16,937	16,937
23	Gyalshing	26	3	9	26,120	8,707
24	Sombaria	14	1	14	16,685	16,685
25	Soreng	40	3	13	43,976	14,659
26	Tashiding	10	1	10	6,430	6,430
27	Yuksom	14	1	14	8,912	8,912

Note: 1) Revenue villages include the villages in reserved forests. Information on the distribution of revenue villages within the ranges was obtained from the Natural Resources Atlas of Sikkim (NATMO 2009). 2) The cluster in Kyongnosla Range (Kyongonosla Alpine Wildlife Sanctuary) is excluded from the project intervention due to the small population. Therefore the total number of clusters for intervention is 45.

First, the number of clusters to be created in each range will be determined. If there are less than 15 villages in a range, one cluster will be created. If there are 15 to 24 villages in a range, two clusters will be created. In some ranges there may be more than 24 villages, in which case three clusters will be created⁸⁰. The 45 target clusters will be allocated among the 26 ranges in this way. However, because the number of revenue villages and the population of each cluster vary widely (Table 7-8), final adjustments to the composition of clusters will be made in Year 1 of the Project.

Second, the 45 IIVs will be selected. In each range, all revenue villages will be considered and ranked according to a set of criteria set by the Project. In each range, IIVs will be ranked and selected until the allocated number of clusters, or IIVs, is fulfilled.

Third, the clusters will be formed in each range. In ranges that are allocated one cluster, all the villages in the range will form a single cluster. In other ranges, all the villages in the range will be put into several clusters according to the number of clusters allocated to the range, with an IIV and several

⁸⁰ As explained earlier, the Project need not strictly adhere to this rule if there are good reasons not to.

surrounding villages in each cluster. The clusters will be formed in such a way that the IIV will be located in the centre of the cluster to the extent possible so that the spread effect of interventions to the surrounding villages is maximized.

Fourth, the 135 SEVs will be selected. In each cluster, three villages on average will be selected after carrying out activities for about a year in the IIV. In each cluster, one SEV is expected to be added every year after one year of conducting activities in the IIV. SEVs will basically be selected using the same criteria as those used for the selection of IIVs. However, the villages that are selected by the EMC for conducting activities under the ecotourism component will receive priority over others, ie, if such villages are not included in the IIVs, they will be selected as SEVs in the first instance to ensure the timely implementation of the ecotourism component⁸¹.

Selection criteria

Here are the criteria of villages that should not be selected:

- Villages with low dependence on forests;
- Villages with poor governance or conflicts related to natural resources or land; and
- Villages that have received or are expected to receive a substantial budget for any government projects such as the Model Village for Integrated Farming.

In addition, those villages that already have a JFMC, EDC or PSS, especially those that have received or are expected to receive a substantial budget for their activities, should be given lower priority, as the Project can only intervene in a limited number of villages. Therefore, priority should be given to the villages that have not yet experienced major government intervention. However, the Project should not deny including those villages already covered by JFMC, EDC or PSS if they express their strong will to be involved in joint forest and wildlife management under the Project.

Suggested selection criteria are as follows:

- The village demonstrates strong willingness to engage in joint forest and wildlife management.
- The village is in or surrounded by forests with high incidence of forest and/or wildlife offences.
- The village is in or surrounded by forests with high incidence of forest fire.
- The village has high dependence on forests.
- The village is close to degraded forests.
- The village has high prevalence of poverty.
- The village has good linkages with other villages, eg, the village has a market and/or other facilities and services that attract people from surrounding villages.

In addition, the selection criteria and priority areas for JFM given in the working plans should be considered if they are completed by the time of selection⁸².

For villages that already have a JFMC, EDC or PSS, the following criteria can be added.

- The JFMC, EDC or PSS has strong leadership.
- The JFMC, EDC or PSS demonstrates willingness to perform better.
- The JFMC, EDC or PSS has a good performance record of activities in forest and/or wildlife protection and management.

⁸¹ However, as the main purpose of the Project is biodiversity conservation, if any village nominated by the Ecotourism Marketing Cell is not willing to participate in joint forest management or biodiversity conservation, it should be dropped.

⁸² For example, in the draft working plan of the East District, maps indicating priority areas for JFM are given. Such information should be considered when developing the selection criteria.

The suggested criteria should be reviewed and refined as necessary by the Project at the time of execution.

C4-2-2 Establishment of committees and planning of activities

Once the target villages are selected, the next step is to establish a JFMC, EDC, or PSS in each village. JFMCs will basically be established in villages that will manage reserved forests, and EDCs and PSS's will be established for managing protected areas and lakes, respectively.

Initially the ROs, BOs, HFGs and FGs, together with the Community Organisers of the DFU, will approach the target villages for rapport-building. The willingness of the villagers to participate in joint forest management will be confirmed at this stage. Then, a JFMC, EDC or PSS will be established if the village does not yet have a JFMC, EDC or PSS.

(a) Establishment of committees

i) Formation of General Body

A General Body will be formed for each JFMC, EDC, or PSS after rapport-building. It will consist of village residents who are willing to join the committee and participate in joint forest and biodiversity management and conservation. The unit of membership will be the household. Households that wish to become a member of the General Body will select one adult male and one adult female as their representatives to attend committee functions and participate in activities such as meetings and plantation activities. The names of the household representatives will be registered as members of the committee. Representatives can depute another member of the household if the representatives are not available for committee functions and activities.

Membership should basically be open to all the villagers. However, the households must have the will to manage forests and conserve biodiversity to join the General Body. In principle, the Project should allow membership to all the households that understand the duties and responsibilities of being a committee member and are willing to actively participate in protection and management of forests and biodiversity in the concerned JFMC, EDC or PSS area. Households that do not express interest in such activities and those that exhibit antisocial behaviour should not be granted membership.

Membership should not be imposed in any form on any household. Representatives of the households that wish to become a committee member should be registered in its respective committee by signing the application for registration.

ii) Creation of Executive Committee

Members of the Executive Committee will be selected from the members of the General Body. The composition of the members should be based on the Forest Department's Notification No. 202/F dated June 26, 1998 and its amendments.

iii) Demarcation of areas to be managed jointly

The members of JFMCs, EDCs, and PSS's and the Forest Department will determine the area of forestland to be managed jointly. The boundaries will be identified using GPS and GIS and will be indicated on the ground and on maps. In doing so, it is important to ensure that the area to be managed by a given JFMC, EDC, or PSS does not overlap with another's⁸³. The area for joint management will

⁸³ Currently, some areas are allocated to more than one JFMC/EDC, while some JFMCs/EDCs are not given a clear

identified on the ground using existing pillars and by putting new pillars in the ground and/or painting the bark of standing trees.⁸⁴

iv) Conclusion of MOU

For successful joint forest management, both the villagers and the Forest Department need to understand that each party has their own duties and responsibilities to perform or fulfil. For this purpose, a memorandum of understanding (MOU) will be signed between the two parties after the formation of the Executive Committee and before the commencement of any project work under the JFM, EDC, or PSS in the village. The PMU should review and revise the MOU template attached to the Sikkim Forest Department's Notification No. 202/F dated June 26, 1998 and develop an improved version if there is need to state the responsibilities of each party more clearly.

(b) Microplanning

The target JFMCs, EDCs, and PSS's will each formulate a micro plan⁸⁵. The micro plan will be the blueprint of all activities to be taken up by each committee. Microplanning will involve the entire village community and Forest Department officials with the help of Community Organisers.

A micro plan should reflect the real needs of the village community for natural resources. For the sound and sustainable management of forests and their resources, it is critical for both the village residents and the Forest Department to first understand the status of demand and utilisation of natural resources by the village community and then to devise collectively ways to meet that demand sustainably. Therefore, in the course of microplanning, the following information will be collected through the PRA method.

- Information on resources, eg, forest type, wildlife, vegetation, topography, soil, land use, livestock, and infrastructure
- Socioeconomic data, eg, economic status of villagers, current income generation activities, and utilisation of forest products
- Community needs regarding forest resources
- Development needs of the community

By analysing the above-mentioned information, detailed activities including forest management, biodiversity conservation, ecotourism-related activities, entry point activities, and IGAs will be identified.

Forest management and biodiversity conservation activities to be included in the micro plan should, however, be basically in line with the working plan and protected area management plans developed by the Forest Department applicable to the area to be managed jointly. The types of forest management and biodiversity conservation activities to be carried out by JFMCs, EDCs, and PSS's are explained in a later section.

Benefit-sharing should be clearly stated in the micro plan. The Forest Department and the village residents should discuss and agree on what benefits are to be shared, how much, when, and how. The

indication of areas they should manage. Such situations should be resolved.

⁸⁴ For the purpose of cost calculation, it is assumed that each JFMC/EDC/PSS will manage 400 ha of forestland and that the perimeter of the area is 8,000 m. Areas to be managed jointly are expected to be fairly large because the proportion of areas requiring forestry work, or degraded forests, is small compared to other states in India. Moreover, as a large portion of the forestland in Sikkim is alpine barren land and under glacier and snow, activities that can be implemented are relatively limited. Therefore, the area to be covered by a single committee is expected to be larger than in other JICA-assisted projects such as the one in Tripura.

⁸⁵ In case of PSS, the micro plan will be called Lake Conservation Plan.

micro plan should clearly state this information.

In connection to the benefit-sharing, a Village Development Fund (VDF) should be set up. The villagers should be asked to deposit a certain proportion of the benefits derived from activities defined in the micro plan into the VDF of the respective JFMC, EDC, or PSS. The ratio should be decided by consensus of the General Body and be included in the micro plan. Similarly, the village residents should contribute a certain proportion of the wages they earn to the VDF. This ratio should also be stated in the micro plan. The VDF is discussed further as another subcomponent later on.

The micro plan should also mention the amount of microfinance loans that can be provided to SHGs, which will be formed under JFMCs, EDCs and PSS's. The amount of funds that can be provided to them for IGAs should be clearly stated.

Before finalisation, the draft micro plan will be assessed by the Project. The draft will require the approval of the DFU before finalisation. The finalised micro plan will be signed by the village residents and the Forest Department. The micro plan will be binding to the two parties: the Forest Department will be responsible for extending support to the community in implementing forest management and biodiversity conservation activities, and to abide by the micro plan in benefit-sharing. On the other hand, the village residents have the responsibility to carry out forestry and other activities contained in the plan in order to be entitled to receive the benefits.

The micro plan will be valid for five years. It will be called the five-year work programme. An annual implementation plan will be made every year by referring to and making necessary amendments to the five-year work programme. The annual implementation plan will be approved by the Project and signed both by the Forest Department and the concerned JFMC, EDC or PSS.

C4-2-3 Entry point activities

The Project will provide funds for target JFMCs, EDCs, and PSS's to carry out entry point activities (EPAs) at an early stage of project implementation. An EPA refers to small-scale assistance for the creation of community assets and should address the common urgent needs of the entire community. The aim of providing EPAs is to gain the trust of the village residents towards the Project by satisfying their immediate demands. In addition, EPAs should be implemented in coordination with the local government and other departments of the state government to avoid the duplication of and to enhance the efficiency of public service delivery. EPAs for each JFMC, EDC and PSS will be selected in a participatory manner and should be included in the micro plan. Examples of EPAs implemented by JFMCs under other JICA-funded projects are as follows.

- Construction of the community hall
- Repair of a schools and pilgrimage centres
- Construction of gates
- Construction of footpaths
- Establishment of school water tanks
- Installation of compost pits
- Establishment of ecotourism facilities
- Establishment of small-scale soil erosion control measures

C4-3 Forest management and biodiversity conservation activities

Through this subcomponent, the forest management and biodiversity conservation activities stated in the micro plans of JFMCs, EDCs, and PSS's developed earlier will be implemented. The types of activities to be undertaken will depend on the type of the committee, the content of the working plan

and protected area management plans for the area to be jointly managed, and the needs identified locally through the PRA exercise done in each of the JFMCs, EDCs, and PSS's. All activities to be implemented will need to be included in the micro plans before implementation.

C4-3-1 Forest management and biodiversity conservation

Conservation, management, and utilisation of forests, biodiversity, and lakes in reserved forests, khasmal, gorucharan, and protected areas will be carried out in selected JFMC, EDC, and PSS areas. Some forestry and related activities will be promoted in private holdings as well. Committee members will be responsible for conducting these activities under the guidance of and in cooperation with the Forest Department. Activities will be identified in the process of microplanning and carried out according to the finalised micro plan⁸⁶.

i) Common activities

The protection of forests, wildlife, and the environment should be made mandatory for all JFMCs, EDCs, and PSS's. Activities to be undertaken by all the target committees should include the following:

- **Boundary maintenance:** The boundaries of reserved forests, protected forests, and protected areas will be maintained through the regular clearing of vegetation. The boundary between one joint management area and another will also be maintained by the committee members. Such boundaries should serve as firebreaks.
- **Fire prevention and control:** Committee members will regularly patrol and watch for fires during the dry season. Each committee will be provided with fire-fighting equipment. Basic training on fire fighting will be given to the committee members through the capacity development subcomponent.
- **Monitoring and reporting of illicit activities:** The areas to be managed jointly will be patrolled regularly by committee members. Illegal felling, poaching, encroachment, bio-piracy, and other criminal activities will be monitored and reported to the Forest Department by the committee members.
- **Range management:** The committee will regulate grazing and fodder collection under the guidance of the Forest Department so that resources will be managed sustainably. Measures such as rotational grazing, prescribed burning, mechanical clearing, and seeding will be applied taking into account the local situations.

ii) Optional activities

Other activities to be implemented by JFMCs, EDCs, and PSS's will depend mainly on the type of committee, the area it looks after, and its needs concerning natural resources. For JFMCs, silvicultural activities such as planting trees and NTFP species, and thinning forests would be the main focus of activities. In higher-altitude areas, planting and harvesting medicinal herbs may become the main activities. For EDCs, management of the national park and sanctuaries including the maintenance and restoration of wildlife habitats, maintenance of gates, fences, and footpaths, and guiding of the visitors may be given emphasis. PSS's will mainly look after the lake environment and the surrounding areas by making sure they are not overused or polluted.

⁸⁶ As costing on a village-by-village basis is not feasible due to the lack of information on the forests and villages on the one hand and the participatory approach adopted for the current component on the other, the standard cost per village will be derived based on a standard set of activities. It is assumed that each JFMC/EDC/PSS will initiate work on 5 ha of forestland each year for four years. However, because of the high degree of variation in the natural environment, and size and nature of the villages, the actual activities to be undertaken in each village will vary. Activities and budget for each village should be decided at the time of microplanning taking into account the available total budget derived from the standard model.

- Artificial regeneration in reserved and protected forests: Trees will be planted in areas that have not had success in natural regeneration. Areas for planting will be identified by referring to the relevant working plan and through PRAs. In selecting the species to plant, the preference of local people should also be considered. This information has already been collocated in the process of developing the working plans for the East and West Districts and for the seven protected area management plans. These should be verified at the microplanning stage. Fences will be installed for protection in areas where the population density of animals is high.
- Aided natural regeneration: Controlled burning and/or light soil working will be done to aid regeneration in sal (*Shorea robusta*) and other forests where the status of regeneration is poor.
- Maintenance of forests: Weeding and climber cutting will be done where required. For plantation forests, weeding will be done for three years or more.
- Thinning of plantation forests: Dhuppi (*Cryptomeria japonica*), sal, teak (*Tectona grandis*) *Shorea robusta*, and other plantation forests will be thinned as per the specifications given in the working plans.
- Medicinal herb plantation: Herbs that have high commercial value will be planted in suitable areas. Species to be planted can be decided using the information provided by the State Medicinal Plants Board (SMPB).
- Planting of bamboo, cane, and other NTFP species: Similarly to tree planting, the species that the local people prefer will be planted on suitable lands. This activity should mainly be promoted in khasmal, gorucharan, and private lands.
- Tree planting on private holdings: Wherever there is demand, tree planting on private land will be encouraged by providing free seedlings and technical guidance to propagate and plant trees.
- Nursery: Interested committees will be encouraged to develop simple village nurseries and to propagate seedlings.
- Management of the national park and sanctuaries: Activities such as the maintenance and restoration of wildlife habitats, control of invasive alien species, construction and maintenance of gates, fences, and footpaths, guiding of the visitors, collection of entrance fees, and collection of solid waste will be conducted by EDCs.
- Mitigation of man-animal conflicts: The committee members will assist in the culling of wildlife such the wild boar done by the Forest Department.
- Soil and moisture conservation
- Lake management: PSS's will manage the lake environment. Visitors will be regulated, entrance fees will be collected, and business activities and littering will be controlled by PSS's.

For activities that generate revenue, the benefit-sharing arrangement must be stipulated in the micro plan. For example, an EDC may manage visitors to a sanctuary and collect entrance fees. A JFMC may plant medicinal herbs or trees and then harvest and sell them. The working plans developed by the Forest Department envisage that thinning will take place in congested plantation forests and that the revenue generated should be shared according to the JFM rules once the plans are approved by the MOEF.

iii) Model activities for forest management and biodiversity conservation

A set of model activities for forest management and biodiversity conservation are assumed to facilitate the estimation of project costs. Table 7-9 shows the areas where each of the following categories of activities will be undertaken during the five-year micro plan period by 180 JFMCs: 1) aided natural regeneration, 2) artificial regeneration, 3) bamboo plantation, 4) mixed plantation of trees having medicinal value, and 5) regeneration of perennial herbs and shrubs. During the project period, 4,500 ha of plantations will be grown. Within the total area, 2,160 ha are expected to be established through artificial regeneration. The maintenance of the plantations will continue until the third year from their establishment.

Table 7-9 Summary of model forest management and biodiversity conservation activities

Type of plantation activity	Items	Annual creation of	Years of creation	Total plantation	No. of target villages	Total areas of	Expected areas of tree
		plantation (ha)	(years)	area/village	for JFMC/EDCs/PSS	plantation	plantation with success
		(ha)	(years)	(ha)	(villages)	(ha)	rate of 80%
		a	b	c=a*b	d	e=c*d	f=e*80%
Aided natural regeneration		0.5	5	3	180	450	n.a.
Artificial regeneration		3.0	5	15	180	2,700	2,160
Bamboo plantation		0.5	5	3	180	450	n.a.
Mixed plantation of trees having medicinal value		0.5	5	3	180	450	n.a.
Regeneration of perennial herbs and shrubs		0.5	5	3	180	450	n.a.
Total		5.0		25		4,500	2,160

iv) Central and village nurseries

For the village residents to carry out various planting activities, the Forest Department will produce seedlings in its nurseries for distribution. The villagers of any given village may, if they wish, develop a village nursery and produce seedlings. Table 7-13 shows the land area that will need to be secured for the Project, assuming that the model activities are implemented in all the target villages. During the project period, central and village nurseries will need to be built on a maximum of approximately 12 ha of land total.

Table 7-10 Nursery area necessary for the joint forest management

Project year	Plantation area (ha)				Total plantation area (ha)	Seedlings to be produced (seedlings)	Nursery area (ha)
	Batch of target villages for JFM						
	1st batch	2nd batch	3rd batch	4th batch			
	a	b	c	d	e=a*1,400	f=b/100,000	
FY1							
FY2	225				225	315,000	3.2
FY3	225	225			450	630,000	6.3
FY4	225	225	225		675	945,000	9.5
FY5	225	225	225	225	900	1,260,000	12.6
FY6	225	225	225	225	900	1,260,000	12.6
FY7		225	225	225	675	945,000	9.5
FY8			225	225	450	630,000	6.3
FY9				225	225	315,000	3.2
FY10							
Total	1,125	1,125	1,125	1,125	4,500	6,300,000	

C4-3-2 Action research on sustainable use of forest resources

Action research on the use of forest resources will be conducted with selected JFMCs. The research will explore ways to sustainably use forest resources such as timber and NTFPs, including medicinal herbs. The objective is to explore management regimes that enable the maximum utilisation of the forest products without undermining the resource base or the related ecosystem. Several different

management regimes will be designed for selected forest products, and experiment blocks will be established in the field to test the regimes with the participation of the local people. For instance, a given forest product will be collected according to the different regimes, and the impacts of each regime, such as changes in the resource base, will be monitored. The forest products to be studied may include medicinal herbs, rhododendrons, bamboos, junipers, branches, leaves, dead and fallen trees, and poles.

Currently, commercial use of the state forest is basically banned, and the concept of sustainable management is lacking. However, on one hand, many rural people depend on forest resources. On the other, forest resources can be a good source of sustained income provided that they are managed sustainably. Moreover, they may be the only major option for income generation for many forest fringe communities. This subcomponent will test the feasibility of developing some of the forest resources that have commercial value into a source of income for rural people without undermining the ecosystem. The results from this experiment should inform the rationalization of regulations that govern forest use.

Approximately ten JFMCs that manage areas containing resources of high value and are willing to participate in these research initiatives will be selected by the Project. Areas where the issue of forest resource use is contentious, such as the sub-alpine and alpine areas, should be given preference. Target JFMCs will be selected by the end of the third year of the project period from the first and second batch of villages under the current component. An international expert in action research on natural resource management will be procured and will design the study during Year 3 in consultation with the PMU. The action research will start in Year 4 and continue for five years. The concerned JFMC members will manage the resource in question according to the research design. The expert will periodically monitor the outcome together with the concerned JFMC members for five years and produce a report each year. After the completion of the five-year period, the expert will produce the final report containing policy recommendations on the use of forest resources.

C4-4 Income generation activities

This subcomponent aims at diversifying the sources of income and improving the microenterprises of the target village residents. It will also encourage SHGs to carry out IGAs. The Project will enable the JFMCs, EDCs, and PSS's to provide microfinance loans to the SHGs through the provision of a block grant.

C4-4-1 Formation of self help groups

To create employment and increase incomes in forest fringe communities, the Project will provide opportunities for members of JFMCs, EDCs, and PSS's to conduct income generation activities (IGAs), which will include activities related to ecotourism. Group activities, ie, SHG activities, will be encouraged. The management manual that will be developed in an earlier stage will be referred to for effective management, implementation, and monitoring of IGAs by SHGs.

i) Formation

An SHG is a group of people who run a small enterprise for the objective of increasing their household income. For the Project, one SHG will consist of 5 to 20 members⁸⁷. Around 540 SHGs, or an average of three SHGs per village, will be formed. SHGs that already exist in the target villages will be considered for project intervention provided that they meet the conditions stated below. SHGs can

⁸⁷ The Swarna Jayanta Gram Swarojghar Yozana (SGSY) guideline recommends that the number of persons in a SHG should be 5 to 20 for sparsely populated areas. SGSY is a central government financed-scheme aiming at livelihood improvement of the poor through creating employment (Ministry of Rural Development, n.d.).

engage in both production activities such as agriculture, animal husbandry and handicraft, or in service businesses such as homestay owner and tour guide.

The main objectives of the SHGs to be supported by the Project will be as follows:

- To achieve economic empowerment by increasing household incomes
- To build the self-esteem and confidence of members through success in business management
- To mutually help and share ideas and knowledge among members to enhance IGAs
- To access microfinance services through JFMCs, EDCs, and PSS's for starting or expanding IGAs
- To express concerns and opinions as a group on livelihood issues or forest management, including the use of forest products

For an SHG to obtain support from the Project, its members must belong to a member household of a JFMC, EDC or PSS. The membership of SHG members in one of these committees will be regarded as their willingness to participate in joint forest management, which will be a precondition for receiving project support. In selecting the SHGs that will receive project support, priority will be given to those with women from households with low income. SHGs that consist of large-scale enterprises such as hotel owners with many employees will not be eligible for project support.

SHGs are to be formed by JFMC, EDC, and PSS members who wish to start or expand their microenterprise and come together voluntarily. With the assistance of the Community Organisers, SHGs will then prepare a business plan. A business plan will include 1) the details, target, and schedule of the activity of the SHG; 2) a plan for meeting the costs of the activity; and 3) detailed information on its members. Selection of the activity to be carried out by an SHG should be guided by the results of the marketing study.

Together with the business plan, SHGs will submit an application requesting the approval of their establishment to the concerned JFMC, EDC or PSS. The Executive Committee of the concerned JFMC, EDC or PSS will appraise the application and approve it if it is deemed plausible.

Once approved by the Executive Committee, SHGs will open their own bank account with the help of the Community Organisers. The Community Organisers will also assist SHGs in administrative procedures related to starting up their microenterprises.

ii) Selection of IGAs

SHGs will select the IGA they wish to conduct under the guidance of Community Organisers. When selecting the IGAs, SHGs should be encouraged to utilise locally-available resources and technologies. Also, the marketability of the final products of the selected IGAs must be taken into consideration. The results of the marketing study conducted during the preparation work subcomponent should inform the decision.

SHGs from the same JFMC, EDC or PSS are discouraged to select the same type of IGA because this may cause excessive competition within the village and result in the loss of profitability. This is also not desirable from the viewpoint of risk management⁸⁸.

Suggested IGAs are as follows:

⁸⁸ For example, if all the SHGs engage in poultry husbandry and there is an outbreak of bird flu, it will have a devastating effect on all SHGs. This has a negative effect not only on the SHG members but also on a village's perception of the activities promoted by the Project. This in turn may result in the loss of the village's confidence towards the Project.

- Processing and sales of forest products such as herbs, timber, fuelwood, and fodder
- Collection, breeding, and sale of wildlife such as wild piglets
- Cultivation, value addition, and sale of medicinal plants
- Collection and sale of NTFPs such as edible fern, mushrooms, stinging nettles, and bamboo shoots
- Collection and processing of wild plants into products of high monetary value such as nettle cloth
- Cultivation and sale of agricultural and horticultural products including large cardamom, ginger, and turmeric
- Cultivation and sale of floricultural products
- Animal husbandry such as dairy farming, poultry husbandry, piggery, and goat rearing
- Production and sale of fermented food
- Production of incense out of rhododendron and juniper
- Production of bio-compost
- Production and sale of traditional handicrafts and handlooms such as carpets, bamboo baskets, and brooms
- Provision of ecotourism services, ie, hotelier, homestay provider, guide, porter, cook, pack animal operator, camp-site operator, rock climbing instructor, and cultural show organiser and performer

The marketing study should provide guidance on how the final products produced by SHGs could be marketed. For instance, the products can also be sold at the retail outlets in tourism facilities such as interpretation centres that will be developed under the ecotourism component. SHGs can also utilise locally-available marketing facilities such as Rural Produce Marketing Centres, which can be used by paying a nominal user fee.

iii) Funds for SHGs

The approved SHGs are entitled to receiving the microfinance loans provided by their respective JFMC, EDC, or PSS if they meet the required conditions. The loans may be used by SHGs as initial capital to start and develop its microenterprise. For example, the funds may be used to purchase equipment or to establish or upgrade the facilities required for running the business. However, SHGs will need to prove that their operations are healthy. Details on the microfinance subcomponent are given later.

Each SHG will be responsible for maintaining its accounts and executing its activities. The profits made should be deposited into its account to be utilised for implementation of other activities or for internal loaning among the SHG members.

iv) Support to SHGs

JFMCs, EDCs, and PSS's, with the support of the Project, will extend support to SHGs by training them on micro business management and technical skills. The details of this capacity development are described later.

C4-4-2 Microfinance

Small loans will be provided to the SHGs formed under the target JFMCs, EDCs, and PSS's of the Project as initial capital for them to carry out IGAs. The objective is to enable the members of the SHGs, who have limited access to financial resources, to secure funds to develop IGAs.

The Project will provide a block grant to a target JFMC, EDC, or PSS to operate the microfinance

subcomponent. The grant will be used as a revolving fund to finance SHG activities. Loans will be provided to the SHGs with a nominal interest rate. The rate should be discussed and agreed on in the General Body meeting of a JFMC, EDC or PSS. The rate should be lower than or equal to that of banks and microfinance institutions.

However, before the provision of the block grant to any JFMC, EDC or PSS, the committee must hold enough capacity to handle the funds. The Project, ie, the PMU, will appraise this capacity by examining whether the committee's financial operations, such as book-keeping and account management, are sound. The PMU will not provide the grant until the committee becomes capable of managing it.

Three SHGs are estimated to be formed under each JFMC, EDC or PSS. Each SHG is entitled to receive the loan twice a year. The maximum amount will be INR 20,000⁸⁹ per SHG per loan. Therefore, the amount of the block grant provided to each JFMC, EDC or PSS will be INR 120,000.

For an SHG to qualify for a loan, it will need to demonstrate that it can operate in a financially sound manner. Before obtaining the loan, SHG members must contribute a small amount of money to their common account every month. The amount to be collected from the members should be fixed and agreed on by all members. The money collected should be lent out to each SHG member until all the members receive a loan. This cycle of saving and lending should be continued successfully for at least six months. The SHG members should carry out activities utilizing the loan they receive. The SHG will become eligible for receiving loans from its JFMC, EDC, or PSS only after it demonstrates that it can operate this cycle successfully.

There should be at least a six month interval between one loan and the subsequent one. To receive the second loan, SHGs need to be evaluated based on their track record of activities during the past six months. Only the SHGs that operate and function well can receive the loan for the second time. Performance evaluation indicators should be developed by the Project and included in the management manual. The JFMCs, EDCs, and PSS's will utilise these indicators when judging whether an SHG is eligible for a second loan.

SHGs must utilise the loan for starting or boosting the microenterprise they have selected. The loan should not be used for consumption purposes. SHGs should invest the loan in its activities, generate profits, and return the principal and interest. On one hand, the principal will be utilised by a JFMC, EDC, or PSS to provide loans to SHGs in the subsequent year onwards because the block grant is given only once from the Project to JFMCs, EDCs, and PSSs. On the other hand, the interest should be deposited into the VDF of their respective JFMC, EDC or PSS to be utilised for the benefit of the entire committee.

If an SHG provides loans to its members, each member will return the principal and interest to the SHG. The interest should be deposited into the SHG bank account to be utilised for purposes that will benefit the entire SHG. SHG members who receive a loan will be prohibited from lending out this money to other individuals for the purpose of making profits.

SHGs will be allowed to borrow from other financial institutions such as banks and microfinance institutions. To attain the objective of the microfinance scheme of the Project, however, the target JFMCs, EDCs and PSS's must ensure that the SHGs access loans only under favourable conditions. The JFMCs, EDCs, and PSS's must properly maintain and actively utilise its revolving fund. At the same time, the committees must make sure that they do not fund poorly-performing SHGs.

⁸⁹ SHGs can borrow less than INR 20,000 per one loan.

C4-5 Capacity development

This subcomponent aims to enhance the capacity of JFMC, EDC, and PSS members in conducting various activities supported by the Project through training and exposure visits. The purpose is to strengthen the committees' management capacities and to help the members successfully implement the forest management, biodiversity conservation, and ecotourism activities, and IGAs.

There will be two types of training. The first type will be on administrative and financial management and will be given to all target villages. The second type will be needs-based training such as skills development courses for SHGs. This type of training will be provided based on the needs of an SHG, JFMC, EDC, or PSS.

Details of the training programmes will be prepared by the Project at the time of the execution. Trainers will be procured by the PMU or DFU. They may be sourced from the Forest Department, other departments, NGOs, academe and the private sector depending on the topic. The Project will utilise facilities such as the field offices of the Forest Department and Block Administrative Centres⁹⁰ as training venues.

C4-5-1 Training on management of JFMCs, EDCs and PSSs

Members of JFMCs, EDCs, and PSS's who are responsible for administrative and financial management of their committee will be trained in basic management skills. The topics may include documentation, account management, and book-keeping. They will also be trained in the monitoring of activities. Although the RO, who will be the Member Secretary of the Executive Committee of JFMCs, EDCs, and PSS's, is responsible for maintaining the account of the committee, the day-to-day operations and management of the committee should be carried out by the village residents. Thus, selected village residents will be trained.

This training will be conducted at the district level. Two training courses will be conducted per district per batch. For the first course, approximately 30 participants will be gathered at the district headquarters and trained. Five participants will be selected by the General Body from its Executive Committee members. The participants should be JFMC, EDC, or PSS members for whom the topics would be directly relevant to their responsibilities, eg, President, Secretary, or Treasurer.

C4-5-2 Technical training on forest management and biodiversity conservation

Members of JFMCs, EDCs and PSSs will be trained on the technical skills required for joint forest management. The topics will depend on the activities that will be carried out by each JFMC, EDC or PSS. Examples are fire prevention and control, nursery and silviculture techniques, wildlife management, and utilisation of NTFPs. Most of the training will take the form of on-the-job training or learning-by-doing in which Forest Department officials will provide guidance and advice during the implementation of the activities.

C4-5-3 Training on business management

Selected members of all SHGs supported by the Project will be trained in business and management skills including business planning, accounting and book-keeping, documentation, business administration, and monitoring. The training will enhance the capacity of SHG members in the planning and management of their microenterprise.

⁹⁰ Block Administrative Centres are the regional offices of the RMDD, Government of Sikkim.

C4-5-4 Skills development training on IGAs

Skills development of SHG members will be conducted to enhance the productivity, quality, and profitability of the SHGs' production activities or service provision. The skills development training will be catered to each SHG based on the activity it selects.

An example of skills development training would be one on handicraft production, which could be given to the SHG members of villages selected for ecotourism development by the EMC and other interested SHG members. The training would take two weeks and would be provided to 50 members of SHGs at Gangtok. Five each from ten SHGs may be selected by the JFMCs, EDCs, and PSS's. These participants in turn would train more inexperienced members of the SHGs upon their return. Groups of ten formed by type of craft or product may be instructed together.

C4-5-5 Exposure visits

Selected members of SHGs and other members of JFMCs, EDCs, and PSS's will be taken on exposure visits. The purpose of these visits will be to provide opportunities for village residents to learn from the experiences of successful SHGs, JFMCs, EDCs, and PSS's regarding forest management, biodiversity conservation, ecotourism, and IGAs.

The destinations of exposure visits could be villages within or outside Sikkim. Darjeeling in West Bengal may be a good candidate for residents of the target villages located in the lower parts of Sikkim because its natural environment is similar to that of such villages. West Bengal has other similarities with Sikkim such as the ban on felling.

C4-5-6 Training on ecotourism

(a) Training of JFMC, EDC, and PSS members

Selected members of JFMCs, EDCs, and PSSs will receive a short training course on ecotourism. The ten villages selected for ecotourism development by the EMC will be the primary targets. The training will provide an overview of the business aspect of ecotourism including how the supply chain works, marketing, the impacts of developing ecotourism, advantages and disadvantages, and the pitfalls to avoid.

An instructor will be appointed to prepare and deliver the course. The instructor will prepare the course and deliver it in the ten villages. This will be carried out in the village hall or another facility if there is none within the Panchayat premises. A total of 30 participants will attend each course, which will last three days. The course will be repeated once over the project period.

(b) Training of local people and the local private sector

Training will be imparted in the ten villages selected for ecotourism development by the EMC. The objective will be to assist local service providers in improving their products. NGOs such as ECOSS, Khedi Ecotourism, and the Ecodevelopment Promotion Society will be contracted to deliver the training. Twenty local people will be expected to attend each training session. The courses will be repeated each year, either as refresher courses, to impart new material, or to teach new participants. The following training courses will be given:

- Organisational development (community management, accounts, billing, rotation, etc.): 5 days a year
- Cooking for homestay providers: 10 days a year

- Housekeeping for homestay providers: 3 days a year
- Guiding: 15 days a year
- Cultural performances: 3 months during the first year, 7 days during the subsequent years
- Spoken English: one month a year

(c) Ecotourism exposure tour

Community members will be taken on exposure trips to observe successful village tourism initiatives, where they will learn how they are operated. They will stay one night in a homestay and participate in all the activities available. Five service providers from each village will be selected by the JFMCs, EDCs, and PSSs to go on the trips. Five trips will be organised.

C4-6 Monitoring

The Project will encourage JFMCs, EDCs, and PSS's to conduct the regular monitoring of activities and audits themselves. In order to maintain transparency in their operation, the committees will be asked to have an internal monitoring system to check the financial management and progress of activities with respect to the micro plan. Social audits will be conducted regularly in the General Body meetings. The presidents of the committees will be responsible for providing answers to any enquiries raised by the General Bodies. Monitoring results of activities should be reflected in the revision of the five-year work programmes and annual implementation plans. The above-mentioned activities will be carried out with the assistance of the Community Organisers.

C4-7 Village Development Fund

The Project will encourage the villagers to set up a VDF in each village. The VDF is a common fund of a village, which is maintained by its residents who contribute a portion of the income generated through project activities. The fund will be used for communal purposes. The aim of setting up the VDF is to enable village residents to continue with the activities they have initiated and maintain the assets created through the support of the Project. Although the main focus will be the maintenance of these assets, it can also be utilised for other purposes provided that it benefits the entire community and that it is based on a consensus among the members.

The source of the VDF may include the money generated during the project period such as profits made through sales of forest products, interest on loans paid by SHGs, user fees for the common assets created under the Project by the EPA, user fees and fines collected in the JFMC, EDC, and PSS areas, and interest on bank account deposits of JFMCs, EDCs, and PSS's. In addition, members will be encouraged to contribute some portion of the wages earned through project activities.

C4-8 Implementation of ecotourism subcomponents

Some of the subcomponents under the ecotourism component will involve the JFMCs, EDCs, and PSS's in the implementation of their activities, which are listed below. The details of these subcomponents are given in the description of the ecotourism component.

- C3-2-4 Creating links between tour operators and local communities offering tourism services
- C3-3-1 Development of high-end ecolodges
- C3-3-2 Development of trekking routes
- C3-3-3 Development of mountain bike trails
- C3-3-4 Development of rock climbing areas
- C3-3-5 Development of wildlife observation areas and points
- C3-4-1 Construction and management of interpretation centres

- C3-4-2 Construction of public conveniences at tourist attractions
- C3-5 Introduction of a solid waste collection and disposal system at tourist areas linked to the priority villages

7.2.4 C5 Organisational strengthening of the Forest Department

This component is designed to enhance the capacity of the Forest Department to deliver forest management and biodiversity conservation services efficiently. As stated earlier in this report, the current capacity of the Forest Department is not sufficient to implement this Project; therefore, capacity development is imperative. This component focuses on 1) improvement of physical infrastructure and equipment of the Forest Department, 2) training of the Forest Department officers and frontline staff members, and 3) establishment of a financial mechanism to secure the sustainable management of activities and infrastructure.

It complements other components that include capacity development services provided to stakeholders outside of the Forest Department.

C5-1 Improvements of infrastructure and equipment

C5-1-1 Development of infrastructure and equipment improvement plan

The demand for physical infrastructure development expressed by the Forestry Department is shown in Table 7-11. It should be noted that the high demand of infrastructure improvement is not only a result of its long-term use, but also is a reflection of the insufficient allocation of maintenance costs. Many offices, rest houses, and officer's residences inspected for this Study were found to be dilapidated and decayed, indicating the insufficiency of maintenance. Infrastructure and equipment gaps were identified based on this current demand, the deployment of forestry officials, and the infrastructure and equipment required to support the expected level of field activities of the Project. Table 7-12 summarises the gaps identified. A detailed proposal for the department-wide distribution of additional infrastructure and equipment to be developed or procured is presented in Annex 18. The current conditions of Forest Department facilities are shown in Annex 19.

In Year 1 of the Project, a survey of physical infrastructure and equipment under the control of the Forest Department will be conducted to verify the proposal and develop an infrastructure and equipment improvement plan. The results of the survey will also be used to update the asset inventory of the Department. Since the recurrent costs for office and equipment maintenance must be secured, the proposed office and equipment upgrades will be carefully examined from the viewpoints of maintenance cost, engineering options to minimise these costs, installation of information technology in the infrastructure, their contribution to the efficient implementation of the Project, and schedule of construction and procurement. The results and recommendations will be reflected in the infrastructure and equipment improvement plan for the immediate implementation of infrastructure development.

Table 7-11 Demand for infrastructure development

Forest Department's management unit			Demand for physical infrastructure development		
Division	Sub-Division	Range	Residence	Office	Check Point
HQ (Forest Colony residential quarter)			39		
East	Gangtok	Gangtok		2	
		(Kyongnosla WLS)	1	1	
		Ranipool	1	2	
		Singtam	1	2	
		Tumin	1		
	Pakyong	Pakyong	1	2	1
		Pathing	1	2	
		Phadhamchen (Fambonglho WLS)	3	3	
	Rongli	Rongli	1	2	
	North	Chungthang	Chungthang	1	1
Lachen					
Lachung				1	
Mangan		Dzongu			1
		Mangan		3	
South	Namchi	Phodong		1	
		Namchi	2	3	1
		Melli	1	2	1
		Namthang	1	1	
	Rabong	Temi			1
		Lingmo		1	
		Rabong	1	1	
West	Gyalzing	Gyalzing	2	6	
		Tashiding	1		
		Yoksom	1	1	1
	Soreng	Dentam	2	1	1
		Sombaria	1	2	
(KNP)	(North)	Soreng (Barsey WLS)	2	2	2
		(West)	(Chungthang) (Dzongu)		
Total			64	42	10

Note: Ranges under the protected areas are indicated with parenthesis.

Table 7-12 Summary of infrastructure development

Infrastructure development items	Quantity
Buildings	
Renovation and improvement of HQ offices	1 unit
Renovation and improvement of quarters in the Forest Colony	6 units
Establishment of a community center	1 unit
Renovation and improvement of Range offices and quarters (large)	9 units
Renovation and improvement of Range offices and quarters (small)	16 units
Renovation and improvement of check posts and attached quarters	10 units
Equipment	
4WD Vehicles	6 units
Trucks	1 unit
Pickup trucks	33 units
Motorcycles	100 units
Computers	20 units
Communication system development	1 unit
Fire fighting tools	64 units

C5-1-2 Construction and renovation of offices and residences

The following criteria were employed to conduct the preliminary selection of offices and check posts for construction or improvement. Results of the selection are shown in Table 7-12 and Annex 18.

- Securing productive working environment to increase productivity of officials
- Promoting improved decentralised implementation mechanism
- Strengthening the capacity of frontline staff members by improving working and living conditions
- Improving the mobility of frontline staff members
- Posting of check posts in strategic points throughout Sikkim
- Positioning of Forest Guards near reserved forests and protected areas
- High demand for upgrading and renovation of offices
- Ranges covering more than one cluster for rural intervention

(a) Renovation and improvement of Headquarters

To host the PMU and improve the working conditions of the Forest Department, renovation and improvement of the Headquarters and associated staff quarters in the Forest Colony, particularly for the lower cadre, are urgently needed. The main reasons for improvement are

- unavailability of required space for the Project in hosting the PMU and other offices;
- three main headquarter buildings not properly connected with one another, causing time-consuming movement of officials;
- dilapidated conditions of restrooms and water supply;
- inadequate lighting and electricity supply systems;
- inadequate information facility;
- outdated staff quarters, particularly quarters for the lower cadre; and,
- poor working conditions of office staff, which negatively affect their motivations.

(b) Renovation and improvement of Range offices and check points

To promote the improved, decentralised implementation mechanism and to increase the field deployment of forest officers, their working and living conditions need to be improved. In addition, strengthening the capacity of frontline officers by providing information technology and mobility requires proper office set ups. The improvement will be also required to host the DFU and the Range Supporting Unit of the PMU. Thus, selected Range offices will be renovated and improved. Offices to be renovated and improved presented in Table 7-12 and Annex 18. The main reasons for the improvement are

- poor condition of offices and residences for Divisional Forest Officers, Range Officers, BOs, and Forest Guards;
- significant increase in activities by frontline officers to be expected during the Project period;
- unavailability of facilities to house the DFUs at district level;
- unavailability of facilities to house the Range Supporting Unit at the range level; and
- poor condition of check posts and unavailability of check posts in strategic locations to control illegal activities.

The construction and renovation will start from Year 2 of the Project and conclude by the end of the Year 3. Facilities may be constructed in an eco-friendly, physically challenged-friendly, and/or disaster resistant manner depending on the needs of its users and the budget available. Locally-available materials will be used, and local traditions will be incorporated where possible. The building code and

other codes will be followed as per the rules applied to the Project. The rules will be stated in the implementation manual of the Project.

C5-1-3 Procurement of equipment

In order to increase mobility of frontline officers, transportation facilities listed in Table 7-12 will be procured to strengthen the offices indicated in Annex 18. The deployment of officers to the field is currently not sufficient to implement the Project. Thus, an increase in number of the officials needs to be realized. At the same time, their mobility must be enhanced by providing cars and motorcycles, which will enable them to pay a sufficient number of visits to forest-fringe communities. In addition, the proper application of the current information technology will significantly increase the officers' capability to plan and coordinate the timely delivery of public services. Therefore, vehicles, motorcycles, and information equipment will be procured in line with the infrastructure and equipment improvement plan and the equipment procurement manual of the Project. The initial procurement and installation will be started from Year 2 of the Project.

C5-2 Training of the Forest Department officers and frontline staff members

The need for trained manpower in the Forest Department is considered utmost. The management of natural resources to maintain biodiversity is complex and multi-faceted, and must be strengthened. For instance, the management of forest through joint forest management requires not only technical knowledge in forestry but also good communication and facilitation skills in mobilising communities. Thus, training in various subjects related to forestry will contribute to strengthening the capacity of the Forest Department.

C5-2-1 Biodiversity management

This subcomponent aims to strengthen the Forest Department's in-house capacity related to biodiversity conservation as well as wildlife management. A few ACFs will receive extensive training for them to act as the key players for biodiversity conservation and to prepare themselves as the future leaders in the Forest Department. The Wildlife Institute of India in Dehradun will be considered as a candidate organisation to send selected officers from the Forest Department for both short- and long-term trainings under the Project.

Three types of trainings will be organised. They are

- (a) a three-week course on protected area management for selected IFS and SFS officers;
- (b) a nine-month post graduate diploma course for two ACFs; and,
- (c) a three-month certificate course for selected ROs and BOs.

In addition, an overseas training program will be planned for selected officers at the CF, DFO and ACF levels. The training program will last for a duration of 14 days. Japan will be considered as a candidate for the hosting the training because of its expertise in protected area management, including natural resource management, management of national parks, and ecotourism. The main purpose of the training will be to expose the selected officers to skills, techniques, and technology available outside Sikkim and to strengthen their capacity as planners and managers in forest management and biodiversity conservation. The training will be conducted either in Year 2 or Year 3 of the Project.

C5-2-2 Forest management

This subcomponent is designed to enhance the forest management capacity of all officers and frontline staff members at the rank of DFO and below.

A two-week training course outside Sikkim will be planned throughout the project period. All concerned officers and frontline staff members will attend the training at least twice during the project period. There are two types of training courses: refresher training courses and follow-up training courses. The content of training will focus on forest management. Themes will include 1) working plan, 2) forest inventory, 3) nursery techniques, 4) silviculture, 5) utilisation, 6) establishment and monitoring of JFMCs, EDCs, and PSS's, and 7) micro plan. In addition, training on communication skills for frontline staff members will be organised.

The training can be conducted at one of the following institutes:

- State Forest Service College, Coimbatore, Tamil Nadu
- State Forest Service College, Burnihat, Assam
- State Forest Service College, Dehradun, Uttarakhand
- Eastern Forest Rangers College, Kurseong, West Bengal
- Indian Institute of Forest Management, Bhopal, Madhya Pradesh
- Forest Research Institute, Dehradun, Uttarakhand
- Andhra Pradesh Forest Academy, Hyderabad, Andhra Pradesh
- Amity School of Natural Resources, Noida, Uttar Pradesh

Additionally, Darjeeling, West Bengal will be the 'exposure visit' destination considering the similarity in natural characteristics between Darjeeling and Sikkim. The visit will be designed for ACF, range officers, Head Forest Guards and Forest Guards to gain practical skills, techniques and to learn mechanism in forest management and biodiversity conservation in a mountainous area. A mixed group of up to 20 persons (one to two ACFs, two to three ROs, three to five Head Forest Guards, and seven to ten Forest Guards) will be selected per district to go on the eight-day exposure visit. Four trips will be organised. Training costs will include transport, board and meals of all trainees in Darjeeling.

Tamil Nadu and Karnataka will also be considered as the exposure visit site as well as the venue to learn techniques on GIS and community development. At present, both states are implementing loan projects related to joint forest management funded by JICA.

C5-2-3 Ecotourism

This subcomponent will 1) define the concept of ecotourism mutually understood by the Forest Department and the Tourism Department, 2) develop basic expertise related to ecotourism particularly from the viewpoint of the policy makers, and 3) enhance capacity of the officers responsible for ecotourism.

(a) Training on ecotourism for selected IFS and SFS officers

A five-day training course on ecotourism will be conducted for selected IFS and SFS officers in Sikkim. The training will cover the issues such as

- how the Forest Department can provide the appropriate policy, regulatory, and supporting framework for the private sector;
- the role of the forestry officers;
- how to implement the proposed ecotourism policy so that ecotourism does not encroach on and damage the environment;
- environmental, social, cultural and economic impacts of developing ecotourism in Sikkim, presenting strategies to enhance the positive impacts and minimise the negative impacts; and,
- the ecotourism business so that the Forest Department understands the needs of ecotourism supply chain and the resources that have to be employed to ensure success.

(b) Training on ecotourism for selected officers and frontline staff members of the Forest Department

A one-day workshop on ecotourism will be organised for selected officials and frontline staff members of the Forest Department as well as selected officials of the Tourism Department in Sikkim. The workshop will be conducted before or after the short course on ecotourism planned for JFMCs, EDCs, PSS and NGOs at field level. The workshop will provide an overview on ecotourism including how the government can play an effective role in promoting ecotourism in Sikkim. A consultant appointed for the ecotourism component will assist the PMU in organizing the workshop.

(c) Training on ecotourism for the focal person on ecotourism in the Forest Department

A two-week course on subjects such as tourism, ecotourism and/or marketing will be attended by the officer(s) responsible for ecotourism at the headquarters.

C5-2-4 Monitoring and evaluation

An annual review seminar will be organised to 1) review the progress of the Project, 2) share experiences and lessons learned among the members of the PMU, DFU, and RSU, 3) solve issues and problems related to the Project, and 4) develop an action plan for the following year. The seminar will be organised by the PMU at least once a year before the end of each fiscal year. All members of the PMU, DFU and RSU will be required to participate. The meeting will last for 3 days.

Table 7-13 shows a sample programme of the annual review seminar.

Table 7-13 Sample programme of the annual review seminar

	Day 1	Day 2	Day 3
09:30 – 11:30	Welcome & Introduction	Progress review – North district	Issues and problem solving
11:30 – 11:45	Tea break	Tea break	Tea break
11:45 – 13:30	Progress review – East district	Progress review – South district	Action plan development
13:30 – 14:30	Lunch break	Lunch break	Lunch break
14:30 – 16:30	Progress review – West district	Experience sharing and lessons learned	Presentation of action plan per district (30 min. each)
16:30 – 17:00	Tea break	Tea break	Tea break
17:00 – 18:00	Experience sharing and lessons learned	Issues and problem solving	Wrap up & Closure

The action plan, which will be developed as a part of the seminar, will be reflected in the action plan for the following year.

In addition to training on the subjects specified above, communication skill development, including facilitation skills would be useful to strengthen the capacity of the Forest Department.

At present, the MOEF is implementing a project supported by JICA, which aims to enhance capacity of frontline staff members of selected states in India. Thus, the Forest Department and the PMU may coordinate with the MOEF to take advantage of the assistance available from the MOEF.

C5-3 Establishment of sustainable finance mechanism

This subcomponent aims to secure financial resources to sustain biodiversity conservation initiatives established under the Project. To ensure the proper management and maintenance of the facilities established by the Project, recommendations for user fees, entrance fees, taxes, and establishment of funds will be made and enforced by the Project to the extent possible. Options for the Forest

Department to maintain the facilities established and to enhance the sustainability of activities by local communities will be explored. This component will be implemented by the PMU with the support of consultants. Details of the mechanism will be prepared by the Project upon execution.

The following are the steps that will be taken:

- i) Establishing rules which will allow JFMCs, EDCs, and PSS's to collect and/or share fees with the Forest Department for non-consumptive use of nature and biodiversity such as ecotourism
- ii) Enhancing the Sikkim Biodiversity Trust Fund by attracting contributions from entities such as hydro-electric companies which rely heavily on nature resources as well as from the civil society through state-wide campaigns
- iii) Proposing of earmarking some of the existing state revenues such as those from the sales of gravel and the state's share of hydro-electricity generation for biodiversity conservation
- iv) Examining and applying international financial schemes for environment protection, such as those on biodiversity conservation and climate change.

Schemes such as the Global Environment Facility (GEF) may be relevant for enhancing activities initiated by the Project. The Reducing Emission from Deforestation and Forest Degradation (REDD)⁹¹, the mechanisms of which are currently being discussed in the climate change negotiations, is relevant to Sikkim, as it basically aims to discourage the exploitation of existing forests by providing adequate compensations. The development of the REDD and other relevant schemes will be monitored and considered for application in Sikkim.

The activities related to the establishment of a sustainable financial mechanism will be carried out from Year 3 until the end of the Project

7.2.5 C6 Consultancy services

C6-1 Consultancy services

Table 7-14 indicates the proposed professional fields and schedules of consultancy services. A consultant team comprising five international consultants, eight national consultants, and a group of support staff members will be procured through international competitive bidding. The required professional fields, levels of competency, and length of services will be finalized by the PMU based on the recommendations made in consultation with JICA. The consultancy services will be procured to secure timely and technically-sound project planning, implementation, monitoring, and evaluation activities.

Because joint forest management requires change in foresters' behaviours and attitudes towards members of forest-fringe communities to achieve participatory forest and biodiversity management, experienced experts should be engaged to introduce new approaches and ideas. Biodiversity conservation and impact assessment require scientifically-sound, high-level research and analytical skills to conduct project activities properly. In order to enter the international ecotourism market, which is significantly different from the one in India, an expert with international experience must be engaged to support the development of the ecotourism market.

⁹¹ Under the Reducing Emissions from Deforestation and Forest Degradation (REDD) scheme, it is expected that developing countries will be compensated for protecting the forests although nothing has been formalized. Unlike the CDM, the idea of the REDD is to provide monetary compensation to developing countries for forgoing conversion of forest land into land for other purposes.

Table 7-14 Proposed professional fields and schedules of consultancy services

Consultants and support staff	No. of person	FY01	FY02	FY03	FY04	FY05	FY06	FY07	FY08	FY09	FY10	PM
		▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	
Construction Season												
Grand total (I + II + III)	<u>21</u>											<u>1,281</u>
Total (I + II)	<u>13</u>											<u>369</u>
I. International consultant	<u>5</u>											<u>102</u>
1. Team Leader/Participatory Forest Management Specialist	1											34
2. Biodiversity Management Specialist	1											21
3. GIS and Forest Management Specialist	1											13
4. Ecotourism Specialist (International Market)	1											21
5. Impact Assessment and M&E Specialist	1											13
II. National consultant	<u>8</u>											<u>267</u>
1. Co-team Leader/Joint Forest Management Specialist	1											77
2. Institutional Development Specialist	1											18
3. Protected Area Management Specialist	1											34
4. GIS and Information Technology Specialist	1											31
5. Ecotourism Specialist (National Market)	1											34
6. Design and Construction Quality Control Specialist	1											28
7. Monitoring and Evaluation Specialist	1											17
8. Training Coordinator	1											28
III. Support staff	<u>8</u>											<u>912</u>
1. Administrative Manager	1											114
2. Accounts Manager	1											114
3. Office Assistant/Photocopier Operator	3											342
4. Driver	3											342

7.3 Implementation arrangement

7.3.1 Project implementation arrangement

The Project will be implemented by the PMU, which will be set up exclusively for the Project under the Forest Department. The PMU has complete liberty to reallocate the staff and hire experts as required.

Figure 7-8 illustrates the organisational structure of the PMU and its relationship with the Forest Department and other related entities for project implementation.

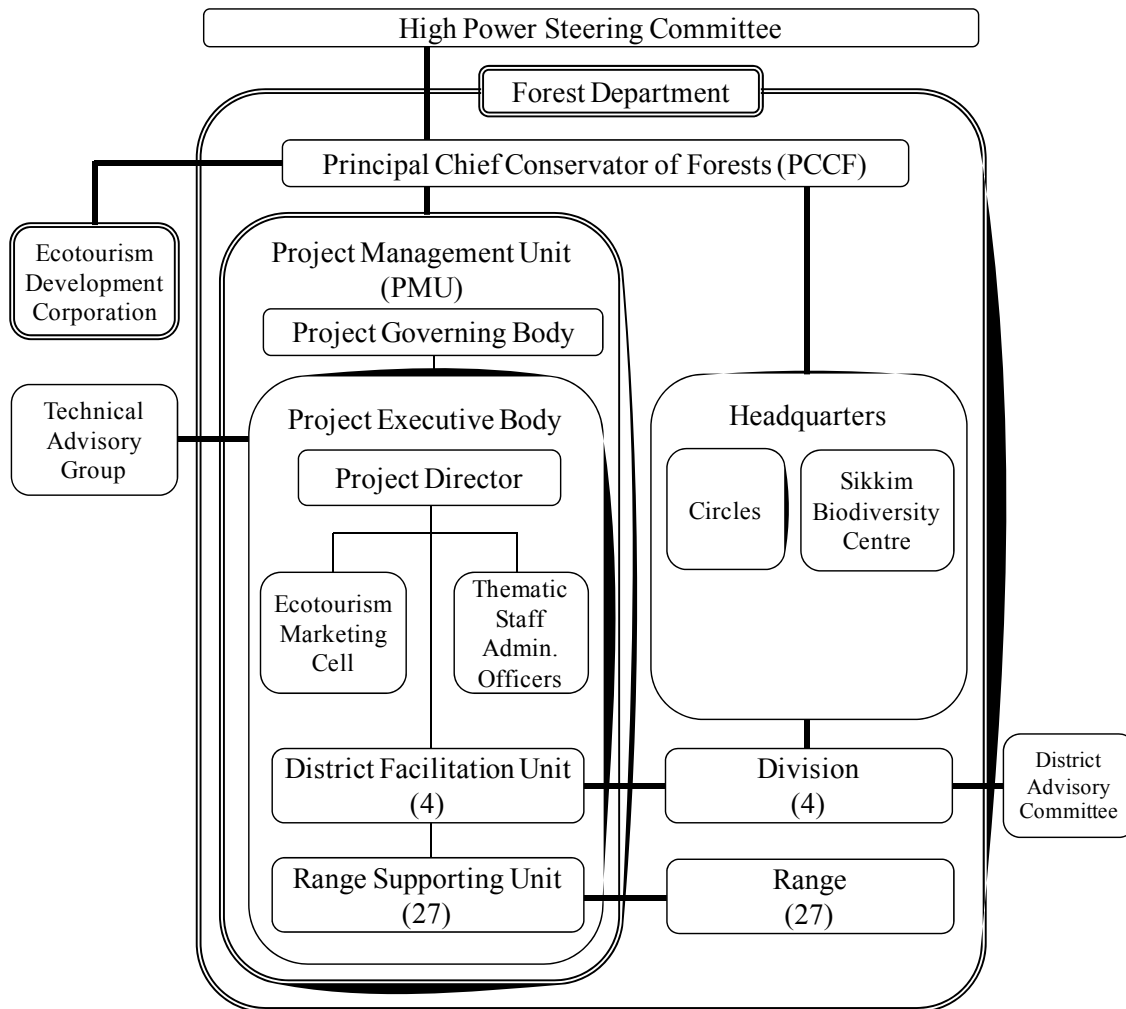


Figure 7-8 Project implementation structure

The PMU will be guided by the HPSC, which will be formed at the state level, and supported by the Project Consultant Team to be procured by the Project.

To secure the smooth and timely implementation of the Project, the PMU will be registered as a society under the Societies Registration Act (1860). Registration as a society will allow the PMU to set up a decision-making protocol that is more efficient than that of the Forest Department. Under the department's conventional protocol, execution of the state budget requires the approval of the PCCF. In contrast, the seven society-mode Forest Development Agencies (FDAs) currently in operation have significantly simplified decision-making processes for budget execution. Although the FDAs need to

obtain approval from the MOEF for the execution of large-scale budgets, authority for day-to-day execution is vested in the District Forest Officer (DFO), who is the Chief Executive Officer of the FDA. As the DFO is four ranks lower than the PCCF, this arrangement is more efficient in terms of the time and manpower needed to coordinate the decision-making process. Accordingly, the PMU's day-to-day decisions regarding budget execution and project operation will be made by the Project Director. Furthermore, a part of director's execution authority can be delegated to the Project Coordinator of the District Facilitation Unit upon approval of the High Power Steering Committee.

High Power Steering Committee (HPSC)

The HPSC will be the highest decision-making body of the Project. It will be responsible for coordination among concerned departments in the Government of Sikkim.

The Forest Department will coordinate with the Government of Sikkim for the issuance of the gazette notification regarding the formation of the HPSC for the Project before its commencement.

The roles and responsibilities of the HPSC will be as follows:

- To approve and endorse the management manual of the PMU
- To approve and endorse the establishment of the PMU and terms of reference of the PMU
- To approve and endorse the annual work plans and budgets of the Project prepared by the Governing Body of the PMU
- To hold meetings to review the project's progress once or twice a year
- To provide advice and/or to resolve issues, problems, and conflicts
- To coordinate among concerned departments in the Government of Sikkim for sharing the experiences and lessons learned related to the Project
- To lead and facilitate processes of policy change to improve the service delivery mechanism of the Forest Department based on the experiences and needs of the Project

Representatives of JICA may be invited to HPSC meetings so that JICA can exchange information and views related to the Project directly with the HPSC members.

Table 7-15 lists the proposed committee members of the HPSC. The Government of Sikkim is expected to 1) make all efforts to engage the concerned heads of departments in the HPSC, 2) issue a notice on the establishment of the HPSC in a timely manner, 3) keep the HPSC active, and 4) dissolve the HPSC after project closure.

Table 7-15 List of proposed High Power Steering Committee members

Title	Name of post and department
Chairperson	Chief Secretary, Government of Sikkim
Member	Head of department, Animal Husbandry, Livestock, Fisheries and Veterinary Services
Member	Head of department, Development Planning, Economic Reforms and North Eastern Council Affairs
Member	Head of department, Finance and Expenditure
Member	Head of department, Horticulture and Cash Crops Development
Member	Head of department, Rural Management and Development
Member	Head of department, Sports and Youth
Member	Head of department, Tourism
Member	Head of department, Urban Development and Housing
Member secretary	PCCF, Forest Department

Project Governing Body

The Projects will introduce two tiers of bodies at state level, namely the Governing Body and the Executive Body. This two-tier system for implementation is applied to the JICA projects implemented in Orissa and in Tripura. This system is a check-and-balance mechanism designed to facilitate the transparency and timeliness of decision-making and of the allocation of funds.

The Governing Body will hold the highest decision-making power within the PMU, which will be guided by the HPSC.

The roles and responsibilities of the governing body will be as follows:

- To prepare required documents and information, and register the PMU as society in Sikkim
- To provide guidance to the PMU in developing the PMU management manual
- To review the annual work plans and budgets prepared by the PMU Executive Body and to present them to the HPSC for approval and endorsement
- To facilitate the integration of the approved plan and budget of the PMU into the annual plans and budgets of the Forest Department
- To disburse funds to the Project in a timely manner
- To monitor the financial and physical progress of the Project
- To hold meetings to monitor and review the project progress every quarter at minimum
- To represent the PMU in the HPSC and to work closely with it to propose policy change as and when necessary
- To demonstrate leadership in the PMU as and when necessary

It is recommended that the governing body for the Project be chaired by the PCCF-cum-Secretary, who is the head of the Forest Department. The proposed members of the governing body are presented in Table 7-16. Officers at the CF and DFO levels should be included as the governing body members, since they are a critical link between policy makers and frontline staff members. They will be the key to facilitating the bottom-up approach within the Project.

Table 7-16 List of proposed PMU Governing Body members

Title	Name of post and department
Chairperson	PCCF, Forest Department
Member	Additional PCCF or CCF, Forest Department
Member	CF, Forest Department
Member	DFO, Forest Department
Member secretary	Project Director, JICA Project

Project Executive Body

The Project Executive Body will be responsible for executing the Project effectively and efficiently. The Forest Department will depute officers who are motivated, capable, and willing to take leadership roles in strengthening the capacity of the Forest Department. The deputed officers will be expected to engage exclusively in the Project during the project period.

The roles and responsibilities of the executive body will be as follows:

- To procure a consultant team and staff members of the PMU
- To prepare the annual work plans and budgets
- To implement the Project as per the approved work plan and budget allocation
- To manage the project funds, including disbursement processing and coordination with JICA
- To coordinate with the Forest Department and concerned stakeholders related to the Project in

project implementation

- To provide guidance to the DFU and the Range Support Unit
- To utilise the technical assistance provided by a consultant team, who is contracted under the Project
- To monitor and evaluate the project progress
- To document and share the project progress, lessons learned, best practices with concerned stakeholders
- To perform any other duties as required

The roles and functions of the proposed executive body members are illustrated in Table 7-17. Due to the limited availability of manpower within the Forest Department, the Project will hire external professionals to form the Executive Body along with the officers deputed from the Forest Department. In addition to specialists with sectoral expertise in ecotourism and biodiversity conservation, a Planning and Monitoring Specialist will be hired so that project activities are closely monitored both daily and on a periodic basis. This specialist will be supported by assistants and will oversee the impact assessment described in Chapter 10.

Table 7-17 List of proposed PMU Executive Body Members

Title	Rank of officers to be deputed and/or contracted	Main function
Project Director	Additional PCCF (Forest Department)	To hold overall management responsibility of the Project
Additional Project Director	CCF or CF (Forest Department)	To assist the Project Director for overall management responsibility of the Project
Planning and Monitoring Specialist	DFO or ACF (Forest Department)	To manage planning as well as monitoring and evaluation of the Project under the guidance of the Project Director
Biodiversity Conservation Specialist	DFO or ACF (Forest Department)	To manage the biodiversity conservation component of the Project under the guidance of the Project Director
Ecotourism Specialist	DFO or ACF (contractual)	To manage the ecotourism component of the Project under the guidance of the Project Director
Divisional Engineer (4 years)	Engineer (Forest Department)	To supervise and control infrastructure development and construction work
Assistant Engineer (4 years)	Assistant Engineer (Forest Department or contractual)	To supervise and control infrastructure development and construction work
Junior Engineer (4 years)	Junior Engineer (Forest Department or contractual)	To supervise and control infrastructure development and construction work
Accountant	Certified chartered accountant (contractual)	To manage all financial matters, including preparation of budgets, monitoring of project funds, disbursement status, preparation of reimbursement requests, and any other financial activities under the guidance of the Project Director

The Project Executive Body will be supported by a team of consultants and by a team of support staff members such as office managers, accountants, office assistants, computer operators, drivers, and peons. In addition, the DFU at the district level and Range Supporting Unit (RSU) at range level will be formed to support the Forest Department and the Executive Body.

District Facilitation Unit (DFU)

A Project Coordinator will be appointed in each district. The Project Coordinator will coordinate and facilitate activities under the guidance of the PMU's Executive Body. (S)he will be the head of the DFU and will work closely with DFOs stationed at the division level to implement the Project. These DFOs will be responsible for project implementation as well as other regular activities undertaken by the Forest Department. They will be supported by ACF, ROs, Head Forest Guards and Forest Guards. Thus, one DFU per district or a total of four DFUs will be formed. Table 7-18 lists the proposed members of the DFU.

Table 7-18 List of proposed DFU members

Title	Rank of officers to be deputed and/or contracted	Main function
Project Coordinator	DFO (Forest Department)	To coordinate and facilitate the project activities
Deputy Project Coordinator	ACF (Forest Department)	To support the DFOs in planning and implementing the annual work plans, budgets, and monitoring and evaluation at the divisional level under the guidance of the PMU and a planning and implementation specialist at the state level
Accountant	ACF (contractual)	To support the DFOs in financial monitoring, processing, and management related to the Project

The DMU will be supported by a group of supporting staff such as data entry operators, drivers and peons. They will be hired under the Project for project implementation. They will support the Forest Department in strengthening its capacity at field level through the Project.

Range Supporting Unit (RSU)

One RSU in each range, or a total of 27 RSUs, will be established. Each unit will comprise community organisers whose responsibilities will be to support the DFOs and below in implementing the activities related to community development and joint forest management under the guidance of the PMU. The objective of establishing the unit in each range is to build a foundation for computerised information management at the range level, which will be maintained by range offices after project closure. ROs will be trained in computer skills under the Project.

Technical Advisory Group

A technical advisory group will be formed to support the PMU technically at state level. Professors from Sikkim University, retired IFS and SFS officers as well as professionals from locally established NGOs will be are potential initial members of the group. The PMU will seek technical guidance from the group when necessary to realise not only innovative but also locally-suitable implementation mechanisms for Sikkim.

District-level project advisory committee

District collectors and officials from other concerned departments should be engaged in rural development at the district level and below. Thus, a district level project advisory committee will be formed to engage them in the Project. Four advisory groups, which will each be responsible for one of the four districts in Sikkim, will be formed.

Table 7-19 List of proposed district advisory committee members

Title	Name of post and department
Chairperson	District collector
Member	President, Zilla Panchayat
Member	District-level officer, Animal Husbandry, Livestock, Fisheries and Veterinary Services Department
Member	District-level officer, Horticulture and Cash Crops Development Department
Member	District-level officer, Rural Development and Management Department
Member	District-level officer, Tourism
Member	Representative, civil society organisation
Member secretary	Project Coordinator, JICA Project

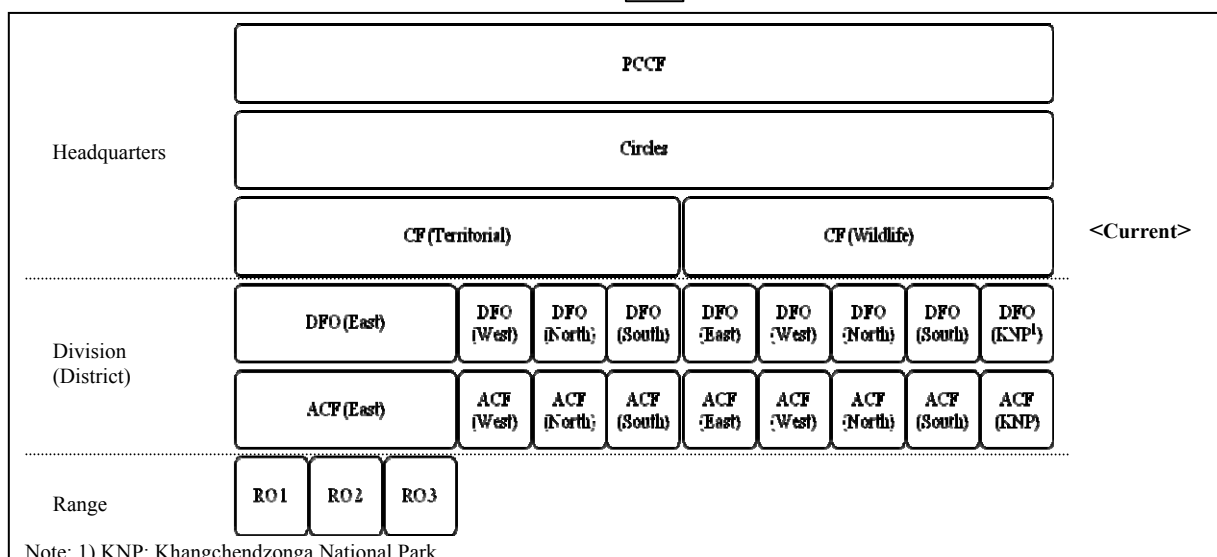
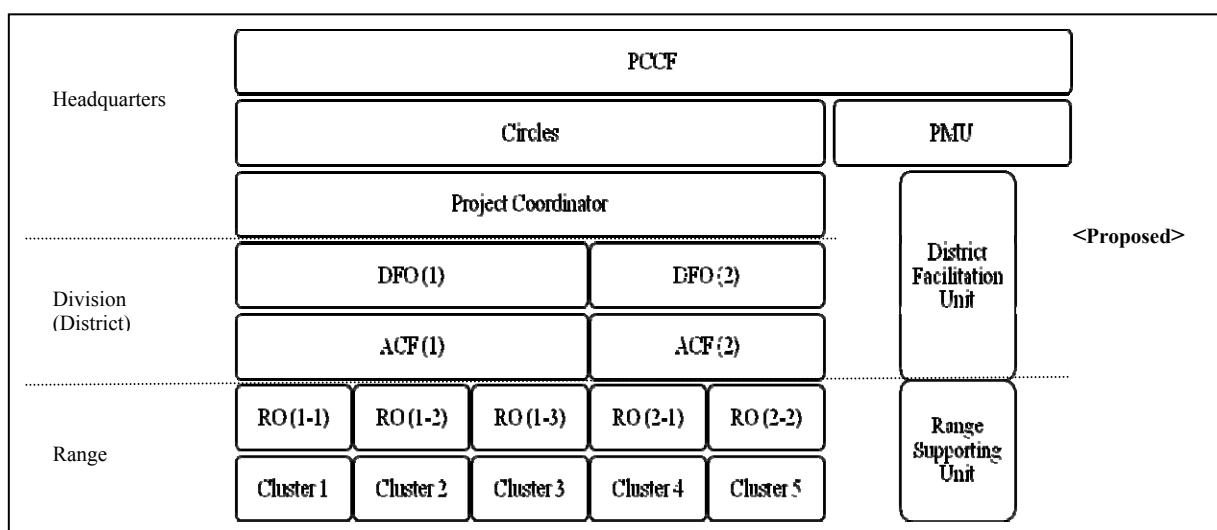


Figure 7-9 Proposed reorganised structure of the Forest Department

The roles and responsibilities of the advisory committee will be as follows:

- To review and endorse the annual work plans and budgets prepared by the DFU;
- To facilitate integration of the project activities into regular activities executed by concerned departments;
- To hold meetings to review project progress twice or three times in a year;
- To provide advice and/or resolve issues, problems, and conflicts;
- To hold meetings at least three times in a year; and,
- To provide guidance to the DFU in the course of project implementation as required.

Table 7-19 shows the list of proposed district level advisory committee members.

Restructuring of the Forest Department

The Forest Department is recommended to rearrange the existing structure at the division level and below. The primary objective of the organisational restructuring will be to strengthen the decentralised service delivery mechanism of the Forest Department in the most effective and efficient manner. The Forest Department should revise the current implementation structure of programmes, projects, and schemes at each level and range to identify the gaps and problems.

The proposed arrangement will be to post one DFO to each district as the Project Coordinator. Each Project Coordinator will be guided by the PMU in implementing the project activities for each district. There will be four project coordinators total working at the district level. These coordinators will be supported by DFOs, ACFs, ROs, Head Forest Guards, and Forest Guards.

The current organisational structure and the proposed reorganised structure are shown in Figure 7-9. The current number of officers and staff ranked DFO or below is presented in Annex 3.

The roles and responsibilities of the Coordinators will cover all the mandates of each circle within the Forest Department. Head Forest Guards and Forest Guards will be assigned to support ROs and to work with communities.

Within the reorganised structure, the Project Coordinators will play key roles in mobilising the officers and frontline staff members at the district level and below with the support of the PMU and of the rest of the Forest Department officials who are not directly involved in the Project.

The reorganisation of the Forest Department will improve the efficiency of task allocation so that its officers and staff are given the appropriate volume of work. Moreover, it will facilitate the holistic design and management of the planning and execution of the Department's activities.

Collaboration with other stakeholders

The Project will seek collaboration with the MOEF, other departments in the Government of Sikkim, and NGOs. The resources that these institutions possess are enormous in terms of information, knowledge, technology, facilities, and manpower and will be mobilised by the Project. Details of the collaboration will be negotiated upon project implementation.

Areas of possible collaboration will range from research to training. The MOEF and World Wide Fund for Nature will be good resources, as they have both experience and knowledge from other states in India. Resources available in the Tourism Department as well as the Rural Management and Development Department will be mobilised as well.

7.3.2 Post project implementation arrangement

The final year or Year 10 of the Project will be spent to 1) develop a handover manual for the Forest Department, 2) transfer the functions performed by the PMU to the Forest Department, 3) transfer infrastructure and equipment to the Forest Department, and 4) assist the Forest Department in the reassignment of the officers deployed to the Project back to the Forest Department.

Development of a handover manual

The PMU will develop a handover manual, which will be utilised when the Forest Department takes over the PMU's operations in Year 10. When developing the manual, the differences in the implementation arrangements between the PMU and the Forest Department should be discussed and measures taken to resolve any issues that may arise for the smooth transition to the subsequent phase. In addition, attention should be given to the following differences between the PMC and the Forest Department:

- Difference in decision-making process
- Difference in financial approval process
- Difference in procurement approval process
- Difference in flexibility in utilising available funds
- Difference in time required for each approval
- Difference in availability of skilled manpower

Transfer of the PMU's functions to the Forest Department

There are two options for sustaining the work performed by the PMU after the project closure. One is to create a new circle, which will perform the same functions as the PMU within the Forest Department. The new circle will oversee all stages of the project cycle: planning, execution, and monitoring and evaluation. The other option is to reorganise the existing circles. One circle will be assigned to the overall planning and management of schemes, programmes, and project executed across the Forest Department.

The PMU, in consultation with the Forest Department, will finalise the post-implementation arrangement in Year 10. Based on the arrangement agreed on by both parties, the PMU will transfer its functions to the Forest Department using the handover manual.

Transfers of infrastructure and equipment to the Forest Department

The Forest Department will meet the costs of operation and maintenance of all infrastructure and equipment procured under the Project. Therefore, only the items utilised exclusively by the PMU, namely vehicles, computers, printers and photocopy machines, will need to be transferred to the Forest Department systematically. A list of equipment utilised by the PMU will be prepared and included in the handover manual mentioned above. The items on the list will be handed over to the Forest Department at the end of the Project. Likewise, a list of procured equipment and a list of improved offices and buildings will be submitted to the Forest Department.

Transfer of the PMU staff members to the Forest Department

The officers assigned to work in the PMU will need to return to the Forest Department after the project closure. The Forest Department, in consultation with the PMU and with support of consultants, will determine the appropriate posts for these officers. The posts should be assigned to take full advantage of the experience, skills, knowledge, and techniques, especially those in GIS and GPS, wildlife management, and biodiversity conservation that the officers gain during the Project.

The PMU staff members temporary hired for the Project will complete their assignments by the end of the Project. The Forest Department will have no obligation to continue their contracts. However, these staff members may be hired, if needed, under new contracts issued by the Forest Department.

The Project will ensure that, by the end of the project, all payments will be made and cleared as per the contracts signed by these staff members.

CHAPTER 8 Cost estimate and procurement

8.1 Project costs

8.1.1 Summary of project cost

The summary of the project cost is shown in Table 8-1.⁹² The total cost of the Project is INR 3,936 million, which is equivalent to roughly 7,834 million Japanese yen (JPY)⁹³. Costs are classified into A) a portion eligible for a JICA loan, which can be financed by both JICA and GOI, and B) a portion ineligible for a JICA loan, which should be financed exclusively by GOI. Detailed cost estimates consistent with the project description introduced in Chapter 7 are presented in Annexes 20, 21, and 22.

In terms of budget size, the largest component is ‘Component 3: Ecotourism’, which accounts for 29.2% of the total project cost. The second largest is ‘Component 5: Organisational strengthening of the Forest Department’ with the share of 16.1%, followed by ‘Component 4: Joint forest management’ and ‘Component 2: Forest and biodiversity conservation’ occupying 9.9% and 9.1% of the total project cost, respectively.

Table 8-1 Summary of project cost

Item	('000' INR)			
	FC	LC	Total	% to total
A. ELIGIBLE PORTION	179,148	3,100,831	3,279,979	83.3%
I) Procurement/construction		2,990,194	2,990,194	76.0%
C1. Preparatory work		491	491	0.0%
C2. Forest and biodiversity conservation		357,493	357,493	9.1%
C3. Ecotourism		1,149,500	1,149,500	29.2%
C4. Joint forest management		389,152	389,152	9.9%
C5. Organisational strengthening of the Forest Department		509,040	509,040	12.9%
Price escalation		442,126	442,126	11.2%
Physical contingency		142,390	142,390	3.6%
II) Consulting services	179,148	110,638	289,786	7.4%
C6. Consulting services base cost	158,024	90,171	248,195	6.3%
Price escalation	12,593	15,198	27,791	0.7%
Physical contingency	8,531	5,268	13,799	0.4%
B. NON ELIGIBLE PORTION		518,668	518,668	13.2%
a Procurement/construction		156,679	156,679	4.0%
C5. Organisational strengthening of the Forest Department		127,260	127,260	3.2%
Price escalation		21,958	21,958	0.6%
Physical contingency		7,461	7,461	0.2%
b Land acquisition				
c Administration cost		309,299	309,299	7.9%
d VAT		34,774	34,774	0.9%
e Import Tax		17,915	17,915	0.5%
Sub-total (A+B)	179,148	3,619,499	3,798,647	96.5%
C. Interest during Construction	105,143		105,143	2.7%
Interest during Construction (procurement/construction)	104,937		104,937	2.7%
Interest during Construction (consulting services)	206		206	0.0%
D. Commitment Charge	32,800		32,800	0.8%
Total (A+B+C+D)	317,091	3,619,499	3,936,590	100.0%
	8%	92%	100%	

Note: FC - foreign currency; LC - local currency

Source: Study team

⁹² See Table 8-10 Financing plan and annual cost schedule for more details.

⁹³ Exchange rate: INR 1 = JPY 1.99

For project management and administration, 7.9% of the total project cost is allocated. To ensure the quality of project outputs and to increase the project implementation capacity, 6.3% of the total project cost is secured for 'Component 6: Consultancy service'. To manage economic and other uncertainties, 16.7% of the total project cost is allocated to price escalation (12.5%) and physical contingency (4.2%).

8.1.2 Cost of components

(1) C1 Preparatory work

Component 1, 'Preparatory work' spends the majority of the allocated budget (INR 491,000) to 1) the development of the project implementation manual and 2) the familiarization of the Project under the C1-3 component, 'Preparation of implementation manual' (see Table 8-2).

Table 8-2 Cost summary of Component 1

Component	Total (‘000’ INR)	% to each component total
Component	2,781,133	
		(‘000’ INR)
Component	Total	%
C1 Preparatory work	491	100.0%
C1-1 Reorganization of the Forest Department		
C1-1-1 Reorganization of the Forest Department		
C1-2 Establishment of project implementation structure	20	4.1%
C1-2-1 Establishment of project implementation structure	20	4.1%
C1-3 Preparation of implementation manual	471	95.9%
C1-3-1 Preparation of implementation manual	471	95.9%
C1-4 Development of annual work plan and budget		
C1-4-1 Development of annual work plan and budget		

Source: Study team

Table 8-3 Cost summary of Component 2

Component	Total	%
		(‘000’ INR)
Component	Total	%
C2 Forest and biodiversity conservation	357,493	100.0%
C2-1 Enhancement and management of forest and biodiversity information base	75,340	21.1%
C2-1-1 Update of topographical and land use map	37,677	10.5%
C2-1-2 Inventory and monitoring of biodiversity	31,112	8.7%
C2-1-3 Study of impacts of climate change and grazing in the Himalayan ecosystem	6,551	1.8%
C2-2 Enhancement of the basis for forest management and biodiversity conservation	73,837	20.7%
C2-2-1 Redefinition of protected area boundaries and improvement of the protected area network	23,713	6.6%
C2-2-2 Management and conservation of flagship species habitats	25,374	7.1%
C2-2-3 Enhancement of working plans and establishment of forest management zones	24,750	6.9%
C2-3 Facilitation of inscription process of Khangchendzonga Biosphere Reserve on the World Heritage List	2,287	0.6%
C2-3-1 Facilitation of inscription process of Khangchendzonga Biosphere Reserve on the World Heritage List	2,287	0.6%
C2-4 Ex-situ conservation and promotion of biodiversity conservation	206,030	57.6%
C2-4-1 Ex-situ conservation of biodiversity	167,060	46.7%
C2-4-2 Knowledge generation and dissemination of biodiversity and best practice information	20,129	5.6%
C2-4-3 Promotion of biodiversity conservation in religious areas	18,841	5.3%

Note: PA – protected area; BR – Biosphere Reserve; WH – World Heritage

Source: Study team

(2) C2 Forest and biodiversity conservation

Component 2 is allocated the budget of INR 357 million in total. Approximately INR 167 million is allocated to 'C2-4-1 Ex-situ conservation of biodiversity'. This subcomponent includes the construction of 1) a butterfly park, 2) a bird park, 3) propagation nurseries, and 4) the main office building of Himalayan Zoological Park and veterinary care facility (see Table 8-3).

(3) C3 Ecotourism

As shown in Table 8-4 a large portion of the Project Cost is directed to 'Component 3 Ecotourism' (approx. INR 1,149 million). Among the subcomponents, 'C3-3 Development of ecotourism areas with respect to specific market segments' has the largest share of the budget of Component 3 (55.6%). Under this subcomponent, high-quality ecolodges, trekking routes, mountain bike trails, rock climbing areas, and wildlife observation areas and points will be developed.

The second largest budget is assigned to 'C3-2 Ecotourism marketing' and almost all of the budget will be spent for the formulation and implementation of the marketing strategy (see Table 8-4).

Table 8-4 Cost summary of Component 3

Component	('000' INR)	
	Total	%
C3 Ecotourism	1,149,500	100.0%
C3-1 Formulation of a policy and regulatory environment for ecotourism	3,680	0.3%
C3-1-1 Formulation of an ecotourism policy	1,628	0.1%
C3-1-2 Improving tourism operating conditions in Sikkim	2,052	0.2%
C3-2 Ecotourism marketing	299,429	26.0%
C3-2-1 Establishing Ecotourism Marketing Cell	5,311	0.5%
C3-2-2 Formulation and implementation of a marketing strategy	285,500	24.8%
C3-2-3 Selection of a funding scheme to finance subsequent marketing strategies		
C3-2-4 Creating links between tour operators and local communities offering tourism services	8,619	0.7%
C3-3 Development of ecotourism areas with respect to specific market segments	639,264	55.6%
C3-3-1 Construction and management of high-end ecolodges	424,202	36.9%
C3-3-2 Development of trekking routes	140,900	12.3%
C3-3-3 Development of mountain bike trails	60,110	5.2%
C3-3-4 Development of rock climbing areas	5,085	0.4%
C3-3-5 Development of wildlife-watching areas	8,967	0.8%
C3-4 Development of tourist facilities	144,822	12.6%
C3-4-1 Construction of interpretation centres and renovation of forest rest houses (FRHs)	144,822	12.6%
C3-5 Introduction of solid waste management at tourism areas linked to the priority villages	37,305	3.2%
C3-5-1 Comprehensive study for baseline information on solid waste management	1,348	0.1%
C3-5-2 Operating solid waste management functions	35,956	3.1%
C3-6 Establishment of Ecotourism Development Corporation	25,000	2.2%
C3-6-1 Establishment of Ecotourism Development Corporation	25,000	2.2%

Source: Study team

(4) C4 Joint forest management

Approximately 63% of the budget under Component 4 is directed to the subcomponent of 'C4-3 Forest management and biodiversity conservation'. As the second largest component, about INR 78 million will be spent to establish the committees for joint forest management. Furthermore, 11.5% of the budget will be mobilised to the subcomponent of 'Capacity Development', including the training programs on various topics (see Table 8-5).

Table 8-5 Cost summary of Component 4

Component	('000' INR)	
	Total	%
C4 Joint forest management	389,152	100.0%
C4-1 Preparation work	4,444	1.1%
C4-1-1 Preparation of JFMC/EDC/PSS management manual	2,282	0.6%
C4-1-2 Marketing study	2,152	0.6%
C4-1-3 Formation of district facilitation teams	10	0.0%
C4-2 Establishment of committees for joint forest management and biodiversity conservation	77,940	20.0%
C4-2-1 Selection of villages for JFMC/EDC/PSS activities		
C4-2-2 Establishment of committees and planning of activities	23,940	6.2%
C4-2-3 Entry point activities	54,000	13.9%
C4-3 Forest management and biodiversity conservation activities	243,586	62.6%
C4-3-1 Forest management and biodiversity conservation	239,236	61.5%
C4-3-2 Action research on sustainable use of forest resources	4,350	1.1%
C4-4 Income generation activities	21,600	5.6%
C4-4-1 Formation of self help groups		
C4-4-2 Microfinance	21,600	5.6%
C4-5 Capacity development	41,582	10.7%
C4-5-1 Training on management of JFMCs, EDCs and PSSs	2,022	0.5%
C4-5-2 Technical training on forest management and biodiversity conservation	10,800	2.8%
C4-5-3 Training on business management	3,646	0.9%
C4-5-4 Skills development training on IGAs	9,040	2.3%
C4-5-5 Exposure visits	3,840	1.0%
C4-5-6 Training on ecotourism	12,234	3.1%
C4-6 Monitoring		
C4-6-1 Monitoring		
C4-7 Village Development Fund		
C4-7-1 Village Development Fund		

Source: Study team

(5) C5 Organisational strengthening of the Forest Department

The budget for Component 5 is INR 636 million INR. About a half of the budget will be allocated to the improvement of infrastructure and equipment, which includes the construction and renovation of offices and residences and the procurement of equipment (see Table 8-6).

Table 8-6 Cost summary of Component 5

Component	('000' INR)	
	Total	%
C5 Organisational strengthening of the Forest Department	636,300	100.0%
C5-1 Improvements of infrastructure and equipment	340,198	53.5%
C5-1-1 Development of infrastructure and equipment improvement plan	520	0.1%
C5-1-2 Construction and renovation of offices and residences	268,556	42.2%
C5-1-3 Procurement of equipment	71,122	11.2%
C5-2 Training of the Forest Department officers and frontline staff members	33,887	5.3%
C5-2-1 Biodiversity management	19,604	3.1%
C5-2-2 Forest management	12,960	2.0%
C5-2-3 Ecotourism	802	0.1%
C5-2-4 Monitoring and evaluation	520	0.1%
C5-3 Establishment of sustainable finance mechanism		
C5-3-1 Establishment of sustainable finance mechanism		
C5-4 Project Management Unit	262,216	41.2%
C5-4-1 Project Management Unit	262,216	41.2%

Source: Study team

In addition, the budget of Component 5 includes the remuneration of the Project Management Unit equal to INR 262 million. The composition of the personnel cost of PMU staff is shown in Table 8-7.

Table 8-7 Composition and annual salaries of Project Management Unit staff

Name of the post	Contract type	Pay scale (low/high) (INR)	No. of person	Person- Month	Monthly payment (INR)	Monthly benefits (INR)	Annual total (INR)
TOTAL			98	1,084	633,360	633,360	26,221,560
A. Project management unit at HQ			47	472	553,690	553,690	13,605,240
A-1. Executive office at state level			40	430	415,790	415,790	11,895,840
Project director	Deputation	67,000/79,000	1	12	79,000	79,000	1,896,000
Additional project director	Deputation	37,400/67,000	1	12	67,000	67,000	1,608,000
Planning and monitoring specialist	Deputation	15,600/39,100	1	12	39,100	39,100	938,400
Biodiversity conservation specialist	Deputation	15,600/39,100	1	12	39,100	39,100	938,400
Ecotourism specialist	Contractual	15,600/39,100	1	12	39,100	39,100	938,400
Divisional engineer (4 years)	Deputation	15,600/39,100	1	4.8	39,100	39,100	375,360
Assistant engineer (4 years)	Deputation/Contractual	9,300/34,800	2	9.6	34,800	34,800	668,160
Junior engineer (4 years)	Deputation/Contractual	9,300/34,800	4	19.2	34,800	34,800	1,336,320
Accountant	Contractual	4,300/6,800	1	12	6,800	6,800	163,200
Office superintendent	Contractual	5,500/9,000	1	12	9,000	9,000	216,000
Junior accountant	Contractual	4,000/6,000	2	24	6,000	6,000	288,000
Office assistant	Contractual	3,050/4,550	4	48	4,550	4,550	436,800
Computer operator	Contractual	3,050/4,550	2	24	4,550	4,550	218,400
Driver	Contractual	3,050/4,550	8	96	4,550	4,550	873,600
Cleaner	Contractual	2,850/4,170	2	24	4,170	4,170	200,160
Peon	Contractual	2,850/4,170	8	96	4,170	4,170	800,640
A-2. Ecotourism marketing cell at state level (last for 5 years)			7	42	137,900	137,900	1,709,400
Chief executive	Deputation/Contractual	37,400/67,000	1	6	67,000	67,000	804,000
Product, sales, and advertizing manager	Contractual	(no scale applied)	1	6	30,000	30,000	360,000
Mrketing, RP, events and festivals manager	Contractual	(no scale applied)	1	6	25,000	25,000	300,000
Accountant	Contractual	4,300/6,800	1	6	6,800	6,800	81,600
Office Assistant	Contractual	3,050/4,550	2	12	4,550	4,550	109,200
Administrative assistant	Contractual	3,050/4,550	1	6	4,550	4,550	54,600
B. District facilitation unit			24	288	70,670	70,670	6,784,320
Project coordinator	Deputation	15,600/39,100	4	48	39,100	39,100	3,753,600
Deputy project coordinator	Deputation	7,000/11,500	4	48	11,500	11,500	1,104,000
Accountant	Contractual	4,300/6,800	4	48	6,800	6,800	652,800
Data entry	Contractual	3,050/4,550	4	48	4,550	4,550	436,800
Driver	Contractual	3,050/4,550	4	48	4,550	4,550	436,800
Peon	Contractual	2,850/4,170	4	48	4,170	4,170	400,320
C. Range supporting unit			27	324	9,000	9,000	5,832,000
Community organiser	Contractual	4,000/9,000	27	324	9,000	9,000	5,832,000

Source: 1) Gazette of India, Extraordinary, Part II, Section 3, Sub-section (i), dated September 27, 2008. 2) Sikkim government service (revised pay) rule (1998).

Source: Study team

(6) C6 Consultancy services

The budget of INR 248 million is allocated to the consultancy services. The budget consists of the remunerations and direct expenses of international consultants, national consultants, and support staff.

(7) Project operation and recurrent costs

Project administration and operation cost is estimated INR 309 million. The budget will be spent on communication, office supplies, utilities, gasoline, etc. The budget is vital to effective implementation

of the Project and enables the Project to conduct its day-to-day activities smoothly.

8.2 Implementation plan

The proposed project implementation schedule and financing plan are indicated in Table 8-8 and Table 8-9. The Project is scheduled to start in FY 2010. The project appraisal, loan negotiations, establishment of a loan agreement, and development of project preparation documents should be completed before the date of project commencement. The procurement of consultancy services should be started early enough to prevent delays in implementation. Since it may take more than six months to complete the selection of consultants, the process should start well in advance of the date of commencement. Other contract packages of civil works and services should be procured and supervised as efficiently as possible to prevent delays in project implementation and to save the overall cost of investment.

During Year 1 of the project implementation period, the project implementation structure will be established, followed by the development of an implementation manual and annual work plan and budget under Component 1. In Component 5, an infrastructure and equipment improvement plan will be developed and the PMU will be established as well in Year 1. International consultants, national consultants, and support staff will be mobilised from Year 1 to assist the Forest Department in implementing the Project. The most of work starts comprehensively from Year 2.

Table 8-8 Project implementation schedule

Items	FY 1				FY 2				FY 3				FY 4				FY 5				FY 6				FY 7				FY 8				FY 9				FY 10											
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4								
C1 Preparatory work																																																
C1-1 Organizational reform of Forest Department																																																
C1-2 Establishment of project implementation structure																																																
C1-3 Preparation of implementation manual																																																
C1-4 Development of annual work plan and budget																																																
C2 Forest and biodiversity conservation																																																
C2-1 Enhancement and management of forest and biodiversity information base																																																
C2-2 Enhancement of the basis for forest management and biodiversity conservation																																																
C2-3 Facilitation of inscription process of Khangchendzonga Biosphere Reserve on the World Heritage List																																																
C2-4 Ex-situ conservation and promotion of biodiversity conservation																																																
C3 Ecotourism																																																
C3-1 Formulation of a policy and regulatory environment for ecotourism																																																
C3-2 Ecotourism marketing																																																
C3-3 Development of ecotourism areas with respect to specific market segments																																																
C3-4 Development of tourist facilities																																																
C3-5 Introduction of solid waste management at tourism areas linked to the priority villages																																																
C3-6-1 Establishment of Ecotourism Development Corporation																																																

Table 8-9 Financing plan and annual cost schedule

Item	Total		FY01		FY02		FY03		FY04		FY05	
	FC	LC	FC	LC	FC	LC	FC	LC	FC	LC	FC	LC
A. ELIGIBLE PORTION	2,990 5,950		80 159		308 612		529 1,053		651 1,295		599 1,191	
I.) Procurement / Construction	0	1	0	1	0	1	0	1	0	1	0	1
C1. Preparatory work	357	711	50	100	114	228	46	92	39	78	21	43
C2. Forest and biodiversity conservation	1,150	2,288			23	46	207	412	379	755	345	686
C3. Ecotourism	389	774			35	70	47	93	62	124	74	147
C4. Joint forest management	509	1,013	25	51	107	213	158	314	56	111	31	61
C5. Organisational strengthening of the Forest Department	2,406	4,787	76	151	279	556	458	911	537	1,068	471	937
Base cost for JICA financing	442	880	4	8	14	27	46	91	83	165	99	198
Price escalation	142	283			15	29	25	50	31	62	29	57
Physical contingency	357	111	577	49	7	64	79	20	119	66	20	106
Consulting services	314	90	494	47	7	61	73	18	109	59	17	93
Base cost	25	15	55	2	2	1	4	4	2	7	5	2
Price escalation	17	5	27	2	3	4	1	6	3	1	5	3
Physical contingency	357	3,101	6,527	49	87	222	79	328	731	66	549	1,158
Total (I + II)												
B. NON ELIGIBLE PORTION												
a Procurement / Construction	157	312	7	13	29	59	46	91	17	34	10	19
C5. Organisational strengthening of the Forest Department	127	253	6	13	27	53	39	79	14	28	8	15
Base cost for JICA financing	127	253	6	13	27	53	39	79	14	28	8	15
Price escalation	22	44			1	3	4	8	2	4	2	3
Physical contingency	7	15	0	1	1	3	2	4	1	2	0	1
Land Acquisition												
Base cost												
Price escalation												
Physical contingency												
Administration cost	309	616	11	21	36	71	56	112	64	128	59	117
VAT	35	69	4	8	7	14	6	13	5	11	6	11
Import Tax	18	36	2	5	4	8	3	7	3	5	3	6
Total (a+b+c+d+e)	519	1,032	24	47	76	152	112	222	89	178	77	154
TOTAL (A+B)	357	3,619	7,559	49	111	269	79	404	883	66	661	1,381
C. Interest during Construction	209		209	1	1	4	4	10	10	17	17	24
Interest during Construction(Const.)	209		209	1	1	4	4	10	10	17	17	24
Interest during Construction (Consul.)	0		0	0	0	0	0	0	0	0	0	0
D. Commitment Charge	65		65	7	7	7	7	7	7	7	7	7
GRAND TOTAL (A+B+C+D)	631	3,619	7,834	56	111	277	90	404	894	82	661	1,397
E. JICA finance portion (A)	357	3,101	6,527	49	87	222	79	328	731	66	549	1,158

Annual Fund Requirement
 Base Year for Cost Estimation: Apr. 2010
 Exchange Rates: INR = Yen 1.99
 Price Escalation: FC: 3.1% LC: 4.9%
 Physical Contingency: 5%
 Physical Contingency for Consultant: 5%

FC & Total: million JPY
 LC : million INR

Table 8-10 Financing plan and annual cost schedule (continued)

FY06	FY07		FY08		FY09		FY10			
	LC	Total	FC	LC	FC	LC	FC	Total		
	344	685	209	416	104	207	98	194	70	138
29	57			50	14	28				14
149	297		25	92						
54	108		46	85	31	62				31
25	51		43	71	25	51				16
258	513		36	297	71	141				20
70	139		149	99	28	56				43
16	33		50	20	5	10				23
29	40		10	14	5	15				3
23	32		3	10	4	3				7
4	6		3	4	5	15				3
1	2		1	3	1	4				1
1	0		0	1	0	1				0
29	350	724	5	214	5	109	222	14	106	225
8	17			25		9	19			10
6	13			18		6	13			6
6	13			18		6	13			6
2	3			6		3	6			3
0	1			1		0	1			0
34	67		21	41	11	22				7
2	5		1	2	1	2				4
1	3		0	0	0	0				1
46	91		34	68	21	42				23
29	395	815	5	248	5	130	264	14	129	271
										1
										89
										177
28	28		30	31	31	32				32
27	27		30	31	31	32				33
0	0		0	0	0	0				0
7	7		7	7	7	7				7
63	395	849	41	248	42	130	302	52	129	310
										40
29	350	724	5	214	5	109	222	14	106	225
										1
										73
										145

8.3 Packaging and procurement methods

The recommended packaging and procurement method for the implementation of each project components are summarised in Table 8-11. Project components should be organised into the appropriate size of packages to allow a sufficient number of bidders to participate. National Competitive Bidding (NCB) will be applied to packages for construction, consultancy, and vehicle procurement. Direct procurement will be applied to recruit JFMC/EDC/PSS members for joint forest management activities; competitive recruitment will be applied to hire qualified PMU staff members; request for quotation will be applied to procure small packages of supplies, tools, and equipment; and International Competitive Bidding (ICB) will be applied to procure consultancy service to the PMU.

Table 8-11 Procurement and packaging methods

Component	Procurement method	Packaging
C1 Preparatory work		
C1-1 Reorganisation of the Forest Department		
C1-2 Establishment of project implementation structure		
C1-3 Preparation of implementation manual		
C1-4 Development of annual work plan and budget		
C2 Forest and biodiversity conservation		
C2-1 Enhancement and management of forest and biodiversity information base	NCB Request for quotation Request for quotation	1 package/year (consultancy) 1 package/year (data set) 1 package/year (equipment)
C2-2 Enhancement of the basis for forest management and biodiversity conservation	Direct procurement NCB NCB Request for quotation Request for quotation	1 package/year (surveyors) 1 package/year (consultancy) 1 package/work (construction) 1 package/year (equipment) 1 package/year (supply)
C2-3 Facilitation of inscription process of Khangchendzonga Biosphere Reserve on the World Heritage List	NCB	1 package/year (consultancy)
C2-4 Ex-situ conservation and promotion of biodiversity conservation	NCB Request for quotation	1 package/work (construction) 1 package/year (supply)
C3 Ecotourism		
C3-1 Policy and regulatory environment for ecotourism promotion	NCB Request for quotation	1 package/year (consultancy) 1 package/year (advertisement)
C3-2 Ecotourism marketing	NCB Request for quotation	1 package/year (consultancy) 1 package/year (advertisement)
C3-3 Development of ecotourism areas with respect to specific market segments	NCB NCB Request for quotation Request for quotation	1 package/year (consultancy) 1 package/work (construction) 1 package/year (training) 1 package/year (equipment)
C3-4 Development of tourist facilities	NCB NCB	1 package/year (consultancy) 1 package/work (construction)
C3-5 Introduction of a solid waste management at tourism areas linked to the priority villages	NCB NCB	1 package/year (consultancy) 1 package/work (construction)

Table 8-10 Procurement and packaging methods (continued)

Component	Procurement method	Packaging
C4 Joint forest management		
C4-1 Preparation work	NCB	1 package/year (consultancy)
C4-2 Establishment of committees for joint forest management	Direct procurement NCB	1 package/year/village (labor) 1 package/work (construction)
C4-3 Forest management and biodiversity conservation activities	Direct procurement NCB	1 package/year/village (labor) 1 package/work (construction)
C4-4 Income generation activities		
C4-5 Capacity development	Request for quotation	1 package/year (training)
C4-6 Monitoring		
C4-7 Village Development Fund		
C5 Organisational strengthening of the Forest Department		
C5-1 Improvement of infrastructure and equipment	NCB NCB NCB	1 package/year (consultancy) 1 package/work (construction) 1 package/year (equipment)
C5-2 Training of the Forest Department officers and frontline staff members	Request for quotation	1 package/year (training)
C5-3 Establishment of sustainable finance mechanism		
C5-4 Project Management Unit	Competitive requirement	1 package/person (PMU staff)
C6 Consultancy service		
C6-1 Consultancy service	ICB	1 package

CHAPTER 9 Evaluation of project plan

9.1 Expected benefits

This section presents the economic and social benefits expected to be generated by the Project based on scenarios reflecting the current socioeconomic conditions of Sikkim. A summary of these benefits is shown in Table 9-1.

Table 9-1 Potential benefits of the project

Component	Benefit
C2 Forest and biodiversity conservation	<ul style="list-style-type: none"> • Conservation of ecosystems • Reduction of CO₂ emissions
C3 Ecotourism	<ul style="list-style-type: none"> • Increase in number of tourists • Generation of employment
C4 Joint forest management	<ul style="list-style-type: none"> • Generation of income • Conservation of ecosystems
C5 Organisational strengthening of the Forest Department	<ul style="list-style-type: none"> • Improvement of forest and biodiversity management

Some of the above are direct benefits of the project, while others are indirect. Among them, the following items are considered the major economic benefits that can be converted to monetary value for quantitative analysis. Details of the valuation method used are described in Annex 23.

- Increase in number of tourists
- Generation of income through joint forest management activities
- Sale of forest products through joint forest management activities

Other items are excluded from the estimation of economic benefits because they are either difficult to convert into monetary terms or are negligible.

The social benefits are included in the qualitative analysis of project benefits. Although they are the joint products of multiple and related project components, the benefits shown below are each classified under a single component to simplify the estimation.

(1) Forest and biodiversity conservation

- Production of public and global goods through the enhancement of the forest and biodiversity information base comprising inventories of flora and fauna and information on their distribution, dynamics, and intra- and inter-species interactions
- Efficiency gain in management of forests and biodiversity by the Forest Department through the enhancement of the forest and biodiversity information base
- Improved financial and operational sustainability of forest and biodiversity management activities through the enhancement of the legal bases and institutional capacity of the Forest Department

(2) Ecotourism

- Protection of the environment from inappropriate tourism infrastructure construction and over-usage of forest and biodiversity resources through the formulation of a sound ecotourism policy
- Efficiency gain in the tourism sector through the liberalization of the current travel restrictions and of the current permit procedures

- Economic gain through the increase in the supply of ecotourism products targeting a larger market through the establishment of the Ecotourism Marketing Cell and ecotourism policy
- Economic and welfare gain derived from the expansion of local employment opportunities through the development of tourism facilities such as high-quality ecolodges, trekking routes, and adventure tourism

(3) Joint forest management

- Efficiency and economic gain in conservation, management, and utilisation of forest and biodiversity resources by JFMCs, EDCs, and PSS's
- Efficiency and economic gain in the utilisation of forest and biodiversity resources such as timber and NTFPs as a result of the action research subcomponent on the use of forest resources; production of public and global goods through the enrichment of the knowledge base through the action research
- Economic development of forest fringe communities, particularly their agricultural production and businesses, through the microfinance subcomponent

(4) Organisational strengthening of the Forest Department

- Efficiency gain in the management of forests and biodiversity by the Forest Department through the rationalization of its tasks and resources, upgrading of infrastructure and equipment, and training of its staff
- Improved sustainability of the economic activities of local communities through the establishment of a sustainable finance mechanism

9.2 Economic evaluation

9.2.1 Methods of economic analysis

(1) Models for valuation of economic benefits

Among all economic benefits, those that are quantifiable have been selected for economic analysis. The following assumptions and models are employed to convert these benefits to monetary terms.

Trend of numbers of tourists

The Project will have both direct and indirect impacts on the tourism sector in Sikkim. As the sector's growth has been hindered by its lack of appropriate service provision, underdeveloped infrastructure, and complexity of travel restrictions on tourists, the Project will address these issues with the aim of increasing the number of tourists to the state. The following assumptions have been made to assess the economic impact of the expected increase:

- The growth rate of tourist volume in Sikkim will reach the average growth rate of tourist volume in all of India.
- The increase in the number of tourists will be stable after it reaches approximately 2 million, which is the presumed maximum capacity of Sikkim to accept tourists.
- The average length of stay for both domestic and international tourists is four days.

Income generation activities by JFMCs, EDCs, and PSS's

The Project will promote income generation activities (IGAs) by members of JFMCs, EDCs, and PSS's involved in the Project. Two models of IGAs, one for the North District and one for other

districts, are used to estimate their economic implications, though the types of IGAs that will be taken up are expected to range widely. The features of the two models are summarised in Table 9-2.

Table 9-2 Model income generation activities

Model (district applied)	Activity	SHGs per activity ¹
Model 1 (North District)	• Cardamom production	90
	• Ginger production	90
	• Animal Husbandry (dairy farming)	90
Model 2 (East, South, and West Districts)	• Ecotourism service provision	90
	• Handicraft development (carpet production)	90
	• Agricultural production (potato production)	90

Note: 1) Number of SHGs assumed to carry out each activity

In addition to the two models, the following assumptions are applied to assess the economic benefits.

- A total of 180 JFMCs, EDCs, and PSS's will be involved in IGAs. In each JFMC, EDC, or PSS, three Self Help Groups (SHGs) will be formed to conduct three IGAs. Thus, a total of 540 IGAs will be carried out.
- The characteristics and performance of SHGs will be uniform throughout Sikkim, and the SHGs will implement their IGAs following the models shown in Table 9-2.
- The two model IGAs will produce tradable goods and services (TGS). With the exception of ecotourism service provision, the economic benefits of the IGAs are calculated as the costs saved by consumers through their improved access to locally-produced items instead of imported ones, ie, the difference in local and international market prices of the goods produced.

Sale of timber and NTFPs by JFMCs, EDCs, and PSS's

Joint forest management activities include various measures for forest management and biodiversity conservation. These will create opportunities for the commercial production of timber and NTFPs. To estimate their economic benefits, a simplified timber-only production model by is employed with the following assumptions:

- A total of 180 villages will be engaged in forest management for the production of timber.
- Each JFMC, EDC, or PSS will plant five hectares a year for four years, which will result in the establishment of 20 hectares of forest plantations in each JFMC, EDC, or PSS.
- All villages will establish a mixed plantation.
- Thinning will be undertaken according to the rates shown in Table 9-3 in accordance with plant maturity.

Table 9-3 Assumptions for timber production (rate of thinning)

Tree age	Rate of thinning	Harvest timber volume per ha
Age 25	10%	4.25 m ³
Age 35	15%	16.46 m ³
Age 45	20%	42.47 m ³
Age 55	25%	53.09 m ³

Note: Timber price per cubic metre is INR6,695.⁹⁴

⁹⁴ See Section 3.4.5

Other assumptions

Other assumptions applied to the economic evaluation are listed below:

- The Project period (economic life) will be 50 years. Compared to other projects such as those in infrastructure development, a project of this type takes a longer time to generate the expected outcomes.
- The project costs that arise during the project period are estimated based on September 2009 prices in Indian Rupees.⁹⁵
- For the estimation of the economic cost of the project, local currency portion, except the cost of experts which are deemed as border price, is converted into economic value by a standard conversion factor of 0.9.
- Price contingencies and other transfer payments such as taxes are excluded from the estimated financial costs.
- Operation and management costs are 3.5% of the capital cost.
- A social discount rate of 7% is applied to the calculation of the net present value.
- The exchange rates applied are INR 1 = JPY 1.99, USD 1 = INR 47.20 (November, 2009)
- The physical contingency rate is 5%.
- Replacement costs will accrue every 5 years at the rate of 4% of the cost of goods.

Economic costs of the project

The economic costs are estimated following the assumptions provided above. A summary of these costs is shown in Table 9-4.

Table 9-4 Summary of economic costs of the project

		(Unit: million INR)		
		FC	LC	Total
A. Portion eligible for JICA loan				
a	Procurement / Construction	0	2,691	2,691
	C1. Preparatory work	0	0	0
	C2. Forest and biodiversity conservation	0	322	322
	C3. Ecotourism	0	1,035	1,035
	C4. Joint forest management	0	350	350
	C5. Organisational strengthening of the Forest Department	0	458	458
	Physical contingency	0	128	128
b	Consulting services	162	86	248
	Base cost	158	81	239
	Physical contingency	4	5	9
Total (a+b)		162	2,777	2,939
B. Portion non-eligible for JICA loan				
a	Procurement / Construction	0	141	141
	C5. Organisational strengthening of the Forest Department	0	115	115
	Physical contingency	0	7	7
b	Administration cost	0	245	245
Total (a+b+c)		0	445	445
TOTAL (A+B)		162	3,222	3,384

⁹⁵ For some items which the latest prices in 2009 were not available, we apply the rate of 2006, adding the price escalation rate of the following year up to 2009.

9.2.2 Results of economic analysis

(1) Calculation of economic internal rate of return (EIRR)

The economic internal rate of return (EIRR) and net present value (NPV) of the project were calculated to assess the economic viability of the project based on the projected economic cash flow presented in Annex 23. The results indicate that the Project is economically viable, as shown in Table 9-5.

Table 9-5 Results of the economic analysis

Criterion	Result
EIRR	15.89%
NPV (when social discount rate is 7%)	INR 2,183.6 million

(2) Sensitivity analysis

By changing the assumptions made for the calculation of benefits and costs, a sensitivity analysis was conducted to examine the viability of the project under a range of conditions. The results shown in Table 9-6 and Table 9-7 indicate that the project still marks 7.19%, beyond its 7% cut-off rate, even with a 20% reduction of the benefits and a 20% cost increment.

Table 9-6 Sensitivity analysis of EIRR

Cost increment	Reduction of benefit		
	Base case (0%)	-10%	-20%
Base case (0%)	15.89%	12.8%	10.18%
+10%	13.1%	10.68%	8.51%
+20%	11.1%	9.07%	7.19%

Table 9-7 Sensitivity analysis of NPV

Cost increment	Reduction of benefit		
	Base case (0%)	-10%	-20%
Base case (0%)	INR 2,183.6 million	INR 1,539.2 million	INR894.7 million
+10%	INR 1,770 million	INR 1,125.6 million	INR 481 million
+20%	INR 1,356 million	INR 712 million	INR67.6 million

9.3 Impacts on climate change

(1) Afforestation and reforestation

The Project will promote tree planting through joint forest management. This will contribute to the mitigation of climate change, as the trees planted will sequester greenhouse gas as they grow. The 180 target villages are expected to establish a total of 2,160 ha of forests under the Project⁹⁶. The volume of greenhouse gas estimated to be sequestered by these forests is shown in Table 9-8. It is expected that 1,058,494 ton CO₂ equivalent will be sequestered by these forests by 55 years after they are planted.

⁹⁶ Under the joint forest management component, the target villages will conduct various forestry activities including tree planting. However, the area to be planted is not fixed. Therefore, for the purpose of estimation, it is assumed that each target village will establish an average 12 ha of broad-leaved tree plantation. This assumption is based on the project plan and budget.

Table 9-8 Estimated greenhouse gas sequestration by forests developed by the Project

Years from planting	Area (ha) ¹	Standing stock of stem per ha (m ³) ²	Total standing volume of stem (m ³)	Total living biomass (m ³) ³	Cumulative greenhouse gas sequestration (ton CO ₂ equivalent) (e = d x WD x CF x CO ₂ /C) ⁵
	(a)	(b)	(c = a x b)	(d = c x BEF x [1+R]) ⁴	
25	2,160	42.47	91,735	183,653	195,285
30	2,160	70.77	152,863	306,032	325,414
35	2,160	109.72	236,995	418,059	444,536
40	2,160	169.90	366,984	637,084	677,433
45	2,160	212.37	458,719	796,336	846,771
50	2,160	240.70	519,912	902,567	959,730
55	2,160	265.47	573,415	995,448	1,058,494

Note: 1) It is assumed that tree planting will be done in a single year for the sake of simplicity

2) According to the stock table for mixed broad-leaved plantation of Darjeeling Division of West Bengal

3) Includes roots and branches

4) BEF: biomass expansion factor; and R: root to shoot ratio

5) WD: wood density; CF: carbon fraction; CO₂/C: carbon dioxide to carbon ratio

6) Figures and sources for BEF, R, WD, CF, and CO₂/C are as follows:

BEF: 1.4; BEF₂, Broadleaf, Temperate, Table 3A.1.10, Annex 3A.1 of IPCC (2003)

R: 0.24 - 0.43; Other broadleaf forest, Temperate broadleaf forest/plantation, Table 3A.1.8, Annex 3A.1 of IPCC (2003)

WD: 0.58; *Quercus*, Table 3A.1.9-1, Annex 3A.1 of IPCC (2003)

CF: 0.5; default

CO₂/C: 44/12; default

(2) Protection of existing forests

The Project will indirectly promote the sequestration of carbon dioxide through the protection of existing forests. This in turn will help mitigate climate change. However, due to the lack of data and the difficulty of separating the effects of the Project from other factors, only an indicative projection on the contribution of the Project to climate change mitigation can be given.

According to the results of the Forest Resource Valuation and Accounting conducted by the Indian Institute of Forest Management in 2007, which are given in the second preliminary draft of the working plan for the East District, the annual carbon intake by the forests of Sikkim is 170,444 tons. This translates into 624,961 tons CO₂ equivalent⁹⁷. Assuming a unit price of INR 880 per ton of CO₂ equivalent⁹⁸, the same as the Forest Resource Valuation and Accounting document, the forests of Sikkim provide environmental service worth INR 40,906,560 annually in terms of climate change mitigation. The Project will contribute to the maintenance and enhancement of this environmental service performed by the forests of Sikkim.

9.4 Environmental and social considerations

Table 9-9 shows the environmental and social impacts expected to result from the implementation of the Project without appropriate countermeasures to mitigate them. Overall, the impact of the eight

⁹⁷ Based on the carbon dioxide to carbon ratio of 44 to 12: $170,444 \times (44 / 12) = 624,961$.

⁹⁸ This is equivalent to INR 240 per ton of carbon.

impact elements is estimated to be low, or at impact level B).

Table 9-9 Scoping matrix

Integrated Project for Sustainable Development of Forest Resources in Sikkim										
Impact category	No.	Impact element	Likely impact							
			Overall rating	C1 Preparatory work	C2 Forest and biodiversity conservation	C3 Ecotourism	C4 Joint forest management	C5 Organizational strengthening of the Forest	C6 Consultancy service	
Social Environment	1	Involuntary resettlement								
	2	Local economy such as employment and livelihood, etc.								
	3	Land use and utilization of local resources	B		B	B	B			
	4	Social institutions such as social infrastructure and local decision-making institutions	B		B	B	B			
	5	Existing social infrastructure and services								
	6	The poor, indigenous and ethnic people								
	7	Misdistribution of benefit and damage	B			B	B			
	8	Cultural heritage			B					
	9	Local conflict of interests	B			B	B			
	10	Water usage or water rights and rights of common						B		
	11	Sanitation	B			B	B			
	12	Hazards (risk) of infectious diseases such as HIV/AIDS								
Natural Environment	13	Topography and geographical features				B				
	14	Soil erosion	B		B		B			
	15	Groundwater								
	16	Hydrological situation								
	17	Coastal zone								
	18	Flora, fauna and biodiversity	B			B				
	19	Meteorology								
	20	Landscape				B				
	21	Global warming								
Pollution	22	Air pollution								
	23	Water pollution					B			
	24	Soil conservation								
	25	Waste	B			B	B			
	26	Noise and vibration								
	27	Ground subsidence								
	28	Offensive odour								
	29	Bottom sediment								
	30	Accidents								

Note: 1) The impacts on "Gender" & "Children's Right" might be related to all criteria of Social Environment.

Rating
 A: Serious impact is expected
 B: Some impact is expected
 C: Extent of impact is unknown
 No mark: No impact is expected. IEE/EIA is not necessary

The expected impacts and proposed mitigation measures for the eight impact elements are described below.

(1) Social environment

a) Land use and utilisation of local resources

Because the Project will directly intervene in the conservation and utilisation of forest and biodiversity resources by forest fringe communities, the intervention may result in the tightening of the Forest Department's restrictions on land use and the utilisation of local resources by communities. This will likely lead to the reduction in economic and social welfare of the communities, and their ownership of resources in reserved and protected areas will dwindle. The low ownership of the resources will further aggravate resource degradation; thus stronger restrictions bear the risk of the suboptimal management of the resources.

In order to mitigate the risk of the degradation caused by inappropriate land use and local resource utilisation, participatory processes of micro planning under the joint forest management schemes should be strictly followed. Based on the demand and supply of resources identified in a participatory manner with community members, the forest and biodiversity conservation policies will be carefully aligned with the local needs in the micro plans so that benefits are secured for both the Forestry Department and forest fringe communities.

b) Social institutions such as social infrastructure and local decision-making institutions

The Project will be implemented through collaboration with existing social institutions of the forest fringe communities to carry out, for example, the joint forest management schemes. The schemes will involve relatively large financial transactions provided by the Project, and there will be a risk of unfair appropriation of the resources by, for example, local élites. This would prevent the development of just and democratic local decision-making institutions and would promote economic and social development in an inequitable fashion.

In order to mitigate the unfair appropriation of resources, the distribution of skewed project information among stakeholders needs to be prevented. Information on the Project's planning and finances should be kept transparent and accessible to anyone concerned with the project throughout the project – from the development and implementation of micro plans to the completion and evaluation of activities. At the same time, the Forest Department will facilitate the process of micro planning in such a way that high priority is given to socially and economically disadvantaged groups in the provision of the Project's technical and financial support.

c) Misdistribution of benefits and damage

As explained in the above section, without appropriate countermeasures, the benefits derived from the project interventions can be appropriated by a limited number of stakeholders. Therefore, the project inherently risks the misdistribution of benefits and hindering the optimal development of Sikkim's rural society.

The proposed mitigation measures are basically the same as the ones proposed in the above section: ensuring transparency and employing participatory approaches to the extent possible.

d) Local conflict of interests

The entry point activities under the joint forest management schemes include small-scale construction work to be carried out by local contractors. Because members of a local community tend to be interconnected complexly within a dense social network, the selection of the local contractors, who themselves are community members, are always subject to conflicts of interest. Such conflicts may lead to weak supervision and low quality of work, and thus, a waste of public investment.

To mitigate local conflicts of interest, transparent competitive bidding and third-party supervision of construction work must be carried out. Forest officers should ensure strict adherence to finance and procurement codes and promote fair and transparent supervision. Community organisers employed by the PMU will also support the forest officers in keeping the process transparent and accountable.

e) Sanitation

The establishment of ecolodges and interpretation centres and the promotion of village tourism carried out under the Project may aggravate littering and pollution of tourism sites. Public conveniences at the sites may become unhygienic if they are not properly managed and maintained.

To address these issues of sanitation, the Project includes a solid waste management subcomponent. The Project will also promote the proper management of public convenience facilities. Sanitation and solid waste management in the cities, rural areas, and tourist sites have been recognized as serious problem in Sikkim, and policy measures, including a ban of use of plastic bags, have been implemented. The Project will support the implementation of such policies.

(2) Natural environment

f) Soil erosion

The Project is expected to carry out the construction of ecolodges, interpretation centres, biodiversity centres, trekking routes, mountain bike routes, offices for the Forest Department, and approach roads to these facilities. The construction work may entail cutting, removal, and filling of earth and/or rocks at the construction sites, which may trigger landslides and/or soil erosion. Enrichment plantation, medicinal plant propagation, and other types of forest management activities may be carried out by the joint forest management committees at locations where soil erosion and landslide are prevalent, which may further aggravate soil erosion.

On top of the preventive measures specified in the state's standard specifications, stricter measures identified by the Project should be employed to mitigate landslides and soil erosion at and near construction sites. The cost of these measures must be estimated and included in the construction contracts. For forest plantation activities, small-scale soil erosion control measures may be selected as entry point activities by the JFMCs if they deem the measures necessary.

g) Flora, fauna, and biodiversity

The Project is expected to carry out the construction of ecolodges, interpretation centres, biodiversity centres, trekking routes, campsites, wildlife-watching sites, mountain bike routes, offices for the Forest Department, and approach roads to these facilities in reserved forests, national parks, wildlife sanctuaries, and national park buffer zones. Particularly, the construction of trekking routes, campsites, wildlife watching sites, and ancillary facilities in the national park, where the highest level of restrictions on artificial objects is applied, may have adverse impacts on fragile flora, fauna and biodiversity within the park. Inappropriate construction of these facilities may hinder or disturb migratory movements, grazing, hunting, and other behaviours of wildlife. An increase in the number of visitors to the developed facilities may multiply cases of bio-piracy, the removal and disturbance of vegetation and rare species, and the spread of invasive species. In addition, visual pollution may occur to the natural landscape if facilities are poorly designed or constructed.

Although the Wildlife (Protection) Act of 1972 allows the construction of permanent facilities in national parks, it is recommended that the Project construct no permanent structures in the national park and wildlife sanctuary areas. Only temporary structures for cooking and sanitation in campsites

and wildlife watching sites will be constructed. Trekking and mountain bike routes can be paved with stone but not concrete. Methods that have minimum impacts on the environment and can prevent visual pollution should be selected for constructing or improving these routes. An exception will be the improvement of existing permanent structures such as bridges, rest houses, and public conveniences. However, facilities to be upgraded should be selected carefully to avoid negative impacts of their construction on surrounding environmental conditions.

The management of ecotourists, trekkers, and guides by the Forest Department will be enhanced to prevent inappropriate behaviours. Professional guiding, extension, awareness, patrolling, and security services will be provided by the Department to protect visitors as well as natural environment. Efficient waste management measures will be introduced and strictly managed in collaboration with visitors to the national park and protected areas.

(3) Pollution

h) Waste

As mentioned in (5) Sanitation, the implementation of the Project will increase the production of bio-degradable and non-degradable waste generated through enhanced economic and production activities. However, an increase in industrial waste is not expected.

The issue of waste management should be prioritized, and a solid waste management subcomponent is recommended for implementation. The training of the beneficiaries to enhance their capacity for waste management has been incorporated into other subcomponents. These components will help manage the wastes generated additionally as a result of project implementation and help control the probable increase in pollution.

CHAPTER 10 Monitoring and impact evaluation

10.1 Operation and effect indicators

10.1.1 Primary indicators

The operation and effect indicators that will be used to assess the progress and achievement of the implementation of the project components are listed in Table 10-1. Outcome indicators will be used to assess the attainment of the Project's overall goal, while operation and effect indicators will be used to assess the achievement of the outputs to be generated by the Project.

Table 10-1 Outcome, operation and effect indicators

Overall goal: Contribute to the enhancement of environmental conservation and the reduction of poverty in the state of Sikkim			
Outcome Indicators	Current (2010)	Target (2019)	Target area
• Rate of forest cover	46% (2005)	47%	Sikkim state
• Below Poverty Line (BPL) ratio	40~70% ⁹⁹	20~50%	Selected Gram Panchayat wards
Project Objective: Promote the conservation of biodiversity and forests and improve the livelihoods of forest-fringe communities in Sikkim			
Effect Indicators	Current (2010)	Target (2019)	Target area
• Rate of open forest	n/a	n/a	Sikkim state
• Wildlife population, eg, number of endangered species	n/a	n/a	Sikkim state
• Income of the target JFMC, EDC, and PSS members	n/a	n/a	Selected JFMC, EDC and PSS members
• Growth rate of tourists in Sikkim per year			
Domestic	11.3% (2008)	11.7% (2023)	Sikkim state
International	9.5% (2008)	10.1% (2023)	Sikkim state
Operation Indicators	Current (2010)	Target (2019)	Target area
C1 Preparatory work			
C2 Forest and biodiversity conservation			
• Total area of protected areas	2,183 km ²	3,000 km ²	Sikkim state
• Number of visitors at newly-established national parks (butterfly park, bird park) /year	n/a	n/a	Sikkim state
C3 Ecotourism			
• Occupancy rate of ecolodgea	n/a	70%	Sikkim state
• Number of visitors to trekking routes and other related facilities / year	n/a	n/a	Sikkim state
• Number of JFM/EDC/PSS members participating in training and waste collection	n/a	n/a	Sikkim state

Note: Indicators as of 2010 (current) and 2019 (target) will be compared to assess the outcomes, effects, and operations of the Project unless indicated otherwise.

⁹⁹ Details are presented in Annex 16.

Table 10-1 Outcome, operation, and effect indicators (continued)

Outcome Indicators	Current (2010)	Target (2019)	Target area
C4 Joint forest management			
• Number of organised JFMCs/EDCs/PSS's	0 villages	180 villages*	Sikkim state
• Afforested area	n/a	2,160 ha	Sikkim state
• Survival rate of seedlings	n/a	80%	Sikkim state
C5 Organisational strengthening of the Forest Department			
• Number of infrastructure facilities established or improved			Sikkim state
Large offices and attached quarters	n/a	12	Sikkim state
Small offices and attached quarters	n/a	20	Sikkim state
Check posts and attached quarters	n/a	8	Sikkim state
• Number of the Forest Department officials trained			
Range and block officers	n/a	30 officers/year	Forest Department
Ecotourism related officers	n/a	130 officers/year	Forest Department
Divisional Forest Officers (DFOs)	n/a	80 officers/year	Forest Department

Note: Indicators as of 2010 and 2019 will be used unless indicated otherwise in parentheses.

* Indicates number of villages where new JFMCs, EDCs, or PSS's will be established by the Project or where those already existing will be selected as target JFMCs, EDCs, or PSS's.

10.1.2 Operation and effect indicators (supplement)

The indicators described above will be used as primary indicators to measure the project outcomes upon ex-post evaluation of the Project. A monitoring team that will be formed within the Project Management Unit (PMU) will be responsible for collecting, reporting, and analyzing these indicators. In addition, the following supplementary indicators can be used to gather more detailed information on the Project's implementation status. The Monitoring team will select the appropriate indicators from these lists based on such selection criteria as data availability and the costs and workload required for data collection.

Table 10-2 Supplementary monitoring indicators

Item	Operation indicators
C1 Preparatory work	
C1-1 Reorganisation of the Forest Department	n/a
C1-2 Establishment of project implementation structure	n/a
C1-3 Preparation of implementation manual	• Number of implementation manuals produced
C1-4 Development of annual work plan and budget	• Number of annual work plans and budgets developed
C2 Forest and biodiversity conservation	
C2-1 Enhancement and management of forests and biodiversity information base	n/a
C2-2 Enhancement of the basis for forest management and biodiversity conservation	• Total area of protected areas • Number of visitors at newly-established national parks • Total area of forest management zones
C2-3 Facilitation of inscription process of Khangchendzonga Biosphere Reserve on the World Heritage List	n/a
C2-4 Ex-situ conservation and promotion of biodiversity conservation	• Number of farmers implementing cardamom disease mitigation measures and area covered

Table 10-2 Supplementary monitoring indicators (continued)

Item	Operation indicators
C3 Ecotourism	
C3-1 Policy and regulatory environment for ecotourism promotion	n/a
C3-2 Ecotourism marketing	n/a
C3-3 Development of ecotourism areas with respect to specific market segments	
C3-3-1 Development of high-quality ecolodges	• Number of visitors to ecolodges
C3-3-2 Development of trekking routes	• Number of visitors at trekking routes
C3-3-3 Development of mountain bike trails	• Number of visitors at mountain bike trails
C3-3-4 Development of rock climbing areas	• Number of visitors at rock climbing areas
C3-3-5 Development of wildlife observation areas and points	• Number of visitors at bird and butterfly watching areas
C3-4 Development of tourist facilities	
C3-4-1 Construction and management of interpretation centres	• Number of visitors to tourism facilities and interpretation centres
C3-4-2 Construction of public conveniences at tourist attractions	• Number of public convenience users
C3-5 Introduction of solid waste management at tourism areas linked to the priority villages	
C3-5-1 Comprehensive study for baseline information on solid waste management	n/a
C3-5-2 Operating solid waste management functions	• Number of JFMC/EDC/PSS members participating in training and waste collection • Quantity of waste collected and treated by solid waste management system
C4 Joint forest management	
C4-1 Preparation work	n/a
C4-2 Establishment of committees for joint forest management	• Number of organised JFM/EDC/PSS
C4-3 Forest management and biodiversity conservation activities	• Number of infrastructure facilities developed through entry point activities (EPAs) • Number of JFMC members participating in forest management, biodiversity conservation activities, and ecotourism activities • Survival rate of seedlings
C4-4 Income generation activities	• Number of groups organised as microfinancing users • Number of SHGs participating in income generation activities • Production from income generation activities (quantity, sales, etc.)
C4-5 Capacity development	• Number of JFM/EDC/PSS members participating in training and exposure tours
C4-6 Monitoring	n/a
C4-7 Village Development Fund	• Account balance of VDF • Collection rates from members
C5 Organisational strengthening of the Forest Department	
C5-1 Improvement of infrastructure and equipment	• Number of infrastructure facilities established or improved • Number of equipment procured
C5-2 Training of the Forest Department officers and frontline staff members	• Number of training courses conducted • Number of training materials developed
C5-3 Establishment of sustainable finance mechanism	• Number of the Forest Department officials trained • Number of training courses conducted • Number of training materials developed
C5-4 Project Management Unit	n/a
C6 Consultancy services	• Person-months of consulting services

The effect indicators, which serve as parameters to assess the impacts of the Project, are summarised in

Table 10-3. In many cases, the indicators will represent the compound effects of several subcomponents¹⁰⁰, and it will be difficult to attribute each of the impacts precisely to a particular subcomponent.

Table 10-3 Effect indicators

Project component	Effect indicators
C1 Preparatory work C1-1 Reorganisation of Forest Department C1-2 Establishment of project implementation structure C1-3 Preparation of implementation manual C1-4 Development of annual work plan and budget	C1 Preparatory work <ul style="list-style-type: none"> • Increased efficiency of the Forest Department and PMU (number of days required to approve a fund release) • Increased level of communication within the Forest Department and PMU (number of days required to inform management's decisions to frontline officers) • Increased level of activity monitoring (number of days required for the HQs to obtain incidence reports from the frontline officers)
C2 Forest and biodiversity conservation C2-1 Enhancement and management of forest and biodiversity information base C2-2 Enhancement of the basis for forest management and biodiversity conservation C2-3 Facilitation of inscription process of Khangchendzonga Biosphere Reserve on the World Heritage List C2-4 Ex-situ conservation and promotion of biodiversity conservation	C2 Forest and biodiversity conservation <ul style="list-style-type: none"> • Rate of forest cover • Situation of wild animals (eg, number of endangered species) • Total area of protected areas • Number of visitors at newly-established national parks • Inscription of Khangchendzonga Biosphere Reserve on the World Heritage List
C3 Ecotourism C3-1 Policy and regulatory environment for ecotourism promotion C3-2 Ecotourism marketing C3-3 Development of ecotourism areas with respect to specific market segments C3-3-1 Development of high-quality ecolodges C3-3-2 Development of trekking routes C3-3-3 Development of mountain bike trails C3-3-4 Development of rock climbing areas C3-3-5 Development of wildlife observation areas and points C3-4 Development of tourist facilities C3-4-1 Construction and management of interpretation centres C3-4-2 Construction of public conveniences at tourist attractions C3-5 Introduction of solid waste management at tourism areas linked to the priority villages C3-5-1 Comprehensive study for baseline information on solid waste management C3-5-2 Operating solid waste management functions	C3 Ecotourism <ul style="list-style-type: none"> • Number of tourists on ecotourism tours throughout the state • Total spending of ecotourists • Average spending of ecotourists (per head per day) • Income of local people engaged in ecotourism-related businesses (such as trekking guides, cooks, etc.) • Number of JFMCs, EDCs, and PSS's members participating in waste collection • Quantity of waste collected and treated by the system

¹⁰⁰ For example, the number of ecotourists is likely to be influenced by both the marketing of Sikkim ecotourism and development of ecolodges.

Table 10-3 Effect indicators (continued)

C4 Joint forest management C4-1 Preparation work C4-2 Establishment of committees for joint forest management C4-3 Forest management and biodiversity conservation activities C4-4 Income generation activities C4-5 Capacity development C4-6 Monitoring C4-7 Village Development Fund	C4 Joint forest management • Income of JFMC members • Total person-days of local employment • Output of income generation activities (either in a monetary value or in-kind)
C5 Organisational strengthening of the Forest Department C5-1 Improvement of infrastructure and equipment C5-2 Training of the Forest Department officers and frontline staff members C5-3 Establishment of sustainable finance mechanism C5-4 Project Management Unit	C5 Organisational strengthening of the Forest Department • Budget execution rate • Number of micro plans developed • Frequency of monitoring and evaluation on JFMC/EDC/PSS activities • Qualitative analysis on capacity of staff, such as speed of decision-making processes on forest management and ecotourism
C6 Consultancy services	C6 Consultancy services • Rate of terms of reference accomplished • Number of reports prepared by consultants

10.2 Progress monitoring

10.2.1 Monitoring plan

The Project will monitor the operation and effect indicators described in Section 10.1. To secure an effective monitoring process, it is necessary to develop and apply a monitoring framework prior to project implementation. The details of the monitoring framework will be defined during the preparatory phase (Component 1).

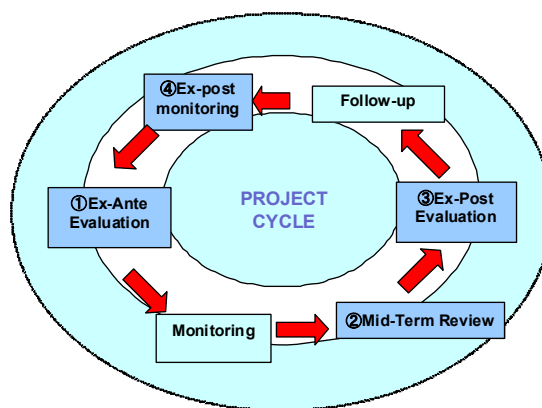


Figure 10-1 Project monitoring cycle of JICA-supported projects

A monitoring plan will be designed in accordance with the project monitoring cycle of JICA. The plan also needs to match the management and operational environment of the Project. Figure 10-1 depicts the concept of the monitoring and evaluation process employed by JICA. The process begins with ex-ante evaluation during the preparatory stages of projects. Ex-post evaluation is conducted two years

after project completion.

The following table shows the major milestones to be used, the monitoring schedule, and the indicators to be collected.

Table 10-4 Monitoring milestones and schedule

Milestone	When	Indicators
1) Ex-ante evaluation	Appraisal	Operation indicators Effect indicators (Baseline)
2) Quarterly and annual Project Status Report (PSR)	Every quarter/year	Operation indicators
3) Project Completion Report (PCR)	At the end of the project period	Operation indicators Effect indicators
4) Ex-post evaluation	Two years after completion of the project	Operation indicators Effect indicators

To maintain an effective monitoring cycle, following points should be stressed.

- At appraisal, the target for each indicator should be set based upon the results of the baseline data.
- Since the impact of forest and biodiversity management projects requires a long time to be realized, the evaluation schedule should be revised where necessary based on the detailed plan of component activities.

A monitoring team will be established in the PMU to conduct operational and effect monitoring. Monitoring activities should be incorporated into day-to-day management and service delivery activities to avoid the inefficiency that may arise from establishing a separate monitoring mechanism from the line of duties. The results of day-to-day activities and data collected at the field level will be assembled and reported by frontline officers to the Headquarters of the Forest Department as well as to the PMU according to the established procedures. Specialised surveys may be required to ascertain the efficiency of the monitoring mechanism and to collect data unavailable through day-to-day operations. Specifically, monitoring should be conducted as follows:

- The monitoring team will be responsible for the development and implementation of the monitoring plan. The results of monitoring should be reported in the form of quarterly and annual Project Status Reports (PSRs).
- To conduct monitoring activities, the monitoring team will appoint field officers in charge of monitoring and data collection in the respective field. Responsibilities and obligations of the staff members involved in monitoring should be clearly understood among all levels of personnel involved in the Project.

Table 10-5 describes the timeline of the monitoring and evaluation process.

Table 10-5 Monitoring plan and milestones

Item	Before project implementation	Project period									After project completion
		FY 1	FY 2	FY 3	FY 4	FY 5	FY 6	FY 7	FY 8	FY 9	
1.Milestone	Ex-Ante Evaluation (Appraisal)	L/A									Ex-Post Evaluation
2.Output	Ex-Ante Evaluation Report	1.Quarterly progress report 2. Annual report						Project Completion Report (PCR)			Ex-Post Evaluation Report
3.Monitoring unit	1.Setting of evaluation indicators 2.Supervising field officer	1.Submit progress status report (PSR) 2.Supervising field officer						1.Submit Project Completion Report (PCR) 2.Cooperate third party evaluator			
4.Field officer	Collecting baseline indicators	1.Collect evaluation indicators 2.Take corrective measures when necessary						1.Collect evaluation indicators 2.Cooperate third party evaluator			

10.3 Impact evaluation

(1) Background

The isolation and estimation of socioeconomic and biophysical impacts attributed to particular public investments (in this case, investments financed by development assistance) have been receiving particular attention from development professionals. However, the accurate isolation and estimation of impacts are often difficult due to the failure to establish ex-ante hypotheses and statistically-correct hypothesis-testing procedures including data collection prior to the commencement of the investment. In the following discussion, it is assumed that the hypothesis testing procedure employs a linear regression model and its analytical concept.

Most development projects and investments are evaluated by ex-post hypothesis testing, which often uses uncontrolled and statistically distorted data with respect to the hypotheses established after the implementation of the project. Various statistical and econometric theories and techniques can be applied to mitigate these problems in estimation. However, because these techniques rely on assumptions regarding causes of distortions, they do not guarantee the complete removal of the problems.

To resolve this isolation and estimation problem, the establishment of hypotheses, identification of statistical population, design of social experiments, consideration of ethical issues, and survey method must be defined and introduced for the impact evaluation prior to the project implementation. Since the hypothesis testing requires social experiments, this impact evaluation procedure must be incorporated into project implementation processes. To identify statistically unbiased isolation and estimation of difference in impacts derived from the Project's different set of socioeconomic interventions, a random assignment of intervention options to be compared, and random sampling of change agents (eg, households) and/or natural conditions (eg, forest cover) from sets of population needs to be followed. Therefore, a procedure called "randomization" must be designed and incorporated in the project implementation.

According to the randomization, to compare effects of the intervention options, the options need to be assigned at random to the subject of the intervention or subjects need to be randomly selected for the assignment of the options. This concept is commonly accepted for the evaluation of social sectors such as education, health and sanitation. However, almost no attempts have been made for the evaluation of forestry and biodiversity management and conservation projects. Since the randomization is a statistically correct procedure to isolate and estimate the degrees of project impact, the study team examined the possibility of applying the randomization method to the Project.

(2) Objective of impact evaluation and general model specifications

In this section links between the project objectives and general (econometric or statistical) model specifications to be used for the impact evaluation of the Project are discussed. Because the Project consists of several different types of development interventions, a specific model for each type of intervention needs to be designed to assess the impact of the intervention. A set of general model specifications discussed in this section will guide selection of a particular model specification designed to evaluate the impact of a subcomponent¹⁰¹. The selection of the model specification will be discussed in the next section. The significance of the model is examined by a hypothesis testing with collected data which must be consistent with assumptions set forth with the model specification to achieve an unbiased testing and estimation of the impacts. Therefore, to achieve an unbiased hypothesis testing

¹⁰¹ Statistically viable overall evaluation of project is difficult to conduct due to the wide-ranging project components from policy development and construction of facilities, to field-level facilitative public service delivery. Therefore, the impact evaluation needs to be conducted for each component or activity.

and estimation, the process of data collection including ways to conduct project intervention needs to be determined along with the model specifications. Because the model specification is constructed with corresponding questions to be asked, the questions are also discussed in the next section.

The objective of impact evaluation is to test the existence and estimate the magnitude of the project interventions' impact on socioeconomic and natural conditions by setting hypotheses prior to project. In order to establish hypotheses, causal relationships among variables need to be determined based on the objective statements of the Project. Because the objectives of the Project are to conserve biodiversity and forests (natural conditions), upgrade the livelihoods of forest-fringe communities (socioeconomic conditions), and develop the capacity of the Forest Department, the following causal relationships (i.e. models to be tested) can be established:

Table 10-6 Examples of statistical models to be tested

Model Type No.	Dependent variable	Explanatory variable(s)	Variables to be controlled	
	Variables representing impact of project intervention (Random sampling with respect to statistically defined population required)	Variables to be examined by hypothesis testing (Random selection of options is required to achieve randomization)	Variables to be controlled by the Project	Variables to be controlled by randomization
1	Socioeconomic variable	Project's intervention options	Project's management options and other related factors	Socioeconomic and natural variables exogenous to the Project's control
2	Socioeconomic variable	Project's management options	Project's intervention options and other related factors	Socioeconomic and natural variables exogenous to the Project's control
3	Socioeconomic variable	Combination of Project's intervention and management options		Socioeconomic and natural variables exogenous to the Project's control
4	Natural variable	Project's intervention options	Project's management options and other related factors	Socioeconomic and natural variables exogenous to the Project's control
5	Natural variable	Project's management options	Project's intervention options and other related factor	Socioeconomic and natural variables exogenous to the Project's control
6	Natural variable	Combination of Project's intervention and management options		Socioeconomic and natural variables exogenous to the Project's control

- Improvement of households' socioeconomic conditions (eg, amount of income, consumption, asset, etc.) is caused by a particular choice of project intervention (eg, types of public service delivered). Analysis of this relationship should reveal effectiveness of each intervention scheme on socioeconomic changes.
- Improvement of households' socioeconomic conditions is caused by a particular choice of way to deliver public services. Analysis of this causal relationship should identify efficient ways of Forest Department's management.
- Improvement of households' socioeconomic conditions is caused both by a particular choice of project intervention and a way to deliver public services. Analysis of this causal relationship

should determine efficient combinations of intervention schemes and ways of service delivery management.

In addition to the above three combinations of variables, three causal relationships with respect to natural conditions such as areas of forest and numbers of animal species can be established. Table 10-6 summarises these six combinations of dependent and explanatory variables (models to be tested), methods of data collection for dependent variables, and randomization requirements for explanatory variables. Data collection for dependent variables needs to employ random sampling from a statistically defined population, and for explanatory variables project intervention or management regime need to be selected randomly to control socioeconomic and natural conditions exogenous to the Project's control.

(3) Questions for the impact evaluation

The following questions will be asked to assess the project impacts on JFMCs, EDCs, and PSS's, their activities, and on forest areas.

Question 1: What is the magnitude of the economic impacts generated by the households receiving JFMC/EDC/PSS support under Component 4?

This question is important for a better choice of development and intervention tools.

i) Type of model to be employed: Model Type 1 in Table 10-6

ii) Data collection for dependent variable

Households for the questionnaire survey will be selected randomly from household lists covering the treated and control areas. Parameters to be collected should include economic variables such as income and consumption, and asset will be selected for data collection.

iii) Randomized selection of treatment and data collection regarding dependent variables

As described in Section 7.2.4, the minimum units of intervention by the Project will be the 454 revenue villages. The Project will form 45 village clusters consisting of ten revenue villages on average. During the project period, four villages per cluster will be selected. One village per cluster will be selected every year for four consecutive years as sites for five-year interventions. At the end of the Project, 180 villages will have received project intervention.

The Project will divide the 180 villages into 1) Initial Intervention Villages (IIVs) and 2) Spread Effect Villages (SEVs). To secure the successful implementation of JFM activities and of their demonstration effects, IIVs will be selected from villages that have expressed their firm commitment to the activities. During the implementation of the JFM activities with IIVs, candidates for SEVs will be selected and shortlisted based also on their level of commitment. For the randomly-selected 22 clusters, the shortlists will be formed by six villages that have demonstrated an equal level of motivation to conduct JFM. From this shortlist, three treatment villages and three control villages will be selected randomly. In this way, the difference in the socioeconomic characteristics of clusters and the levels of motivation of the villages can be controlled for. To control for differences in project management, the same management style should be applied to all experiment sites throughout the project period.

A more detailed and specific estimation of impacts rendered by particular schemes such as microfinancing and income generation activities can be made based on the this model specification.

Question 2: How much does project management affect the magnitude of the economic impacts generated by households of JFMC/EDC/PSS support under Component 4?

This question is important for better management of public service delivery.

i) Type of model to be employed: Model Type 2 in Table 10-6

ii) Data collection for dependent variables

Households for the questionnaire survey will be selected randomly from household lists of the treated and control areas. Parameters to be collected should include economic variables such as income and consumption, and asset will be selected for data collection.

iii) Randomized selection of treatment and data collection regarding dependent variables

The remaining 23 clusters not selected for the first experiment will be used to address this second question. Among the 23 clusters, 12 clusters will be selected randomly for the implementation of high-intensity internal monitoring of frontline officers. In the rest of the 11 clusters, low-intensity monitoring of frontline officers will be conducted. This method can be modified to test three levels of monitoring intensity, in which case three cluster groups would be selected randomly. Intensive monitoring and communication can be achieved using, for example, cell phones with GPS. Following the monitoring method applied by the Forest Department in the state of Tamil Nadu, intensive monitoring can be conducted through random phone calls from superior officers to front line officers. The period of the experiment will be set at 2 years, and if the method proves effective, it will be expanded to include the entire Department. To control for differences in project interventions, the same types of interventions should be implemented at all of the experiment sites throughout the project period.

A more detailed and specific estimation of the impacts rendered by different management regimes can be made based on this model specification.

Question 3: How much impact does the Project's support to households involved in JFMC/EDC/PSS activities under Component 4 have on forest areas?

This question is important for selecting best options to achieve forest and biodiversity conservation.

This question is a variation of Question 1, and the only difference is in the data collection for dependent variables. For this question, (spatial) random sampling will need to be employed to gather information on the conditions of forests. Model Type 4 in Table 10-6 will be used.

Question 4: How much impact does the training of Forest Department officials and staff have on JFMC/EDC/PSS activities?

i) Type of model to be employed: Model Type 2 in Table 10-6

ii) Data collection for dependent variable

Households for the questionnaire survey will be selected randomly from household lists of the treated and control areas. Parameters to be collected should include the households' capacity for forest management and biodiversity conservation such as the number of households participating in the activities, level of documentation, account management, and book-keeping.

iii) Randomized selection of treatment and data collection regarding dependent variables

In Year 1, two types of treatment, provision of training on community facilitation skills and no provision of community facilitation skill training, will be established and randomly assigned to Forest Guards employed by the Forest Department. In Years 2 and 3, the performance of these trained and untrained staff will be evaluated using the data collected through the method introduced in the above section. A detailed and specific estimation of the impacts rendered by these training regimes can be made based on this model specification.

(4) Constraints and issues

Prior discussions of the constraints and issues associated with the above model for impact evaluation are important for the interpretation of the evaluation results. Although some variables can be seen as constraints, change in the analytical framework makes it controllable or analysable. The following are the potential constraints of this impact evaluation.

i) Consistency with the JFM approach

JFM is a scheme that relies on the participation of forest-fringe communities, and its success inherently depends on the incentives and commitment of the communities toward the JFM activities. Thus, it is not ethical to reject their commitment and request just because they are not selected randomly. In the above proposal, this problem is partially mitigated by conducting a random selection among equally motivated villages. Another mitigation measure could be random assignment of two levels of intervention among the selected villages.

ii) Endogenous influences

Exogenous factors can be controlled by randomization. However, there are influences of treatment itself to the subjects' decision-making which causes distortion with respect to the linear nature of the model specification. This issue may arise when, for example:

- Due to forest-fringe community's prior knowledge of the Project it wants to implement activities under other components. It will be difficult to deny the community's request to choose activities in the other component.
- Due to availability of external resources a denial of project implementation in the controlled village prompts the village to seek resources from other resources.

iii) Small samples

Because of the very small geographical extent of Sikkim, the size of samples receiving treatment is small. In addition, natural socioeconomic environments of the subject groups vary widely. This may result in an inclusion of large measurement errors which may obscure estimation of the relationships among variables. In addition to the introduction of randomization, additional efforts need to be made to minimize and normalize errors.

iv) Nature of forest and biodiversity conservation project

One of the unique characteristics of a forest conservation project is the long time frame necessary to generate its impact. In Sikkim, it usually requires ten years to monitor changes in vegetation. If the evaluation of the project takes place in Year 5 of the Project, vegetation changes are bound to be small, and precise and costly measurements need to be employed.

CHAPTER 11 Conclusions and recommendations

The results of the study have clearly verified the validity of the Project to be conducted with loans provided by JICA. The investment aiming at the realization of the state's high potential for sustainable forest and biodiversity management and at the generation of economic gains from its rich environmental/cultural heritages should yield large social and economic returns. It is also recommended that a significant portion of the investment be allocated to the enhancement of the Forest Department's capacity to deliver effective and efficient public services in a sustainable manner. The study team strongly believes that the establishment of a sustainable financial mechanism in collaboration with the private sector and civil society is one of the key capacity areas which need to be developed to sustain project activities.

The study has confirmed that Sikkim is rich in biodiversity and forest resources and that it exhibits high potential for ecotourism, with tourism assets yet to be tapped such as its exceptional nature and culture. The study has also revealed that there are many forest-fringe communities whose livelihoods rely heavily on services and products derived from natural resources. On the other hand, the state maintains a ban on the extraction of forest and biodiversity resources. These resources are managed mainly for conservation purposes, and non-consumptive utilisation of forest resources for such objectives as ecotourism by the private sector and livelihood maintenance of forest-fringe communities is also promoted. However, the study results have indicated that the unrealistic enforcement of the prohibitive conservation policy may be inducing the 'tragedy of the commons', where the sense of ownership of forest resources by the forest-fringe communities is difficult to nurture. The perceived ownership of forests and biodiversity resources by the forest-fringe communities is the driving force for sustainable conservation and utilisation of these resources.

Moreover, the sustainable resource management approach relies on information on the quantity and quality of the investment, production, and removal or consumption of resources. However, under the current state of incomplete enforcement of the prohibitive policy, precise information on resource extraction is difficult to obtain from the resource users. Without well-grounded information, sustainable resource management is difficult to achieve.

To nurture the communities' ownership over the resources, the application of the joint forest management (JFM) concept must be enhanced. In Sikkim, this concept has been introduced, adopted, and practiced to establish more than a hundred JFMCs and EDCs thus far. To manage the reserved forests and protected areas with a relatively small number of forestry officials, forest-fringe communities must be mobilised through JFM for the enrichment and protection of forests and biodiversity. At the same time, consumptive and non-consumptive demand for the resources for the maintenance of community livelihoods needs to be met through sustainable utilisation of the resources. Since JFM is a participatory resource management scheme that allows the Forest Department and communities to coordinate the joint management and ownership of forests and their resources, it is envisaged that its success would facilitate the generation of real resource inventory information, which is essential for sustainable management, through the process of micro planning.

The Forest Department's infrastructure and capacity to manage forest and biodiversity resources should be enhanced through the implementation of the Project. The Department must be reorganised partially prior to project implementation to improve its decision-making and budget execution processes. From the point of view of forestry staff deployment, the JFM scheme compensates for the limited manpower of the Department by, for example, engaging members of JFM committees who function as forestry workers. This, in turn, would prevent the Department from hiring more staff, which may expand the department into an unnecessarily large and costly organisation. The Project should also support the establishment of a biodiversity information base to increase the economic,

scientific, and global values of Sikkim's biodiversity, and to promote extension activities. Finally, business opportunities of the ecotourism service providers and forest-fringe communities must be improved by the Forest Department through measures such as eliminating permission requirements, developing ecolodges, and financing training, which will lead to the improvement of the business environment.

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Annexes

Annex 1

Poverty mapping in the state of Sikkim

This document was excerpted and adapted from *Poverty Mapping Using Geographic Information Systems (GIS) to target the Poorest Gram Panchayat Wards (GPW) in the State of Sikkim*.

(1) Objectives of the study

The objective of the study was to disaggregate the state-level poverty statistics to the village level to identify pockets of poverty. As per the status in early 2007, when the study was initiated, there were a total of 4 districts, 9 subdivisions, 24 blocks, 31 geographic political constituencies, 454 revenue blocks, 166 Gram Panchayat Units, and 905 Gram Panchayat wards in the state. The target of the study was to disaggregate poverty and its correlates across all these administrative units.

(2) Methods used

The source of information for this study was the State Household Socio-Economic Census, DESME, 2005 and Census of India, 2001. The data was compiled by the Department of Information Technology and analyzed by the Department of Rural Management and Development on a GIS platform.

(3) Criteria used for determining non-poor households

A household meeting any of the conditions listed below was classified as a non-poor household. Thus a poor household was determined to be one that did not meet any of these conditions or criteria:

Household having any member as government employee, work charge, muster roll; household having any member as government contractor or Class I and Class II; income over INR 3,000 per month; household having pucca house; household having paddy, cardamom, orchards, or floriculture land 2.5 acres or above; household having barren or other lands over 5 acres; household having more than 6 cattle, 10 goats, 6 yaks, 30 poultry, 6 buffalo, 10 horses, 50 rabbits, or 6 pigs; household having TV and fridge; household having scooter/bike or vehicles; household having washing machine, vacuum cleaner, microwave, geyser, generator, inverter, computer, DVX, VCD, oven, rice cooker, camera; household having more than one fan, more than one sofa, more than one almirah, more than two pressure cookers, more than one sewing machine; household sending their children to private school; household having telephone / mobile

(4) Findings of the study

i) Of the 93,451 households surveyed in rural Sikkim, 19,235 households were found to be below poverty line (BPL). Of these, only 1,054 (5%) were in North district and the remaining 18,181 were more or less equally distributed in the remaining three districts.

ii) In terms of poverty rate, the South and West districts form one cluster with about 25% of the households being BPL while North and East districts form the other cluster with 15% BPL rate.

iii) The poverty rate of the 905 Gram Panchayat wards in the state showed a large variation from 0% (Theng, Choten, Thingshim, Upper Tathangchen, Chongthang, Lower Likship, Lower Ralong, Upper Karchi, Soreng, Bhareng) to 72% (Manghim and Beng).

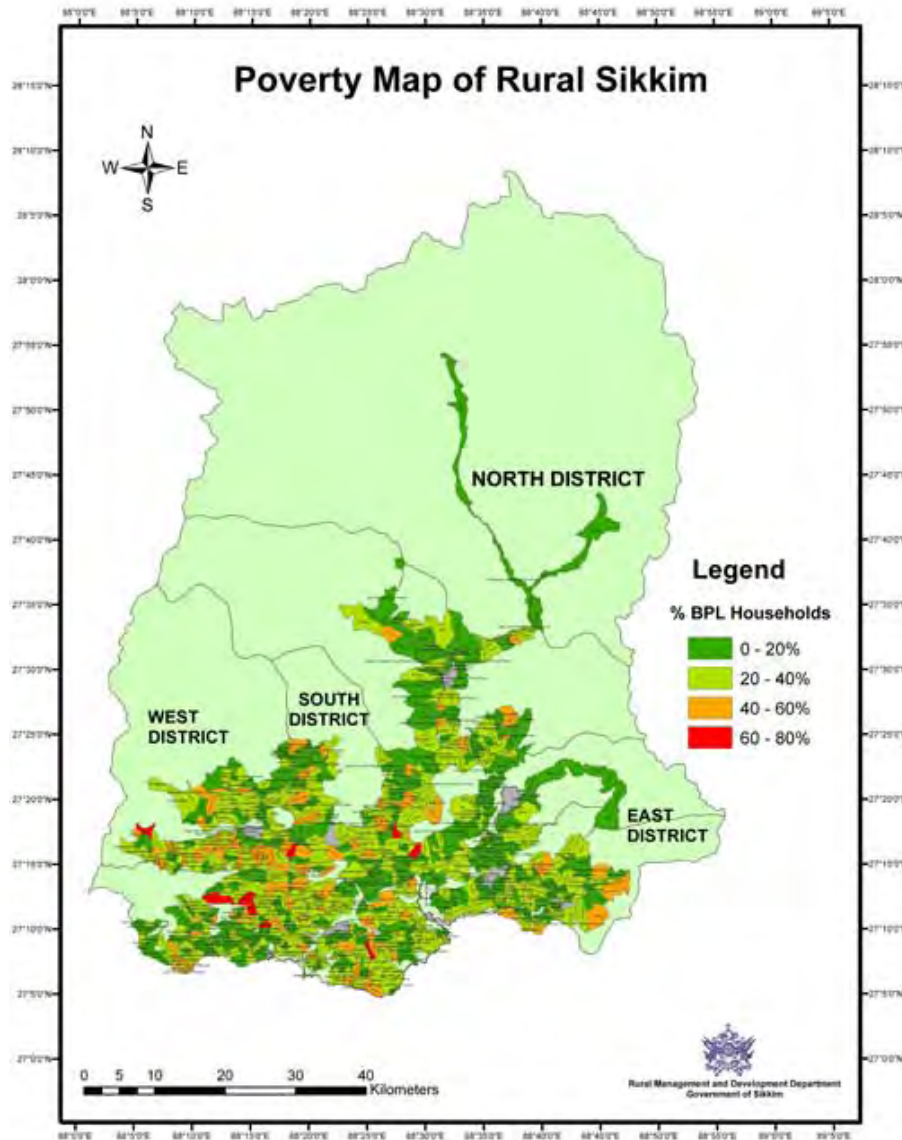
iv) Of the 905 Gram Panchayat wards having 19,235 poor households, 11 Panchayat wards (0 poor households) had 0% poverty incidence, 389 Panchayat wards (5,158 poor households) had 0-20% poverty incidence, 383 Panchayat wards had 20-40% poverty incidence, 111 Panchayat wards (3,854

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poor households) had 40-60% poverty incidence, and 11 Panchayat wards (487 poor households) had 60-80% poverty incidence.

v) Of these 122 Gram Panchayat wards with greater than 40% poverty rate, 9 are in North District, 15 in East District, 44 in South District, and 54 in West District.

vi) It is also reasonable to assume that the largest number of the poorest among the poor is located in the Gram Panchayat wards with the highest poverty rates.



Source: Rural Management & Development Department

Figure 1 Poverty map of the state

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Table 1 Distribution of Gram Panchayat Wards and BPL households

Poverty group % of Poor households	Number of Gram Panchayat Wards					Number of Poor Households				
	North	East	South	West	Total	North	East	South	West	Total
0%	4	2	2	3	11	0	0	0	0	0
0-20%	57	149	84	99	389	458	2,445	1,443	1,112	5,458
20-40%	33	107	125	118	383	394	3,225	3,082	3,035	9,736
40-60%	9	13	41	48	111	202	466	1,455	1,731	3,854
60-80%	0	2	3	6	11	0	97	83	307	487
Total	99	271	253	271	894	1,054	6,233	6,063	6,185	19,535

(5) Recommendations

- i) Notify the 122 Gram Panchayat Wards with more than 40% poverty rates as the most backward or poorest village in the state.
- ii) Target existing government developmental programs in these poorest 122 gram Panchayat wards.
- iii) Use the Backward Regions Grants Funds (BRGF) scheme. This scheme is specifically designed to redress regional imbalances in development and provides financial resources for supplementing and converging existing developmental inflows into backward areas. Integrated development will commence with each district undertaking a diagnostic study of its backwardness by enlisting professional planning support. As per the Programme Guidelines of the BRGF, this will include the preparation of a baseline survey which can be used for undertaking evaluation at a later date. The vision and objective of this program directly matches with the needs and requirements of these poorest and backward 122 Gram Panchayat wards. This scheme should be used to target and supplement existing government developmental programs in these backward 122 Gram Panchayat wards of the state.
- iv) Initiate special government programs to support these poorest Gram Panchayat wards. This is amongst the first examples of a state using scientific economic criteria and not caste-based criteria for defining poverty and backwardness in the country. Also, Sikkim has become amongst the first few states in the country to use scientific poverty mapping as a tool for targeting government development programs in the relatively backward areas of the state.

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List of 122 Gram Panchayat Wards with BPL rates greater than 40%, by district

Table 2 North District

Gram Panchayat Ward	Gram Panchayat Unit	% of BPL households	Total households	BPL households
Laven	Lingthem Lingdem	58.82%	17	10
Rarik	Men Rongong	58.33%	36	21
Ramthang Gongkha	Ramthang Tangyek	53.19%	47	25
Men Rongong	Men Rongong	48.98%	49	24
Rel	Tung Naga	48.57%	35	17
Safyong	Phensong	48.28%	29	14
Tibuk	Tingchim Magshila	44.93%	69	31
Ralak	Tingchim Magshila	41.00%	100	41
Sangtok	Lum Gor Sangtok	40.43%	47	19
Total		49.17%	429	202

Table 3 East District

Gram Panchayat Ward	Gram Panchayat Unit	% of BPL households	Total households	BPL households
Beng	Khamdong	71.59%	88	63
Thasa	Singbel	61.82%	55	34
Upper Lingtam	Lingtam Padamchen	54.10%	61	33
Dhanbari	Tumen	50.54%	93	47
Lower Samlik	Samlik Marchak	48.08%	52	25
Mamring (Amba Mamring Gumpa)	Amba	47.83%	115	55
Premlakha	Premlakha Subaneydara	46.67%	30	14
Singaneybas	Premlakha Subaneydara	46.15%	13	6
Lower Tarpin	Rhenock Tarpin	45.39%	152	69
Dokchin	Rhegoh	45.12%	82	37
East Machong	Riwa Parkha	44.44%	99	44
Namrang (Tumin Karma Choling Gumpa)	Tumen	43.10%	116	50
Simik (Simik Daduling Gumpa)	Simik Lingzey	41.18%	51	21
Kutitar	Aritar	41.12%	107	44
Namin	Samlik Marchak	40.38%	52	21
Total		48.50%	1166	563

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Table 4 South District

Gram Panchayat Ward	Gram Panchayat Unit	% of BPL households	Total households	BPL households
Manghim	Sadam Suntaley	71.70%	53	38
Bering	Lamting Tingmo	71.43%	14	10
Kharibotey	Rateypani	60.34%	58	35
Gangla	Rabong Sangmu	58.97%	117	69
Mangar Dalam	Ralong Namlung	58.49%	53	31
Lower Lingi	Lingi	58.12%	117	68
Upper Wak (Wak Gumpa)	Wak Omchu	57.97%	69	40
Belling	Turuk Ramabung	54.29%	70	38
Lower Sripatam	Sripatam Gagyong	53.57%	112	60
Lower Perbing	Perbing Chubba	52.59%	116	61
Hingdam	Lamting Tingmo	52.27%	132	69
Subuk Rockland	Sanganath	50.00%	24	12
Bul	Rong Bul	50.00%	50	25
Lamting	Lamting Tingmo	50.00%	52	26
Lower Tokdey	Niya Mangzing	50.00%	118	59
Tharpu	Lungchok Kamarey	49.18%	61	30
Nizameng	Rameng Nirrameng	49.02%	51	25
Biring	Barfung Zurung	48.57%	70	34
Upper Namphing	Namphing	48.45%	97	47
Dharagaon	Salghari	47.62%	63	30
Upper Sripatam	Sripatam Gagyong	46.67%	120	56
Rabitar	Sadam Suntaley	46.48%	71	33
Lower Kolthang	Lingmo Kolthang	46.34%	82	38
Chekhim	Sanganath	46.15%	39	18
Upper Ramabung	Turuk Ramabung	45.88%	85	39
Shayampani	Sorok Shyampani	44.44%	36	16
Rolak Kabey	Ben Namprick	44.44%	117	52
Lower Tinkitam	Tinkitam Rayong	44.00%	50	22
Lower Ramabung	Turuk Ramabung	43.94%	66	29
Upper Mangzing	Niya Mangzing	42.53%	87	37
Nardang	Tinkitam Rayong	42.00%	50	21
Kerabari	Mallidara Paiyong	41.91%	136	57
Rabikkhola	Tangi Bikmat	41.89%	74	31
Zurung	Barfung Zurung	41.89%	74	31
Dong	Rameng Nirrameng	41.86%	43	18
Mangbrue	Lamting Tingmo	41.86%	43	18
Pakjer	Tingrithang	41.67%	36	15
Badamtam	Paiyong	41.67%	60	25
Upper Karek	Perbing Chubba	41.43%	70	29
Samatar	Poklok Denchung	41.43%	140	58
Upper Rateypani	Rateypani	41.38%	58	24
Sangbong Ahley	Assangthang	40.91%	44	18
Lower Tingrithang	Tingrithang	40.43%	47	19
Dozok	Rabong Sangmu	40.30%	67	27
Total		48.27%	3192	1538

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Table 5 West District

Gram Panchayat Ward	Gram Panchayat Unit	% of BPL households	Total households	BPL households
Deythang	Deythang	68.67%	83	57
Upper Parengaon	Deythang	65.33%	75	49
Suntoley	Khaniserbong Suntoley	65.22%	46	30
Deythang-Maneydara	Deythang	63.95%	86	55
Ferek	Karmatar Gaten	61.25%	80	49
Nazar Bartok	Chingthang	60.36%	111	67
Lower Khandu	Sangkhu Radukhandu	59.29%	113	67
Bhasmay	Samsing Gelling	58.89%	90	53
Lower Sapong	Bangten Sapong	56.14%	57	32
Dewani Tar	Chota Samdong Arubotey	55.56%	36	20
Jeel	Sangadorji	55.43%	92	51
Mangbir	Takothing	55.00%	80	44
Lungyam Nalbogaon	Lonchok Salyangdang	55.00%	80	44
Lower Tikjya	Lingchom Tikjya	54.24%	59	32
Khachodpalri (Khachodpalri Gumpa)	Tingle Khachodpalri	53.97%	126	68
Middle begha	Dentam	53.33%	105	56
Hattaban (anden Wolung Gumpa)	Upper Fambong	52.78%	72	38
Mazua Tamthok	Chota Samdong Arubotey	52.38%	63	33
Lower Sallyangdung	Lonchok Salyangdang	51.19%	84	43
Middle Chota Samdong	Chota Samdong Arubotey	51.02%	49	25
Upper Dhupidara	Dhupidara-Narkhola	50.00%	24	12
Upper Sangkhu	Sangkhu Radukhandu	50.00%	30	15
Miyong	Chingthang	48.48%	99	48
Malbasay	Gyalshing-Omchung	47.69%	65	31
Mangder	Karchi Mangnum	47.62%	21	10

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Table 6 West District (continued)

Gram Panchayat Ward	Gram Panchayat Unit	% of BPL households	Total households	BPL households
Lower Sardong	Sardong Lungzik	47.46%	59	28
Barnyak	Barnyak Barthang	47.17%	106	50
Upper Begha	Dentam	46.83%	126	59
Upper Mangnam	Karchi Mangnum	46.67%	15	7
Bhirkuna Lingyang	Gerethang	46.55%	58	27
Upper Hatidunga	Sangadorji	46.43%	84	39
Gaon)	Lower Fambong	45.86%	133	61
Lower Segeng	Mabong Segeng	45.71%	70	32
Lower Dupidara	Dhupidara-Narkhola	45.45%	11	5
Lower Lunzik	Sardong Lungzik	45.33%	75	34
Pecherek-Majhgoan	Pecherek Martam	45.21%	73	33
Upper Siktam	Siktam Tikpur	45.16%	62	28
Chongjong	Yangthang	45.10%	102	46
Barnyak-Daragaon	Barnyak Barthang	44.34%	106	47
Lower Dodok	Dodak	44.16%	77	34
Bullung	Karmatar Gaten	44.05%	84	37
Darap-Singfeng	Darap	43.62%	94	41
Buriakhop-Rengeng	Burikhop	43.55%	62	27
Singling-Phuncheybong	Singling	43.01%	93	40
Chingthang	Chingthang	42.65%	136	58
Kumrek-Sepi	Maney Bung Sopakha	42.50%	40	17
Liching	Karmatar Gaten	41.86%	43	18
Singlitam	Melli	41.27%	63	26
Lower Linchom	Lingchom Tikjya	41.24%	97	40
Middle Lungchok	Lonchok Salyangdang	41.07%	56	23
Barthang Rungdu	Barnyak Barthang	41.07%	112	46
Ahaley-Pakhagaon	Chakung	40.79%	76	31
Lower Mukrung Simbola	Maney Bung Sopakha	40.68%	118	48
Upper Mamgmoo	Dentam	40.30%	67	27
Total		49.41%	4124	2038

Source: Tambe, Sandeep. (2006). *Poverty Mapping Using Geographic Information Systems (GIS) to target the Poorest Gram Panchayat Wards (GPW) in the State of Sikkim*. Gangtok: Rural Management and Development Department, Government of Sikkim.

Annex 2

List of endangered and rare species of flora and fauna in Sikkim

1. Major and identified endangered and rare species of flora of the Sikkim Himalaya

Table 1 List of endangered and rare species of flora in the Sikkim Himalaya

Scientific Name	Status
<i>Rhododendron fulgens</i>	Rare
<i>Rhododendron Leptocarppum</i>	Endangered
<i>Rhododendron.maddeni</i>	Endangered
<i>Rhododendron niveum</i>	Endangered
<i>Rhododendron pendulum</i>	Rare
<i>Rhododendron pumilum</i>	Endangered
<i>Rhododendron sikkimense</i>	Endangered
<i>Rhododendron wighti</i>	Rare
<i>Acer hookeri</i>	Endangered
<i>Acronema pseudotenera</i>	Indeterminate
<i>Angelica nubigena</i>	Indeterminate
<i>Pimpinella tongioensi</i>	Endangered
<i>Pimpinella wallichi</i>	Endangered
<i>Ptempetalum radiatum</i>	Indeterminate
<i>Calamus inermis</i>	Endangered
<i>Livistona Jenkinsiana</i>	Endangered
<i>Phoenix rupicola</i>	Rare
<i>Ceropegia hookeri</i>	Endangered
<i>Ceropegia lucida</i>	Endangered
<i>Lactuca cooperi</i>	Endangered
<i>Rhopalocnernis phalloides</i>	Rare
<i>Begonia rubella</i>	Rare
<i>Begonia satrapis</i>	Rare
<i>Begonia Scutata</i>	Rare
<i>Codonopsis affinis</i>	Rare
<i>Areneria thangoensis</i>	Vulnerable
<i>Carex Kingiana</i>	Undetermined
<i>Dennstaedtia ehwesii</i>	Extinct Possibly
<i>Mecodium levingei</i>	Rare
<i>Juncus sikkimensis</i>	Rare
<i>Lloydia himalensis</i>	Rare
<i>Lagerstroemia minuticarpa</i>	Rare
<i>Aphyllorchis parviflora</i>	Rare
<i>Calanthe alpine</i>	Rare
<i>Calanthe mannii</i>	Rare
<i>Coelogyne treutleri</i>	Extinct Possibly
<i>Cymbidium eburneum</i>	Vulnerable
<i>Cymbidium hookerianum</i>	Vulnerable
<i>Cymbidium Whiteae</i>	Endangered
<i>Cypripedium himalaicum</i>	Rare
<i>Didickea cunninghamii</i>	Endangered
<i>Paphiopedilum fairrieianum</i>	Endangered

Table 1 List of endangered and rare species of flora in the Sikkim Himalaya (continued)

Scientific Name	Status
<i>Paphiopedilum hirsutissimum</i>	Rare
<i>Paphiopedilum venustum</i>	Vulnerable
<i>Euxine pulchra</i>	Endangered
<i>Cypripedium elegans</i>	Rare
<i>Christiopteris tricuspis</i>	Undetermined
<i>Aconitum ferox</i>	Vulnerable
<i>Cotoneaster simonsii</i>	Undetermined
<i>Ophiorrhiza lurida</i>	Rare
<i>Picrorhiza kurrooa</i>	Vulnerable
<i>Christella clarkei</i>	Vulnerable
<i>Cyclogramma squamaestipes</i>	Rare
<i>Oreopteris elwesii</i>	Rare
<i>Cissus spectabilis</i>	Endangered
<i>Acer hookeri</i>	Endangered
<i>Acronema pseudotenera</i>	Undetermined
<i>Angelica nubigena</i>	Undetermined
<i>Pimpinella tongioensis</i>	Endangered
<i>Pimpinella wallichii</i>	Endangered
<i>Ptempetalum radiatum</i>	Undetermined
<i>Calamus inermis</i>	Endangered
<i>Livistona Jenkinsiana</i>	Endangered
<i>Phoenix rupicola</i>	Rare
<i>Ceropegia hookeri</i>	Endangered
<i>Ceropegia lucida</i>	Endangered
<i>Lactuca cooperi</i>	Endangered
<i>Rhopalocnernis phalloides</i>	Rare
<i>Begonia rubella</i>	Rare
<i>Begonia satrapis</i>	Rare
<i>Begonia Scutata</i>	Rare
<i>Codonopsis affinis</i>	Rare
<i>Areneria thangoensis</i>	Vulnerable
<i>Carex Kingiana</i>	Undetermined
<i>Dennstaedtia elwesii</i>	Extinct possibly
<i>Mecodium levingei</i>	Rare
<i>Juncus sikkimensis</i>	Rare
<i>Lloydia himalensis</i>	Rare
<i>Lagerstroemia minuticarpa</i>	Rare
<i>Aphyllorchis parviflora</i>	Rare
<i>Calanthe alpine</i>	Rare
<i>Calanthe mannii</i>	Rare
<i>Coelogyne treutleri</i>	Extinct possibly
<i>Cymbidium eburneum</i>	Vulnerable
<i>Cymbidium hookerianum</i>	Vulnerable
<i>Cymbidium Whiteae</i>	Endangered
<i>Cypripedium himalaicum</i>	Rare
<i>Didickea cunninghamii</i>	Endangered
<i>Paphiopedilum fairrieianum</i>	Endangered
<i>Paphiopedilum hirsutissimum</i>	Rare

Table 1 List of endangered and rare species of flora in the Sikkim Himalaya (continued)

Scientific Name	Status
<i>Paphiopedilum venustum</i>	Vulnerable
<i>Euxine pulchra</i>	Endangered
<i>Cypripedium elegans</i>	Rare
<i>Christiopteris tricuspis</i>	Undetermined
<i>Aconitum ferox</i>	Vulnerable
<i>Cotoneaster simonsii</i>	Undetermined
<i>Ophiorrhiza lurida</i>	Rare
<i>Picrorhiza kurrooa</i>	Vulnerable
<i>Christella clarkei</i>	Vulnerable
<i>Cyclogamma squamaestipes</i>	Rare
<i>Oreopteris elwesii</i>	Rare
<i>Cissus spectabilis</i>	Endangered

Annex 2 List of endangered and rare species of flora and fauna in Sikkim

2. Major identified endangered and rare species of fauna in the Sikkim Himalaya

Table 2 List of endangered and rare species of fauna in the Sikkim Himalaya

Common name	Scientific name	Category	WPA, 1972 Status
Chinese pangolin	Mainis pentadactyla	Mammals	Schedule I, Part I
Clouded leopard	Neofelis nebulosa	Mammals	Schedule I
Gaur or indian bison	Bos gaurus	Mammals	Schedule I
Himalayan thar	Hemitragus jemlahicus	Mammals	Schedule I
Lesser of red panda	Ailurus fulgens	Mammals	Schedule I
Musk deer	Moschus moschiferus	Mammals	Schedule I
Pangolin	Manis crassicaudata	Mammals	Schedule I
Serow	Capricornis sumatraensis	Mammals	Schedule I
Snow leopard	Panthera uncial	Mammals	Schedule I
Takin or mishmi takin	Budorcas taxicolor	Mammals	Schedule I
Tibetan fox	Vulpes ferrilatus	Mammals	Schedule I
Tiger	Panthera tigris	Mammals	Schedule I
Tibetan wolf	Canis lupus chanco	Mammals	Schedule I
Pythons	Genus python	Amphibians & reptiles	Schedule I, Part II
Blood pheasant	Ithaginis creuntus tibetanus, ithaginis Cruentus kuseri	Birds	Part III
Monal pheasant	Lophophorus imperyanus, Lophophorus	Birds	Part III
Peacock pheasant	Polyplectron bicalcaratum	Birds	Part III
Tragopan pheasant	Tragopan melanocephalus, Tragopan blythii, Tragopan satyra, Tragopan temminckii	Birds	Part III
Kaliz pheasant	Lophurs Leucomelana	Birds	Part III
Civets	Species of Viverridae except Malabar civet	Beetles	Schedule II, Part II
Common fox	Vulpes bengalensis	Beetles	Schedule II
Flying squirrel	Bulopetes, Petaurista, pelomys & Eupetaurus	Beetles	Schedule II
Himalayan black bear	Selenarctos thibetanus	Beetles	Schedule II
Jackal	Canis aureus	Beetles	Schedule II
Jungle cat	Felis chaus	Beetles	Schedule II
Marmots	Marmota bobak himalayana, Marmota caudate	Beetles	Schedule II
Martens	Martes foria intermedia, Martes flogigule, Martes gwatkinsii	Beetles	Schedule II
Indian cobras	Ophiophagus Hannah	Beetles	Schedule II
Barking deer or muntjac	Muntiacus muntjak	Mammals	Schedule III
Gorals	Nemorhaedus goral	Mammals	Schedule III
Wild pigs	Sus scrofa	Mammals	Schedule III

Annex 3

List of DFOs, ACFs, ROs, and BOs of the Sikkim Forest Department

Table 1 List of DFOs, ACFs, ROs, and BOs of the Sikkim Forest Department

Name	Division		Sub-division		Range			Block			Total number by division				
	Circle	Number of DFOs	Name	Circle	Number of ACFs	Name	Circle	Number of ROs	Name	Circle			Number of BOs		
East	LU* ¹	2	Gangtok	PA	2	Gangtok	NTFP	3	Gangtok	T	6	T	44		
	SF* ²	2		T	2		Silvi	2		LU	3	WL	16		
	FCA* ³	1		WL	2		WL	2		WP	3	SF	10		
	HZP* ⁴	1		HZP	1		FCA	1		HZP	1	LU	8		
	NTFP* ⁵	1		U	1		HZP	1		PA	1	PA	5		
	PA* ⁶	1					LU	1		SF	1	HZP	4		
	Silvi* ⁷	1					PA	1		U	1	NTFP	4		
	T* ⁸	1					SF					U	4		
	U* ⁹	1					U	1				FCA	2		
	WL* ¹⁰	1					Wp* ¹¹	1				Seri	1		
										Pangthang	T	1	Silvi	1	
										Tadong	T	1			
							Ranipool	T	1	Ranipool	T	5			
										Rumtek	T	1			
										Assamlenzey	T	1			
							Singtam	SF	1	Singtam	SF	2			
									1		T	2			
										Sang					
										Rangpo	Seri* ¹²	1			
											T	1			
										Rorathang	T	1			
							Kyongnosla	T	1	Kyongnosla	T	2			
								WL	1						
							Tumin	T	1	Tumin	T	1			
									1						
								LU	1						
							T	3	Pakyong	T	1	Pakyong	T	1	
							WL	1		LU	1		SF	1	
									Pathing			Pathing			
									Phadhamchen	T	1	Phadhamchen			
												Nathang			
									Fambonglho Sanctuary	WL	2	Fambonglho	WL	4	
							T	3	Rongli	T	1	Rongli	T	4	
							WL	1		SF	1	Rhennock	SF	1	
									Pangolakha Sanctuary		2	Pangolakha Sanctuary	WL	4	
															(99)
	North	T		1	Mangan	T	4	Mangan	LU	2	Mangan	T	3	T	17
		LU		1		LU	1		LU	1		WL	1	LU	7
		SF		1		NTFP	1		NTFP	1		Naga		WL	6
WL		1	U	1			SF	1				NTFP	4		
			WL	1		Dzongu	NTFP	1	Upper Dzongu	T	1	SF	3		
							T	1	Lower Dzongu			U	2		
								WL							
							Phodong	LU	1	Phodong					
								SF	1	Kabi	T	3			
								T	1						
							T	1	Chungthang	LU	1	Chungthang	U	1	
									SF	1		WL	1		
									WL	1	Shipgyer				
									Shingba Sanctuary	WL	1				
					Lachen			Lachen	T	1					
								Thanggu							
					Lachung			Lachung					(39)		

Annex 3 List of DFOs, ACFs, ROs, and BOs of the Sikkim Forest Department

Table 1 List of DFOs, ACFs, ROs, and BOs of the Sikkim Forest Department (continued)

Division			Sub-division			Range			Block			Total number by division			
Name	Circle	Number of DFOs	Name	Circle	Number of ACFs	Name	Circle	Number of ROs	Name	Circle	Number of BOs				
South	T	1	Namchi	T	4	Namchi	NTFP	1	Namchi	T	8	T	28		
	LU	1		LU	1		T	1		SF	3	WL	8		
	SF	1		NTFP	1		WL	1		Kitam Bird Sanctuary	WL	1	LU	6	
	WL	1		WL	1	Melli	LU	2		Melli	T	1	SF	4	
								1		Manjhitar			NTFP	2	
										Jorthang			Seri	2	
							Namthang	LU	1	Namthang	LU	1			
								Seri	1		Seri	1			
								T	1	Mamring	T	1			
							Temi			Temi	T	1			
					Rabong	T	2	Rabong	T	1	Rabong	T	1		
						WL	1		WL	1		Kewzing	T	1	
												Maenam Sanctuary	WL	2	
												Ravanglag	T	2	
												Yangyong			
						Lingmo	T	1	Lingmo	T	1				
									Lingi				(50)		
West	T	1	Gyalzing	T	2	Gyalzing	T	1	Gyalzing	T	9	T	31		
	LU	1		HZP	1		SF	1		LU	1	WL	9		
	SF	1		LU	1		NTFP	1		Pelling	T	1	LU	3	
	WL	1		WL	1		Seri	1		Legship			NTFP	2	
						Yoksum	T	1		Yoksum	T	2	SF	2	
											WL	2	Seri	1	
											Khechepery				
							Tashiding	T	1	Tashiding	T	1			
											WL	1			
					Soreng	T	4	Soreng	T	1	Soreng	T	1		
						WL	2					Naya Bazar			
												Siribadam			
								Dentam	T	1	Dentam	T	1		
												Bermiok	T	1	
								Sombaria	T	1	Sombaria	T	1		
									Hillay	T	1				
					Barsey Sanctuary	WL	2	Barsey Sanctuary					(48)		
KNP	KNP	1	North	KNP	1	Chungthang	KNP	2	Chungthang			KNP	6		
						Dzongu	KNP	1	Dzongu						
			West	KNP	1								(6)		
Total by level		25			44			66			108		242		

Note: 1) Land use and Environment 2) Social Forestry 3) Forest Conservation Act 4) Himalayan Zoological Park 5) Non Timber Forest Produce and State Medicinal Plants Board 6) Planning and Administration, which includes Tribal Sub-Plan and Scheduled Caste Sub-Plan, Parks and Garden 7) Silviculture and Research 8) Territorial 9) Utilisation, Integrated Watershed Development Program, and JICA 10) Wildlife 11) Working Plan 12) Sericulture

Source: FEWMD, personal communication, June-Aug. 2009

Annex 4 Tourism assets of Sikkim

The tourism assets of Sikkim may be grouped under two broad categories:

- 1) **Natural**, resulting from physical, climatic and ecological features, and
- 2) **Cultural**, representing features of tourist interest such as the way of life of the people, their monasteries, historic monuments, art treasures and festivals.

Natural attractions of Sikkim

- Mountains peaks and passes
- Glacier system
- River system
- Lakes
- Hot springs and waterfalls
- Biodiversity – flora and fauna
- Parks and sanctuaries
- Caves

Cultural attractions of Sikkim

- People
- Religion
- Built heritage
- Folk song and dances.
- Woven handicrafts
- Wooden crafts
- Paintings
- Cane and bamboo crafts
- Cuisine

The types of tourism that can be enjoyed in Sikkim include:

Nature based tourism

- Village tourism and home stays
- Botanical tours for those interested in rhododendron, orchids or any other vegetation,
- Bird watching
- Butterfly watching
- Tours visiting the national park and sanctuaries

Nature based adventure/sport tourism

- Trekking
- Mountain biking
- Mountaineering to those peaks which have been opened for climbing.
- Angling

Culture based tourism

- Voluntarism
- Monastic tours
- People, their culture, religions, festivals and their way of life.
- Pilgrimage

Tourism destinations and attractions

TOURISM DESTINATIONS AND ATTRACTIONS BY DISTRICT		
HUB	SPOKES	ATTRACTIONS
<i>East District</i>		
Gangtok	<ul style="list-style-type: none"> • Rangpor-Majitar (Educational and business tours) • Aritar (leisure) 	<p><i>Historical and Cultural</i></p> <ul style="list-style-type: none"> • Namgyal Institute of Tibetology • Do Drul Chorten • Enchey Monastery • White Memorial Hall • Directorate of Handloom & Handicrafts • Gongjang Monastery • Rumtek Dharma Chakra • Pal zumang Kagyud Monastery, Limdum • Sa Ngor Monastery • Baba Harbhajan Singh Memorial temple <p><i>Gardens and Recreation Parks</i></p> <ul style="list-style-type: none"> • Flower Show • Chogyal Palden Thondup Namgyal Memorial Park • Saramsa Garden • Nehru Botanical Park <p><i>Sightseeing (view points and natural sights)</i></p> <ul style="list-style-type: none"> • Bakthang Waterfalls, • Tashi View point • Hur Huray Danre, Nam nang • Gangtok Ropeway • Ganesh tok • Banjhankri Falls • Smile Land • Water Garden • Tourist Village, Pastanga • Hanuman Tok • Tsomgo Lake • Nathula Pass (For Indians only). <p><i>Sanctuaries</i></p> <ul style="list-style-type: none"> • Fambong Lho Wild Life Sanctuary • Himalayan Zoological Park • Kyangnosla Alpine Sanctuary

			<i>Excursions</i>
			<ul style="list-style-type: none"> • Aritar • Pakyong
		<u>South District</u>	
Namchi	<ul style="list-style-type: none"> • Rabang • Jorethang • Lingey-Peyong, Sokpey 		<i>Historical and Cultural</i> <ul style="list-style-type: none"> • Samdruptse • Yung Drung Kungdrakling Bon Monastery • Borong
			<i>Garden and Recreation Parks</i> <ul style="list-style-type: none"> • Rock Garden • Flower Show of Namchi • Phur Tse Chu Hot Spring
			<i>Sightseeing (view points and natural sights)</i> <ul style="list-style-type: none"> • Namchi • Rabong • Tendong Hill • Temi Tea Garden • Maenam Hill • Sikip • Jorethang • Lingey Payong-Sokpey
			<i>Sanctuaries</i> <ul style="list-style-type: none"> • Kitam Bird Sanctuary
		<u>North District</u>	
Lachung	<ul style="list-style-type: none"> • Lachen • Chungthang • Mangan, Singhik • Dzongu 		<i>Historical and Cultural</i> <ul style="list-style-type: none"> • Kabi Lungchok • Phensang Monastery • Phodong Monastery • Thangu • Sirijunga Yuma Mangheem- Mangshila • Rong Lungten Lee • Lachung Village and monastery
			<i>Sightseeing (view points and natural sights)</i> <ul style="list-style-type: none"> • Seven Sisters Waterfalls • Chungthang • Yume Samdong • Guru Dongmar Lake
			<i>Sanctuaries</i> <ul style="list-style-type: none"> • Singbha Rhododendron Sanctuary • Yumthang Valley
		<u>West District</u>	
Pelling	<ul style="list-style-type: none"> • Yuksom • Kaluk-Rinchenpong 		<i>Historical and Cultural</i> <ul style="list-style-type: none"> • Pamayangtse Monastery • Rabdentse Palace

- Uttarey
- Hee-Bermoik
- Soreng
- Varsey
- Sangacholing Monastery
- Khecheopalri Lake
- Yuksom
- Dubdi Monastery
- Tashi Ding
- Kongri Labdang
- Shiv Mandir Legship
- Limboo Cultural Centre, Tharpu,
- Srijunga Fooku & Wadhan (Cave)

Sightseeing (View Points and natural sights)

- Pelling
- Darap Chery Village
- Khangchen-Dzonga Waterfalls
- Yuksom
- Phamrong Waterfalls
- Rangit Water World
- Soreng
- Chakhung
- Jureli Danre
- Rinchenpong – Kaluk
- Hee Bermoik
- Dentam
- Singshore Bridge, Uttarey

Sanctuaries

- Khangchen-Dzong National Park
 - Varsey Rhododendrons Sanctuary
-

Types of cultural attractions found in Sikkim

The cultural heritage of Sikkim is a mix of traditional Lepcha, Bhutia and the Nepali culture.

TYPES OF CULTURAL ATTRACTIONS FOUND IN SIKKIM	
Built heritage	• Monasteries form a dominant part of the built heritage of Sikkim
Handicrafts	• The woven crafts of Sikkim include a variety of products such as Tibetan carpets, Rari, handbags and other crafts including products such as pen stands, pouches, wallets, cushion covers, jackets and money purses, Jamats, local cushion seats
Wooden crafts	• The traditional Tibetan tables called ‘Chokses’ or ‘Soltas’
Paintings	• The paintings of Sikkim include the traditional Tibetan ‘Thangkas’ and a fairly recent form in which tribal faces, monasteries and natural scenes are depicted in colours on black cloth.
Handmade paper & paper products	• The hand made rice paper is made from the bark_of tree called ‘Argeli (Edgeworthia gardenia).
Cane & Bamboo crafts	• The Sikkimese are expert in making cane & bamboo crafts such as hats and bags. They also make vessels of different types and decorative wall hangings.
Jewellery, ornaments & artefacts	• The traditional jewellery is made of beads, precious stones and gold ornaments with dragon motifs.
Cuisine	• The staple diet of Sikkimese people is rice and dal. Other local dishes are thukpa, momo, phagspa (strips of pork fat stewed with radish and vegetables), gundruk, sael roti, chang, chhurpi, niguro. seesnu ko saag, kinama, etc.

Festivals of Sikkim

FESTIVALS OF SIKKIM	
SAGA DAWA	<ul style="list-style-type: none"> The birth of Lord Buddha. During this festival a procession starts from Tsukkhang monastery carrying the holy books of the teachings of Buddha.
PANG LHABSOL	<ul style="list-style-type: none"> The festival is popularised by the Choymal of Sikkim Chakdor Namgyal. It marks the signing of the treaty of brother hood between Lepchas and Bhutias on the 15th of August
DRUPKA TESHI	<ul style="list-style-type: none"> This festival falls on the fourth day of sixth Tibetan month around August. It marks Lord Buddha's first preaching of the Four Noble Truths
BHUMCHU	<ul style="list-style-type: none"> This is celebrated in Tashiding Monastery during the months of January and February.
LOOSOONG	<ul style="list-style-type: none"> This Bhutia festival marks the end of harvest season and also the end of the Tibetan year.
LOSSAR	<ul style="list-style-type: none"> Tibetan New Year festival.
TENDONG LHO RUM FAAT	<ul style="list-style-type: none"> This is specific to the Lepchas. The festival marks the celebration of the Tendong hill
DASAIN	<ul style="list-style-type: none"> It is the main festival of the Hindu Nepalese in Sikkim. It signifies the victory of good over evil
TIHAAR	<ul style="list-style-type: none"> This festival corresponds to the Indian festival of Diwali and is called Tihar. It is celebrated as the festival of lights in Sikkim.
NAMBUN	<ul style="list-style-type: none"> This is celebrated in the last week of the December and also marks the Lepcha New Year.
KAGYAT DANCE	<ul style="list-style-type: none"> It is celebrated on the 28th and 29th day of the 10th month of the Tibetan calendar around December at Rumtek, Pemayangtse, Phodong, Labrang monasteries. It symbolises the destruction of evil forces and prays for peace and prosperity to flourish in every Sikkimese home
ENCHEY CHAAMS	<ul style="list-style-type: none"> This is celebrated on the 18th and 19th day of the 11th month, around December at Rumtek, Pemayangtse, Phodong, Labrang monasteries. Main Puja and spiritual lama dances.
MAGHE SANKRATE	<ul style="list-style-type: none"> This festival takes place in the month of Magh around January.
GUTHOR CHAAM	<ul style="list-style-type: none"> This festival takes place in February at Rumtek Monastery and is also called winter Chaam. It is held two days prior to Losar.
TSE-CHU CHAAM	<ul style="list-style-type: none"> This is celebrated on the 10th day of the 5th lunar month, around June with ritual dances of the Lamas.
TERWANG CEREMONY	<ul style="list-style-type: none"> The festival is held in Doling Monastery. A hidden treasure discovered by the 5th Lama –Ven. Phurdue Dorjee is displayed.
KATHOK LATSO CEREMONY	<ul style="list-style-type: none"> This is celebrated at Yuksom during the winter. The lake and local deities are worshiped and a small fair is held.

Trekking routes in Sikkim

TREKKING ROUTES IN SIKKIM		
Name of trek	Degree of difficulty	Type of trek
<i>NORTH SIKKIM</i>		
Green Lake	Moderate to strenuous	Authorities to decide on opening the route
Tholung Monastery	Strenuous	Wildness
Thangu-Chorten Nyimala	Strenuous	Authorities to decide on opening the route
Gurudangmar	Moderate to strenuous	Authorities to decide on opening the route
Lharsar Valley	Moderate to strenuous	Authorities to decide on opening the route
Phimphu	Moderate to strenuous	
Samartek	Moderate to strenuous	
Lava-Tarum tsa chu	Moderate to strenuous	Wilderness
Tosa	Moderate	
<i>EAST SIKKIM</i>		
Assam Lingzey to Khedi	Moderate	
Tinjure- Tumin	Gentle to moderate	
Gangtok walking tour	Gentle	Open to all
<i>WEST SIKKIM</i>		
Yuksam-Goechaela	Moderate to strenuous	Wilderness
Uttarey-Singelila	Moderate to strenuous	Wilderness
Hilley-Varsey	Moderate	Designated trail
Monastic (w)	Gentle to moderate	
Soreng-Richenpong	Moderate	
<i>SOUTH SIKKIM</i>		
Ravangla-Maenam	Moderate	Wilderness
Chakung	Moderate	Designated trail
Damthang-Tendong	Moderate	Designated trail
<i>INTER DISTRICT</i>		
Monastic trek (E & N)	Gentle to moderate	
Monastic trek (E,S & W)	Gentle to moderate	

Mountain peaks open for mountaineering

Open prior to 2005:

- Mt Thingchinkhang (6,010 m)
- Mt Jopuno (5,603 m)

Open after 2005:

- Frey's peak (5,830 m)
- Lamo Angden (5,868 m)
- Brumkhangse (5,635 m)

Annex 5

The seven mechanisms of poverty alleviation through tourism

The seven mechanisms where the poor can be included in the tourism sector include:

1. Employment of the poor in tourism enterprises
2. Supply of goods and services to tourism enterprises by the poor or by enterprises employing the poor
3. Direct sales of goods and services to visitors by the poor (informal economy)
4. Establishment and running of tourism enterprises by the poor, eg, micro, small and medium sized enterprises (MSMEs), or community based enterprises (formal economy)
5. Tax or levy on tourism income or profits with proceeds benefiting the poor
6. Voluntary giving/support by tourism enterprises and tourists
7. Investment in infrastructure stimulated by tourism also benefiting the poor in the locality, directly or through support to other sectors

1. EMPLOYMENT OF THE POOR IN TOURISM ENTERPRISES

Advantages of direct employment of the poor

The opportunity for the poor to benefit from the business and entrepreneurial skills of others, rather than taking risks themselves

- The potential to benefit sizeable numbers of people, especially if larger employers become involved
- The self-respect associated with having a job and receiving pay for it
- The chance that whole households can benefit from having a member with a regular paid job

Benefits to the tourism firm

- Making the enterprise more locally distinctive – which is increasingly valued by tourists
- Reducing staff turnover – it is often found that local people stay longer and are more loyal
- Increasing the standard of service – people who feel that the enterprise is helping them and their local communities are more likely to work to a high standard and relate well to guests
- Generally creating a more supportive commercial and political environment for trading and future investment

Challenges to address

- Education and awareness of the poor about tourism employment opportunities
- Ensuring good conditions of employment, (health and safety, sick pay, formal contracts...)
- Removing any barriers, real or perceived, around race and gender
- Respecting religious and cultural norms
- Paying a fair wage, including respecting the value of traditional skills and knowledge
- Overcoming seasonality, in order to offer secure, year round employment

Approach to maximising the benefits of employing the poor in tourism enterprises

- Positive discrimination favouring the poor in recruitment
- Provide training and career advancement
- Offer flexible working hours and part-time contracts

- Make short part-time work available to spread benefits to as many of the poor as possible
- Promote employment opportunities within communities
- Offer opportunities for extra remuneration for families

2. SUPPLY OF GOODS AND SERVICES TO TOURISM ENTERPRISES BY THE POOR OR BY ENTERPRISES EMPLOYING THE POOR

Advantages to the poor

- It provides a market for their existing activities and skills
- It can form the basis for the development of new activities and skills relevant to local capabilities and interests
- It can complement and support traditional patterns of rural livelihood

Benefits to the tourism firm

- The provision of fresh and locally distinctive food for guests
- Enhancing the character of their establishment, such as through the provision of locally distinctive decorative and textile items needed in accommodation and catering establishments.
- Offering a particularly personal service, rooted in the area.
- Reduced supply costs

Challenges to address

- Ensuring that suppliers are able to meet the quality and reliability required by tourism enterprises.
- Capacity problems in regularly meeting large orders.
- The time required by tourism businesses to audit their sources, seek out local suppliers and maintains contact and quality control
- The high standards of health and safety demanded by some corporate tourism enterprises, or purchasers further up the supply chain such as tour operators who are bound by international legislation (such as the EU Package Travel Directive)
- The need to be simple and transparent, and to ensure fair pricing and contracts that do not exploit the purchasing power of large enterprises

Approach to maximising the benefits of supplying goods and services to tourism enterprises by the poor

- Slowly build the supply network starting with a few linkages and build on this
- Improve information networks linking suppliers and enterprises
- Offer enterprises assistance in selecting alternative local suppliers
- Encourage direct retailing of carefully sourced local products
- Provide assistance (business, technical advice, financial support) to suppliers to improve the quality and capacity of their production
- Set up specific projects to establish new or improved sources of supply
- Stimulate and support co-operative arrangements among small suppliers
- Set and promote industry ambitions or standards

3. DIRECT SALES OF GOODS AND SERVICES TO VISITORS BY THE POOR (INFORMAL ECONOMY)

Advantages to the poor

- A more assured engagement with the poor. Trading with the informal economy means that spending is more likely to reach poor people, rather than simply local people
- Ease of access by poor people, including both men and women
- Additional support for existing trading arrangements that often serve local residents as well as visitors, such as local markets

Challenges to address

- The quality of the product or service on offer, which can be very inconsistent
- Being able to give visitors some reassurance that what is offered is safe
- The chaotic nature of the competitive trading process, including hassling tourists which can be off-putting and sometimes threatening
- Seeking to reduce the involvement of children, to increase their chances of attending school
- Ensuring through fair pricing that neither the seller nor the buyer is exploited: either can be a consequence, for example, of bartering
- Reducing conflict with the formal economy, to enlist their support and cooperation
- Offering information and access arrangements that enable and encourage visitors to seek out opportunities to engage with the informal economy

Approach to maximising the benefits of direct sales of goods and services to visitors by the poor

- Support opportunities for the informal sector to organise and manage itself in new ways
- Training and capacity building to improve the quality, variety and appeal of the products and services on offer
- Strengthen the relationship between visitor flows and the location of trading points
- Licensing, linked to quality criteria that provide assurance to customers
- Access to simple support and advice, including finance
- Improve presentation and promotion, including points of sale
- Provide better information and education for tourists on how to meet and treat local traders
- Strengthen links with the formal sector to deliver mutual benefit
- Conduct research to improve the benefits that women derive from the informal economy

4. ESTABLISHMENT AND RUNNING OF TOURISM ENTERPRISES BY THE POOR - E.G. MICRO, SMES OR COMMUNITY BASED ENTERPRISES (FORMAL ECONOMY)

Advantages to the poor

- It places power and control in the hands of local people, including the poor
- It is about investment for the longer term
- It can allow enterprises to establish a scale of operation with sufficient presence to attract customers, of special importance when a journey to a new location is involved
- It enables enterprises to be started within communities that include the poor

Types enterprise development

- An individual enterprise, which may be family-based or employ others
- A group of enterprises within the same community, independently owned but benefiting each other
- A community owned enterprise, with benefits enjoyed by, or shared among, the community
- A private sector enterprise (local or incoming), where the community holds an interest that enables them to negotiate benefits through concessions or entering into a partnership

Challenges to address

- Availability of capital and appropriate sources of finance
- Lack of business skills, for establishing enterprises and for negotiating with others
- Particular problems for women in obtaining legal recognition, assistance and access to credit
- Poor infrastructure, including clean water and sanitation, energy sources, transport access and modern telecommunications
- Inadequate resources for ongoing maintenance and repair of infrastructure
- Poor access to markets, lack of market understanding and marketing skills
- For community enterprises, ensuring that income earned is equitably distributed

Pre-conditions for success

- Certainty about the inherent appeal of the particular products that will be created - will visitors want to come?
- A realistic assessment of the market potential and of access to markets – are there enough visitors who will come?
- Assurance of a general acceptance of tourism within the community, and plans in place to avoid negative environmental, social or cultural impacts
- Reasonable conditions for conducting business – political and legal framework, security, etc

Approach to maximising the benefits of establishing and running tourism enterprises by the poor

- Participatory planning of tourism activities
- Capacity building within poor communities
- Clarify or strengthen property rights
- Support communities in negotiating joint ventures with private sector businesses
- Provide communities with the knowledge and skills to determine and pursue their own enterprise development opportunities
- Develop business support schemes (training, advice and appropriate finance or micro-credit)

5. TAX OR LEVY ON TOURISM INCOME OR PROFITS WITH PROCEEDS BENEFITING THE POOR

Advantages to the poor

- All of the poor can benefit from tourism without each having to be engaged in the tourism industry, or any other related activity: resources can be directed to the most needy cases
- Significant sums can be raised in this way
- The mechanisms involved can be quite simple
- Benefit can be obtained from all types and sizes of tourism activity in whatever location

Challenges to address

- Ensuring that the industry and travellers are not deterred. It is very important that taxation levels should not act as a serious deterrent to investment or to the volume of visitor arrivals. This would reduce the overall ability of the country or local communities to earn the tourism income that could benefit the poor
- Taking care to avoid loss of tax revenue. Minimising the use of accountancy processes that allow multinational operators to reduce tax liabilities in destination countries; and ensuring that tax incentives are used judiciously as a means of attracting foreign investment
- Determining mechanisms for equitable distribution of any revenues raised, especially, at the local level

Approach to maximising the benefits of Tax or levy on tourism income or profits with proceeds benefiting the poor

- Review taxation policy at a national level, including possible tourist related taxation for use on poverty schemes
- Encourage more local level schemes to raise revenue for poverty related projects from admissions, levies etc. based on careful research and consultation with local stakeholders
- Transparency and consultation in the development of new local taxation schemes

6. VOLUNTARY GIVING/SUPPORT BY TOURISM ENTERPRISES AND TOURISTS

Advantages to the poor

- Awareness of poverty issues is raised amongst visitors and the travel trade
- Potential to raise quite significant amounts of support
- Beneficiary schemes can be selected that address very specific issues and to reach those most in need

Challenges to address

- Exercising sensitivity in the way that the process is put across to all concerned
- Avoiding token gestures. Tour operators and tourism enterprises should be encouraged to demonstrate real commitment to the projects that they identify
- They should first ensure that poverty related actions are in place their own businesses, including fair pay and conditions and supply chain management
- Involving local communities in the selection and management of beneficiary projects, as well as in the development and management of the basic schemes

Approach to maximising the benefits of voluntary giving/support by enterprises and tourists

- Improve knowledge of sponsorship and donation raising of tourism service providers
- Encourage operators to work together in local areas
- Work with NGOs to establish beneficiary schemes and then promoting these to operators
- Provide a range of support (funding, technical, access to material, etc...)
- Improve publicity to visitors on opportunities to support these schemes
- Demonstrate to donors how their money is used

7. INVESTMENT IN INFRASTRUCTURE STIMULATED BY TOURISM ALSO BENEFITING THE POOR IN THE LOCALITY, DIRECTLY OR THROUGH SUPPORT TO OTHER SECTORS

Approach to maximising the benefits of investment in infrastructure stimulated by tourism

- Involve local communities in tourism planning in their area at an early stage
- Use planning regulations to derive community benefits from any new development
- Profile tourism in infrastructure development programmes, nationally and locally

Annex 6 Destinations competing with Sikkim

- **Nepal:** Nepal receives some 400,000 international tourists a year and it is the country most associated with the Himalayas, at least from the Western tourist's perspective. With the highest peak in the world, it has positioned itself as 'The Rooftop of the World' and offers 326 peaks open for mountaineering. It has a very well developed trekking product. It also boasts a rich biodiversity and a very interesting culture. Over the last ten years Nepal has suffered a civil war which has hampered its tourism development. During the periods of unrest it is noticeable that the number of visitors to Sikkim increases.
- **Tibet:** Tibet receives a large number of tourists, mainly from China which is considered domestic tourism. In 2006, it received more than 2.5 million visitors, including 154,800 from overseas and in 2007 it received more than 3 million. By 2010, the region is expected to receive 6 million tourists from across the globe.
- **Bhutan:** Less than four decade ago, Bhutan was geographically isolated and followed a policy of self-imposed isolation. Today, Bhutan's tourism policy is based on the concept of 'high value – low volume' strategy. In 2006 Bhutan earned USD 24 million from 17,365 tourists. Indian tourists are not counted in this figure and significantly increase the number of visitors to the country. Over the last few years there has been substantial investment in the sector with the establishment of some high quality hotels.
- **Himachal Pradesh:** A recent article in the Times of India (24 August 2007) reported that Himachal Pradesh earned more than INR 10 billion (over USD 250 million) from tourism in 2006 and received over 7.5 million tourists including 200,000 foreign tourists, more than the 6.7 million population living in the state. It offers a well managed mountain and cultural experience with a variety of products guided by a strong Tourism Act.
- **Kashmir:** Jammu and Kashmir has a long tradition of domestic as well as international tourism. It offers beautiful sites, adventure tourism, in particular water sports, trekking and mountaineering, skiing, pilgrimage in particular to Srinagar as well as lake tourism. The Indian government is vigorously encouraging tourism to Ladakh. Kashmir has a relatively strong image in the international market which unfortunately has been marred by internal instability. Domestic tourism is growing though and the state is becoming increasingly popular for Indian tourists.
- **Uttarakhand:** Tourism is one of the fastest growing industries in Uttarakhand. According to the 2008 Tourism Development Master plan of Uttarakhand, the estimated number of tourist visits to the state during 2006 was about 9.13 million by domestic tourists and 0.1 million by foreign tourists. The great majority of tourists are pilgrims travelling for religious purposes to the Hindu and Sikh religious shrines and spiritual areas. Leisure and relaxation tourism mostly enjoyed by the domestic market is becoming important around the lakes of Nainital, the Kumaon hills and valleys as well as the different hill stations. The national parks offer excellent opportunities for ecotourism, bird watching and wildlife watching, especially Corbett National Park with its high population of tigers and the Valley of Flowers. Trekking, mountaineering and water sports such as rafting and canoeing are growing adventure tourism products and are potentially star products for the future in Uttarakhand.

- **Darjeeling and Kalimpong:** These are nearby, easily accessible hill stations. Darjeeling is a well established destination attracting up to ten times the number of visitors than Sikkim. However, recent political unrest is affecting tourism to these areas.
- **Arunchal Pradesh:** Less known than Sikkim, Arunchal Pradesh became an Indian state in 1987. It offers a comparable product to Sikkim including trekking opportunities, Himalayan Buddhist culture and monasteries and traditional tribes and cultures.

Annex 7 Environmental problems at tourism sites

Without an ecotourism policy to guide development in the sector, poor construction using inappropriate material and damaged by graffiti are evident throughout the state.

View point development at the 7 Sisters Waterfall in North Sikkim is made of concrete and is damaged by graffiti



Even recently built infrastructures are poorly maintained and look very run down





There is an urgent need for regular environmental clean-up at tourist sites.

Zero Point at the top of the Yumthang Valley in North Sikkim is ruined by littering



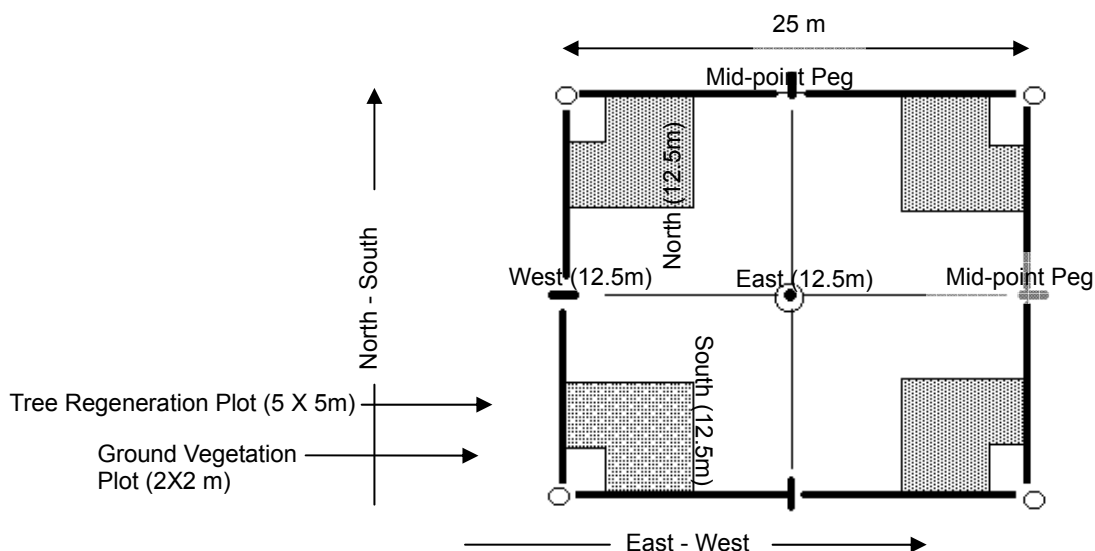
Annex 8 Formats for the rapid biodiversity survey

Sampling

A variety of methods exist for sampling vegetation. In this vegetation survey distribution of plots are predetermined along several transects throughout each park. To identify the characteristics of individual plants and their species, the vegetation survey team comprised of three persons, will investigate all accessible sites by using a GPS and mapping on the topo sheet. Each site (plot) will be measured by a quadrat. Of the three team members, one will be a recorder and two will be observers. The recorder will record data while the observers will measure trees and shrubs variables. Equipment required are a diameter-at-breast-height (DBH) measuring tape, two 50m tapes, four 25m nylon ropes (yellow/white), a altimeter, yellow enamel paint, clinometer, GPS, compass, clipboard, stapler and calculator.

The sampling site will be located using a GPS. Under a dense canopy, however, a GPS may not provide accurate reading. Therefore, in such a situation, any canopy opening nearby will be used to locate the sampling site. To lay out the a quadrat of 25 X 25m, the centre will be marked with a peg and painted yellow. Using a measuring tape in four cardinal directions from the centre, four pegs will be placed at a distance of 12.5m from the centre. These pegs are in the middle point between two corners of the plot. From each peg, the measuring tape will be run north-south or east-west for 12.5m to find four corners of the plot. All four corners will be marked with yellow paint for future reference. A yellow-coloured nylon rope will be placed all around the plot, which visually facilitates observation while measuring vegetation variables. Within this plot of 25 X 25m, all tree variables will be measured. All shrub variables will also be measured. In the alpine areas, the plot size will be reduced to 10 X 10m because of absence of trees and tall shrubs. Within the plot, there will be four 5 X 5m plots nested at the four corners of the plot. These are tree regeneration plots (shaded area). There will also be smaller four 2 X 2m plots to measure ground layer vegetation.

Figure 1 Layout of the vegetation plot



Sampling Procedures

The date, transect number, plot number, Lat/Long., Observer number, weather, ecological zone, forest type, elevation, slope, aspect, soil moisture, forest regimen, disturbance, and threats will be recorded. Details of plot variables are given on the next page. The tree diameter will be measured with a DBH tape at breast height (130cm). All trees with a DBH greater than 10cm will be measured. All trees will have their heights estimated. The total percent tree crown cover will be estimated using the reference map below. Shrubs will be grouped into tall (2 – 5m) and short (< 2m) types. All individual shrubs will be identified at the species level and their frequencies and percent cover will be noted within the 25 X 25m plot.

Table 1 Plot Variables

ECOLOGICAL ZONE 1. Moist Subtropical Zone 2. Subtropical Zone 3. Montane Zone 4. High Montane-subalpine Zone 5. Alpine Zone	FOREST REGIMEN 1. Natural 2. Tsmadrog/Pangzing 3. Tseree 4. Soksing/Others
FOREST TYPE 1. Subtropical 2. Warm Broad-leaved 3. Chir pine 4. Cool broad-leaved 5. Evergreen Oak 6. Blue pine 7. Spruce 8. Hemlock 9. Fir 10. Juniper-Rhododendron 11. Dry alpine scrub 12. Others	THREATS 1. Tsamdrog 2. Tseree 3. Timber extraction 4. Traps/Hunting/Poaching 5. Drainage of wetland 6. Roads 7. Others
SLOPE (Degrees) 1. Flat: 0 2. Gentle: 0 –5 3. Moderate: 6 –14 4. Moderately Steep: 15 –26 5. Steep: 27 –45 6. Very Steep: >45	STRATUM 1. Canopy 2. Sub canopy 3. Tall Shrub (2-5m) 4. Short Shrub (<2m)
ASPECT (Degrees) 1. N 338 -22 2. NE 23 -67 3. E 68 - 112 4. SE 113 –157 5. S 158 –202 6. SW 203 –247 7. W 248 –292 8. NW 293 – 337	TREE CONDITION 1. Live 2. Dying 3. Decay from Top 4. Down 5. Cut 6. Lopped 7. Others
SOIL MOISTURE 1. Extremely Dry 2. Dry 3. Moist 4. Wet 5. Very wet 6. Periodically inundated	EPIPHYTES 1. Abundant 2. Common 3. Occasional 4. Rare
CATTLE GRAZING 1. High 2. Medium 3. Low	HUMAN INFLUENCE 1. Critical 2. High 3. Medium 4. Low
	GROUND LAYER VEGETATION 1. Litter 2. Log 3. Moss 4. Lichens 5. Soil 6. Rock 7. Water

Annex 8 Formats for the rapid biodiversity survey

All four 2 X 2m ground vegetation plots nested at the four corners of the large plot will be used to assess herbaceous cover. All portions of the ground in the plot covered by different components will be estimated. Estimates will be made in increments of 10% (for example, 10%, 20%, 30% and so forth) for all components comprising more than 5%. All three team members will make independent estimates before reaching a consensus.

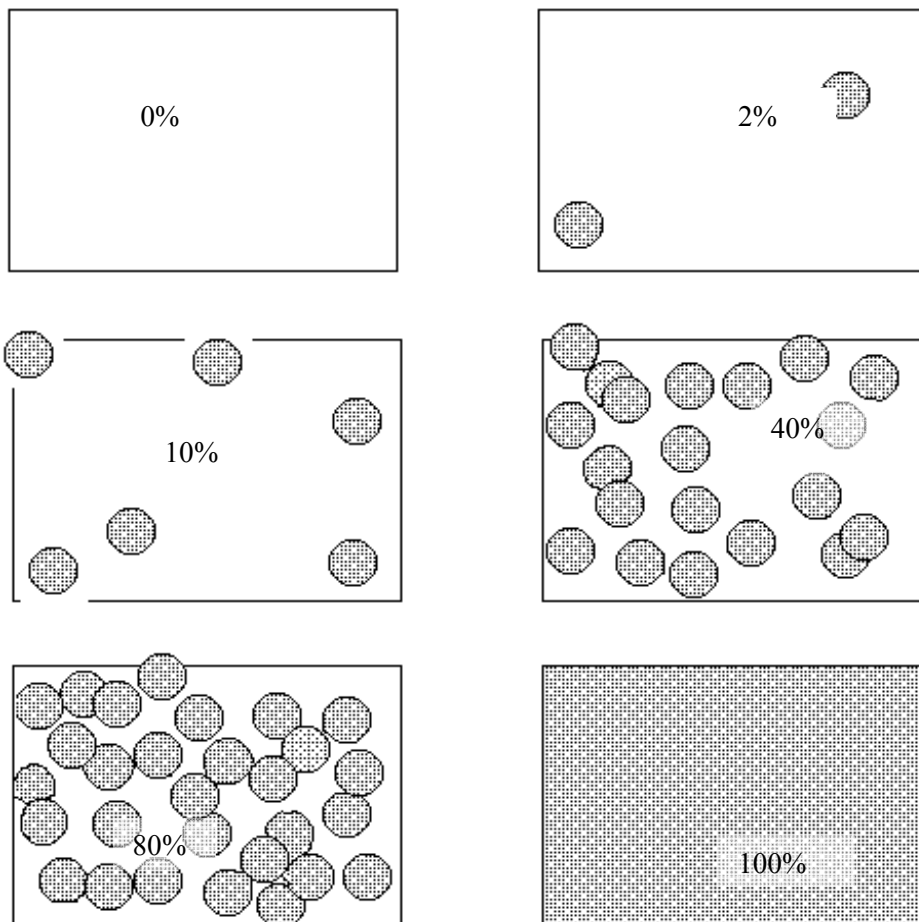
For measuring tree regeneration, four 5 X 5m plots will be nested at the four corners of the large plot. All young trees and saplings will be counted and recorded by species and size class. The size classes are: 1) 0.1m tall, 2) 0.1 - .499m tall, 3) 0.5 – 2m tall, and 4) >2m tall and <1.5cm DBH.

The vegetation team members may encounter species of concern on their way to the sampling sites or within any sampling plots. These species of concern may be of value for endemism, rareness, medicinal, and other ecological parameters. Hence, they should be treated carefully and their population, age structure and phenology should be noted along with GPS bearings.

Table 2 Key parameters for species of concern

1.	Local Name of the species of concern
2.	Location (GPS Bearing)
3.	Species population area
4.	Phenology (leaf/bud/flower/fruit/dormant)
5.	Approximate number (< 10, <50; <100; 100 –200; >200)
6.	Percent age structure (seedling, Juvenile and Mature)

Figure 2 Approximated percent crown cover value



Annex 8 Formats for the rapid biodiversity survey

Data Sheet

Date:
 Observer:
 Plot number:
 Elevation:
 Forest type:
 Aspect:
 Forest regimen:
 Threats:

PA:
 Transect:
 Lat/long:
 Ecological zone:
 Slope:
 Soil moisture:
 Human influence:
 Cattle grazing:

TREE MEASUREMENT					PA:	Page	of
Transect:		Plot number:			Percentage of tree coverage		
Stratum	Tree species	DBH	Tree height	Condition	Epiphytes	Remarks	

SHRUB MEASUREMENT		PA:	Page	of
Plot:		Transect:		Total shrub coverage
Stratum	Shrub Species	Local Name	Percentage	Remarks

GROUND VEGETATION MEASUREMENT			PA:	Page	of
Transect:			Plot:		Total herb coverage
	Ground cover type	Local name	Percentage	Remarks	

Annex 8 Formats for the rapid biodiversity survey

SPECIES OF CONCERN		Page	of
PA:		Transect:	Plot:
Species:		Local Name:	
Phenology: leaf / bud / flower / fruit / dormant		GPS:	
Approximate number:		Population area:	
Percent age structure: seedling / juvenile / mature			
Remarks:			

PA:		Transect:	Plot:
Species:		Local name:	
Phenology: leaf / bud / flower / fruit / dormant		GPS:	
Approximate number:		Population area:	
Percent age structure: seedling / juvenile / mature			
Remarks:			

PA:		Transect:	Plot:
Species:		Local name:	
Phenology: leaf / bud / flower / fruit / dormant		GPS:	
Approximate number:		Population area:	
Percent age structure: seedling / juvenile / mature			
Remarks:			

TREE REGENERATION		PA:		Page		of	
Transect:		Plot number:					
Species	No.	Regeneration class (height)					
		< 0.1 m	0.1 - .49m	0.5 – 2 m	>2m & <1.5 cm DBH		

MAMMAL SURVEY		PA:		Page		of	
Travel route followed:							
Transect:		Plot No:			Date:		
Species	Elevation	Number observed	Habitat	Regimen	Human influence	Grazing	

Annex 8 Formats for the rapid biodiversity survey

BIRD SURVEY		PA:	Page of			
Transect:		Plot No:		Date:		
Species	Elevation	Number observed	Habitat	Regimen	Human influence	Status

Annex 9

Cost estimates for proposed butterfly park and bird park

(1) Proposed butterfly park at Rangrang, North Sikkim

The total estimated cost for Phase I of the project is provided in Table 1.

Table 1 Cost estimate of proposed butterfly park at Rangrang, North Sikkim

Sl. No.	Item Heads	(INR) Amount in thousand
Phase-1 - Stage 1 - Preliminary Work		
1	Roadside Fencing	1,620
2	Roadside Compound Wall	190
3	Viewing Decks along the road	720
4	Entrance Gate	415
5	Security Cabin & Ticket Counter	230
6	Entrance Plaza	260
7	Carriage	245
Total		3,680
Phase-1 - Stage 2 - Main Development		
1	Information Center - Unit 1	900
2	Information Center - Unit 2	900
3	Research Centre - Unit 1	900
4	Research Centre - Unit 2	900
5	Green House	1,000
6	Staff Quarters - Type 2	850
7	Walkthrough Butterfly Habitat	55,000
8	Landscapae	3,000
9	Infrastructure	6,200
10	Carriage	3,500
11	Labour component escalation to suit current rates	4,750
Total		77,900
Grand Total		81,580

Annex 9 Cost estimates for proposed butterfly park and bird park

(2) Proposed bird park at Rabdentse, West Sikkim

The total estimated cost for Phase I of the project is provided in Table 2.

Table 2 Cost estimate of proposed bird park at Rabdentse, West Sikkim

		(INR)
Sl. No.	Item Heads	Amount in thousand
1	Extension to Information Centre	1,100
2	Facility Centre	1,550
3	Research Centre	1,500
4	Nocturnal Centre	1,850
5	Bird Clinic	1,500
6	Staff Quarters	850
7	Walkthrough Aviary	35,000
8	Landscape	4,000
9	Infrastructure	6,000
10	Carriage	3,500
Total 1		56,850
Add 17.65%(of 35% Labour Component)		3,512
Total 2		60,362
11	Consultancy Fees @ 4% of total Project Cost	2,412
12	Contingencies 3%	1,881
13	Monitoring and Evaluation @ 1%	604
Grand Total		65,259

Annex 10

Example of the functions of a marketing unit

This example is taken from the recommendations made in the 2007 Uttarakhand Tourism Development Master Plan commissioned by the central and state governments and executed by the United Nations World Tourism Organisation.

Redefining the marketing function at Uttarakhand Tourism Development Board (UTDB)

According to the Uttaranchal Tourism Development Board Act, 2001, the UTDB shall:

‘Undertake to promote publicity and marketing of tourism within India and abroad, with a view to attracting tourists to Uttaranchal and to this end also organize, and participate in, tourism related projects within and outside Uttaranchal.’

Currently in Uttarakhand, tourism marketing activities are carried out by a few part-time officers within the UTDB using a budget that has to be secured from the Department of Finance. Last year just two thirds of the required sum was approved, thus drastically reducing the resources available to launch planned marketing campaigns, a substantial proportion of which had to be cancelled.

To achieve the directive prescribed in the tourism policy it is essential that the marketing function is allowed to carry out its essential tasks without fear of having the budget it proposes each year slashed by the Department of Finance. Arguments have to be presented to the Department clearly explaining the real economic impact of increasing the number of tourist arrivals to Uttarakhand and why the required resources are vital to encourage people to visit the State.

Private sector ideas, needs and recommendations must be reflected in UTDB’s marketing effort. Three private sector members sitting on the board of the UTDB but located in Delhi do not effectively represent the private sector in Uttarakhand’s tourism industry. Therefore, to ensure that the tourism marketing of the State is not impeded by political whim and that a marketing strategy can be pursued over time without fear of budget cuts, an independent body responsible for the marketing function for the State should be created.

There are different models that can be adopted to achieve this. One model could take the form of a ‘Tourism Promotion Board’ which will be guided and therefore report to a board of directors comprising a mix of public sector and private sector stakeholders. These should be located and working in the State. It should be headed by a prominent private sector stakeholder, thus guaranteeing a degree of independence from the Government. The principal functions of the Tourism Promotion Board would be to:

- prepare the State’s strategic tourism marketing plan and annual tactical plan;
- undertake product improvement and expansion programmes in response to tourism demand;
- develop and manage the tourism information system comprising Tourism Information Centres (TICs), the Uttarakhand Tourism Website, and market research activities; and,
- direct and implement marketing efforts through strategically targeted actions elaborated in the plan.

Financing of the board could be a combination of public funds generated from the State budget and the Tourism Fund held by the UTDB as well as contributions from the private sector. These can be contributions in-kind; for instance, providing free accommodation and transport to visiting journalists on familiarization trips, reserving advertising space in brochures and leaflets or contributing to specific marketing campaigns.

Annex 10 Example of the functions of a marketing department

The board should be a legal body registered with the company registration organisation as a not-for-profit entity. A constitution should be drawn up, the board members identified and the board incorporated.

Another model is the one adopted by the Department of Tourism of Karnataka, which outsources tourism marketing activities to an advertising agency commissioned to act as a full-time promotion advisor and co-ordinator to the Government. The agency is required to undertake the following responsibilities:

- provision of strategic and operational inputs to promote tourism in Karnataka;
- preparation of various promotional plans and schedules;
- preparation of creatives and other necessary artwork/material;
- co-ordination with other parties for organising conferences, road shows and trade fairs;
- release of advertisements, representation/participation in various forms along with the Department of Tourism; and,
- carrying out of all public relations-based activities besides other plans and strategies for tourism promotion.

The selected agency is charged with the supervision, execution, and successful implementation of the said activities. The efforts are coordinated by the Department of Tourism and Jungle, Lodges and Resorts (JLR), the accommodation chain owned and independently managed by Karnataka Tourism.

The contract is awarded for a period of two years and this is the 5th year that this scheme has been running successfully. The agency reports to a director in the Department of Tourism but to ensure that the private sector is fully implicated, a series of workshops and focus groups are organised throughout the year and an event named ‘Connect’ is arranged annually involving the whole sector. Initially, the scheme met with some resistance from stakeholders but now it has proved its success and is fully endorsed by the sector.

The advantage is that there is a certain amount of continuity as strategic planning is typically for five years, allowing marketing strategies to be implemented over time and to take hold. Despite the two-year contracts, the selected ad agency is expected to follow the strategy previously agreed and to build on it. Apart from receiving a fixed fee, the agency earns from developing creatives, placing ads as well as from other activities. Because the agency is results-driven, its performance will guarantee further contracts and if it fails to satisfy the requirements it can be replaced by another agency. This provides a far more efficient method of ensuring that activities are carried out and that leads are followed up than in a situation where busy executives at the Department of Tourism are given the demanding tasks. The open tender every two years ensures that fresh ideas are constantly presented as agencies vie for the contract. The specific promotional activities that the agency is commissioned to carry out are presented in Table 1.

Table 1 Promotional Activities Required from Karnataka Tourism Advisors

Promotion Mode	Channels/ Target Audience
Exhibitions and shows	Venues for information display and distribution aimed at tourism industry stakeholders such as travel agents, hotels, and tourists
Public relations	All media exposure appearing as editorial, not as paid for advertising space
Familiarization trips	Educate and raise awareness through sampling – aimed at opinion-formers (e.g., tour operators, journalists)

Annex 10 Example of the functions of a marketing department

Distribution channels	Systems by which tourists might seek information, including computerized networks, information kiosks etc.
Promotion literature	Brochures, leaflets and other print media
Direct mail	Part of the wider activity of direct marketing
Sponsorship/special events	Community-based activities, sports and music events and 'good causes'
Media advertising	Press, radio, billboards and the internet; also tourist board and travel-related guides, books and brochures that sell advertising space, television etc. including those for ambient media (e.g. advertisements on back of tickets, passes, etc.)

Source: Selection of Tourism Promotion Advisor and Coordinator for Karnataka - Department of Tourism – Government of Karnataka(2006)

The State of Kerala, one of the foremost tourism destinations in India, operates a similar system. In fact, Karnataka's initiative is based on an original Kerala scheme.

Creating an independent tourism promotion board and outsourcing key activities

It is important that the Uttarakhand Tourism Development Board has firm control of the marketing function and is fully up-to-date with the activities as they are carried out. Therefore, it is recommended that a mix of the two models above is adopted in Uttarakhand. A recommended model should have the following characteristics:

- 1) the creation or separation from the UTDB of the marketing unit, which would report to a Board comprising a mix of public and private sector stakeholders and headed by a Chairman from the private sector; and
- 2) the commissioning of an agency or agencies to advise on tourism strategy as well as on marketing and promotional activities which will also carry out some of the functions outsourced by the unit or in collaboration with the unit.

In order to efficiently employ the tools and apply the techniques described in the next section, the marketing unit at the newly created Uttarakhand Tourism Promotion Board must be staffed by well-trained professionals.

Ideally, the unit will comprise different functions with full-time qualified employees. The unit should be headed by a Marketing Director and include the sub-divisions illustrated in the organisation chart in Figure 1. However, as much of the work will be outsourced, the staffing should be kept to only senior executives who will oversee and evaluate the work of contracted agencies and provide them with guidance when necessary.

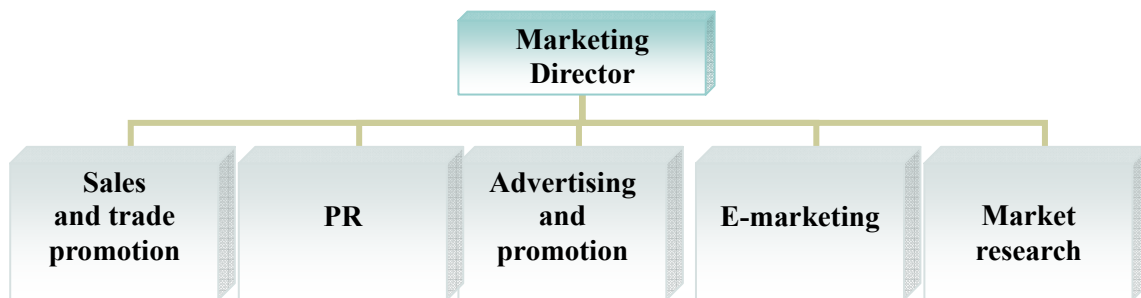


Figure 1 Organisation of the future Marketing Division at the UTDB

Some of the functions may be carried out by the same managers, at least initially until tourism growth in Uttarakhand warrants a separation of the tasks. However, a job description for each of the subdivision is present here, irrespective of whether the activities are carried out in-house or outsourced.

The *Sales and Trade Promotion manager* will be responsible for keeping close relations with stakeholders in Uttarakhand and with tour operators in tourist generating countries. Many of the required activities may be outsourced. The manager and the selected agency will have the following responsibilities:

- Maintaining a continuously up-dated database of tourism stakeholders in Uttarakhand and maintaining a regular relationship with them;
- Recording changes in the structure and make-up of the Uttarakhand tourism sector and reporting these to the marketing director on a regular basis;
- Maintaining a continuously up-dated database of tour operators and other service providers from generating markets with links to tourism in Uttarakhand and maintaining a regular relationship with them;
- Recording events and changes concerning tour operators in tourist generating countries and reporting these to the marketing director on a regular basis;
- Regularly attending trade fairs;
- In collaboration with the PR manager, organising farm trips with tour operators and travel agents from generating markets;
- Developing and keeping updated the sales manual
- Collaborating with the advertising and promotion manager as well as the e-marketing manager to ensure representation in advertising material and to secure sponsorship for the various campaigns;
- Collaborating with the advertising and promotion and the PR manager in the production of the Uttarakhand Tourism Newsletters;
- Keeping a photo library to assist Uttarakhand stakeholder marketing.

The *PR manager* is the ‘face’ of the Uttarakhand tourism sector and represents the destinations in the market place. Many of the required activities may be outsourced. The manager and the selected agency will have the following responsibilities:

- organising seminars, meetings and press conferences on specific events in the State;
- participating in exhibitions and seminars to lobby NGOs and the media;
- organising and participating in trade fairs;
- holding meetings with editors of Indian and relevant foreign publications on a regular basis to generate articles on tourism in Uttarakhand;

Annex 10 Example of the functions of a marketing department

- writing articles and sending them to the media;
- organising familiarisation trips with journalists, tour operators and travel agents (in collaboration with the sales and promotion executive);
- preparing a media kit for journalist enquiries;
- periodically sending a newsletter to the media, to tourism service providers linked to Uttarakhand tourism, and to specialist associations as well as to embassies, consulates and to tourist offices around the world;
- answering critical articles in newspapers and other media;
- collecting news items and distributing them to the relevant departments at the UTDB and at the Ministry of Tourism;
- providing new information about tourism to the local community; and,
- contributing to tourism awareness programmes.

The **Advertising and Promotion manager** will work in collaboration with the selected agency to carry out the following activities:

- developing brochures, leaflets, CDs, videos and promotional material for print media and for road shows;
- selecting appropriate distribution channels focusing on target markets;
- in collaboration with the PR and sales managers, developing and sending a newsletter to selected media, inbound service providers, stakeholders and relevant interest groups;
- organising print media, radio and television when necessary;
- purchasing, supervising, creating art work, films etc.;
- planning and scheduling media;
- buying domestic and international media;
- setting up contests, coupons, or give-aways (with the PR manager);
- participating in trade fairs, road shows and public events and meetings with other members of the marketing team.

The **E-Marketing manager** (or the Online Marketing Manager / Web Marketing Manager) manages and delivers the marketing strategy for the Uttarakhand website. He or she will provide the creative look of the site delivering consistency of messages and brand images whilst supporting the growth of tourist traffic. E-commerce will support the private sector's efforts and direct enquires and reservations. Specific responsibilities will include:

- developing an e-marketing strategy;
- implementing the annual e-marketing plan, taking into consideration overall marketing objectives;
- taking overall responsibility for the design and content of the website, including driving traffic and developing the e-commerce functionality of the site;
- leading the production of web contents, including liaison with buying, design and marketing to ensure that the website supports current products and marketing initiatives;
- building an e-database; and,
- managing the web contents, budget control and reporting, delivering the marketing plan for e-commerce as well as composing and editing editorial copy.

The **Market Research manager** must work with the Statistics department of the UTDB and ensure the data needs of the marketing unit. Much of the work can be outsourced to a specialist research agency. He or she will have the following responsibilities:

- collecting and analysing data on customer demographics, preferences, needs, and buying habits to identify potential markets and factors affecting product demand;

Annex 10 Example of the functions of a marketing department

- preparing reports of findings, illustrating data graphically and translating complex findings into written text;
- measuring and assessing customer satisfaction;
- forecasting and tracking marketing trends, analysing collected data;
- seeking and providing information to help stakeholders determine their position in the marketplace;
- measuring the effectiveness of marketing, advertising, and communications programmes and strategies;
- conducting research on consumer opinions and marketing strategies, and collaborating with marketing professionals, statisticians, pollsters, and other professionals;
- providing management with information and proposals concerning the promotion, distribution, design, and pricing of products or services applied in the sector;
- gathering data on competitors and analysing their products, prices, and method of marketing and distribution;
- monitoring industry statistics and following trends in trade literature;
- devising and evaluating methods and procedures for collecting data as requested by the marketing unit (such as surveys, opinion polls, or questionnaires), or arranging to obtain existing data;
- developing and implementing procedures for identifying advertising needs; and,
- directing trained survey interviewers

At the tourism zone level, officers should be trained to carry out basic marketing activities and entrusted with interfacing with the public (tourists as well as stakeholders) to provide them with information and to collect relevant information that the marketing unit will be able to use. In particular, the tourism zone officers will inform about events, activities and general tourism trends in their respective areas.

Source: Government of India, Government of Uttarakhand, UNDP, UNWTO. *Uttarakhand Tourism Development Master Plan, 2007–2022*. (2008). Dehradun: Author.

Annex 11
Festivals that could be considered for support by the Ecotourism Marketing Cell

Festival	When and where	Significance
Lossoong	Around the last week of December; all over Sikkim.	Sikkimese New Year
Kagyat dance	Around Lossoong; at Enchay Monastery, Limdung Monastery, Pemayangtse Monastery, Phodong Monastery, etc.	Dance symbolises the destruction of evil forces and augurs peace and prosperity.
Maghe Sankranti	Mid-January; in Jorethang, Rimbi	Nepali harvest dance
Guthor Chaam	Around February; at Rumtek	Also called winter dance
Saga Dawa	Full moon day in May or early June; on Gangtok and other places.	
Pang Lhabso	Around August; in Gangtok and Rabong	To worship Mt. Khangchendzonga as well as to commemorate the conclusion of a treaty of blood brotherhood between the Lepcha and Bhutia
Tendong Lho Rum Faat	Around August; In Gangtok, Dzongu, and others	Lepcha festival in honour of Mt. Tendong

Annex 12

Potential sources of funding for the Ecotourism Marketing Cell

Funds to fund the Ecotourism Marketing Cell (EMC) can come from a variety of sources.

- **Government allocation of public funds:** This is a direct budget contribution for all or a proportion of the funds needed from the public sector – either from the central government or from the state government. This may be taken from the Tourism Fund if this exists in the state or from general taxation or taxation levied on the sector countrywide.
- **Raising of local hotel taxes or levies:** This may take a variety of formats such as a levy on hotel room occupation in the area. This can be legislated or voluntary and simply administered as it can be incorporated into existing sales tax collection procedures. This measure is not popular with the hotel sector which feels that it is being singled out to subsidise other businesses. However, it would be good revenue for the EMC. A bed levy (a tax per person rather than per room) would generate more revenue.
- **A wider tourism tax:** This system may be seen as fairer because it involves a greater number of businesses. Therefore, the tax could be lower as it is spread wider. The difficulty, however, is to obtain consensus on which firms are in the tourism or recreation industry and therefore it is complex to administer. For instance, bars that do not cater to the tourism sector may object to being charged a tax.
- **Membership fees paid by firms in the tourism sector:** This is a popular method of generating funds for the EMC but tends to work best in destinations where tourism is well established. The problem with this system is that, unless membership is compulsory, firms have to be convinced that membership provides them enough benefits. There is also the problem of ‘free riders’, i.e., firms that do not become members still benefit from the increased number of tourist arrivals. The key is to ensure that there are strong enough benefits from becoming a member. For instance, in terms of advertising services, representation at trade fairs, preferential treatment during events, regular meetings and networking sessions, guest speakers, strategic planning mentoring for their businesses, workshops and training etc. should be offered.
- **Private sector sponsorship alliance:** Firms benefiting substantially from visitors to a tourist destination agree to donate a percentage to the EMC in return for prominent advertising visibility throughout the destination and in promotional programmes. These firms, such as in credit card business, alcoholic beverages and gasoline retailing, are not necessarily part of the tourism sector but benefit from tourists buying their services. However, this system does not always provide long term stable revenue for the department.
- **User fee, sponsorship and advertising:** This is where firms pay for the department’s services that they use, for instance, by sponsoring events and promotional activities for prominent advertising, advertising in tourist publications or paying commissions for bookings and sales (i.e. the department through the TIC takes hotel bookings for which the hotel pays a commission).
- **Commercial/retail sales at TICs:** The department can generate funds by selling goods and services via the Tourist Information Centre. These include books and maps, excursions and guiding services.

Annex 12 Potential sources of funding for the Ecotourism Marketing Cell

- ***Contributions in-kind:*** Stakeholders can relieve the burden on the department's budget by providing contributions in-kind. For instance, free transport and accommodation for tour operators, travel agents and journalists invited to the state by the EMC can be included in such contributions.
- ***Allocation from gambling and lotteries:*** The Government can set up a public lottery and use the profits to fund the department or levy a tax on gambling. However, in India this may be a contentious method, although Sikkim allows limited gambling which is to be expanded.

In practice, a combination of these methods may be used to generate enough funds to ensure that the Ecotourism Marketing Cell has sufficient operating capital to perform its work effectively and to recruit more staff in the future.

Whilst not all of these methods are suitable now nor will they be suitable in the future for Sikkim given the specificities of the State and its political and economic environment, it is important that relying on donor agencies to provide the department's operating funds is viewed as a short-term solution and that a self-financing scheme needs to be established in the shortest delay.

Annex 13

Survey of ecolodge economics and finance

The following is a summary excerpted from the study that Elizabeth Halpenny and Ed Sanders prepared in 2008 for The International Ecotourism Society (TIES). The study is titled *The Business of Ecolodges: A Survey of Ecolodge Economics and Finance* and can be purchased from TIES. The study was based on the results of a survey of 121 ecolodges completed the year before. Ed Sanders notes that ‘the sample is too small to be statistically reliable and it only covers the ecolodge segment of the ecotourism industry, but the report is important as it reflects the first-ever systematic survey of ecolodge financing.’ The following findings are probably the most relevant to the Financing Sustainable Tourism Conference.

The typical ecolodge is quite small, averaging less than 15 rooms. The cost for the ecolodges averaged USD 1 million for new construction and USD 3 million for replacement value (which reflects subsequent add-ons). This size range is too large for most individuals to finance, but too small for most institutional investors, thus creating an inherent financing problem.

Size distribution by number of guest rooms

Number of rooms	Developed country	Developing country	Total
1-15	70%	57%	60%
16-30	13%	32%	27%
>30	17%	11%	13%
Total of Group	100%	100%	100%
Lodges Reporting	30	89	119

Given this size range, it is not surprising that the bulk (almost two-thirds) of the financing has come from the owner’s own equity or from friends and family. Commercial bank loans have been relatively unimportant (especially in the developing countries) and governments have been almost non-existent players in ecolodge financing.

Sources of financing for ecolodges

Financing Source	Developed countries	Developing countries	Combined
Owner’s own funds	57%	58%	58%
Friends and family	1%	8%	6%
Other equity investors	10%	19%	9%
Commercial bank loans	21%	11%	14%
Government loans	3%	2%	2%
Private loans	5%	4%	4%
Other sources	4%	9%	7%
Total for group	100%	100%	100%
Lodges responding	25	74	99

One may be surprised to find that less than 20 percent of the ecolodges were primarily built at one time, with almost 60% built incrementally over time. However, this is not surprising because of the heavy reliance on owner’s own funds to build the resort, suggesting that most started small and were expanded as cash flow allowed.

Timing of construction

Primarily Built	Developed Country	Developing Country	Total
at one time	23%	17%	18%
in two stages	17%	24%	22%
incrementally	60%	59%	59%
Total for Group	100%	100%	100%
Lodges Reporting	30	87	117

The general financing problem associated with small ventures has been compounded by the wide variability in the profitability of ecolodges. An astounding 45% of the ecolodges in the developing countries reported that they were operating at a loss (although the number of lodges is too small to be statistically reliable). Nonetheless, this suggests that many ecolodge operators may be in the business for 'lifestyle' rather than profit maximization reasons, which is likely to scare off many potential investors. On the other hand, a significant number (17%) of the lodges were highly profitable, with revenues of over 20% on sales (which compares to the 6-7% profitability in the U.S. hospitality industry).

The study tried to identify the primary determinants of profitability, such as size and age of the establishment, occupancy rates, ownership arrangements, and room rates. Occupancy and room rates appeared to have some influence but not much. This suggests that each ecolodge has to be evaluated on its own merits and that industry averages are of limited applicability, thereby making it even more difficult and expensive for investors and lenders to decide whether to support any given venture.

Industry profits as a percentage of total revenues

Profits	Developed Countries	Developing Countries	Combined
Loss	45%	26%	31%
0 to 10 %	31%	26%	28%
11-20%	10%	30%	24%
Over 20%	14%	18%	17%
Total for Group	100%	100%	100%
Lodges Reporting	29	73	102

As an answer to the question: what the single most important obstacle to increasing profitability was, by far the most common complaint (23%) was lack of financing to expand, which is probably a proxy for lack of investment capital.

The next most common complaint (15%) was lack of financing for marketing, which is probably a proxy for operating capital. These two concerns far outweighed the other eight categories, with difficulty of attracting tourists (10%) and extreme seasonality (10%) being the next most important obstacles identified by the respondents.

These summary findings suggest that if the industry is to grow, ways must be found to: help aspiring ecolodge developers to realistically assess their potential for accessing various types of financing; help them to prepare well-documented requests for financing that meet the requirements of potential investors and lenders; and, encourage the growth of special financing programs by government agencies and non-profit organizations to meet the special needs of small scale ecotourism ventures.

Source: Sandars, Edward G. and Halpenny, Elizabeth A. (200). *The Business of Ecolodges: A Survey of Ecolodge Economics and Finance*. Burlington: The International Ecotourism Society.

Annex 14

Hotel management contracts in Europe

By Elana Bader and Amir Lababedi

A hotel management contract, also known as a management or operating agreement, is an arrangement whereby a hotel's owner contracts with a separate company, or an operator, to run a hotel.

By doing so, the owner retains limited control over the operation of the asset often through measurable performance standards albeit that the owner retains more risk than if the hotel were leased to the operator.

An operator, or hotel management company, hired to run a hotel business will provide supervision, expertise, established methods and procedures and normally also a track record of verifiable past performance. The operator runs the hotel for a fee according to specified terms negotiated with the owner; the most common of these terms are described below in more detail. Such an agreement generally aims to maximise the return on investment (ROI) for both the operator and the owner (typically an 'investor owner'), places the operational risk of profit and loss on the owner, and can affect the asset value in a positive or negative way depending on the quality of the operating company and market conditions.

As a result of a gradual shift in hotel investment trends over the past 20 years, owners have developed a much greater understanding of the hotel operation, and have become more sophisticated in their selection of operators and in the negotiation of contract terms, often with the help of specialist advisory firms. It has become increasingly common in recent years for institutional and financial investors and private equity funds to invest in hotel assets. Such investors typically aim to separate ownership of the physical hotel asset from operation of the business.

In addition, the investment interest and associated increase in the amount of capital available for hotel investment from this wider pool of investors has further contributed to the increased sophistication of hotel investors, who often have in-house hotel asset managers or engage speciality consultancies or asset management companies to obtain peak performance from the operator.

The second major influence on the evolution of management contracts in Europe has been driven by the continued consolidation and globalisation of the industry. This expansion of major global brands into Europe has inevitably led to an increase in competition among operators, and has consequently led to the 'balance of power' shifting more towards the owner rather than the operator, whereas the reverse has historically been the case.

Management Contract Terms

A typical hotel management contract consists of a mix of commercial and legal terms. Some of these terms have an immediate and lasting effect on the likely cash flow to the owner and the performance and manageability of the selected operator. We have highlighted the following terms, which are described in more detail below.

- Term;
- Operating Fees;
- Operator Guarantees;
- Performance Measures;
- Owner Approval;

- Capital Expenditure;
- Non-Compete Clause;
- Dispute Resolution;
- Termination, including Early Termination.

Term

The **initial term** of a management contract is the length of time that the agreement is to remain in effect. Initial terms usually last 10, 15 or 20 years, depending on the brand and positioning of the operator selected. Well-respected upscale operators, such as Four Seasons Hotels & Resorts and Ritz-Carlton, can generally command much longer initial contract terms of the order of 50 years.

Renewal terms generally extend the total length of an initial term. This is commonly done by mutual consent and is rarely unilateral. In general, renewal terms occur in multiples of five years, occasionally ten. Most contracts offer two terms (sometimes more) on the condition that six months' written notice is given prior to the end of the current term.

There has been a noticeable decrease in the average length of initial terms across Europe from a historical average of 20 years towards a current average of 15 years. This shift can be attributed to the following factors.

- An increase in hotel investment in emerging markets, such as those in Central and Eastern Europe, and the associated risks, have led both owners and operators to negotiate contracts with shorter initial terms in order to provide the opportunity to exit in the event of disappointing market conditions;
- The proliferation of private equity vehicles in the hotel investment arena in recent years has placed pressures on operators to offer more competitive, shorter initial terms but more renewal options;
- Increasing competition among hotel operators seeking to broaden their distribution network.

Operating Fees

An operator will typically receive remuneration from the owner, often termed a **base fee**, in exchange for performing the duties specified in the contract. Base fees typically range from 2% to 4% of total revenue. In addition to the base fee, an operator usually receives an **incentive fee** based on a percentage of profits. This may be curtailed, for example, until profitability reaches a certain threshold, or until minimum return requirements to the owner are met (typically related to debt service). These incentive fees are typically related to one of the following.

- Gross operating profit (GOP) before the deduction of base management fee (although this is rare);
- Adjusted GOP (calculated by deducting the base management fee from the GOP);
- Net operating profit (NOP) after deduction of some or all fixed charges, for example building insurance, property taxes, reserve for replacement of furniture, fixtures and equipment (FF&E), or rents payable;
- NOP after deduction of some or all fixed charges and an owner's priority return. In this event the percentage fee payable to the operator is sometimes higher.

A growing number of operators accept lower base fees in return for higher incentive fees of up to 15% of GOP, which are intended to reward operators more generously for outperforming agreed targets.

While a set incentive fee of about 10% of GOP was typical, it is becoming increasingly common to have

scaled incentive fees. The tendency towards higher or scaled incentive fees versus higher base fees rewards effective operators but also increases the proportion of free cash flow to equity in the event of poor operator performance.

Other fees and charges typically relate to contributions to the operator in respect of, inter alia, reservation systems, sales and marketing contributions or assessments, accounting charges, purchasing costs, and license or franchise fees. These fees are often set as a percentage of rooms' revenue, and typically range from 1% to 4% of gross rooms revenue.

Operator Guarantees

An operator guarantee ensures that the owner will receive a certain level of profit. In the event that this level of profit is not achieved by the operator, the operator guarantees to make up the difference to the owner through their own funds. For example, if the contract states a guarantee of €1,000,000 per annum, and the operator only achieves €800,000, the operator will then make up the remaining €200,000 from their own funds.

It is typical when such guarantees exist that there is a provision for the operator to 'claw back' any payments made under a guarantee out of future surplus profits. Equally typical is the tendency for the operator to place a limit ('cap') on the total guaranteed funds within a specified number of years.

Operator guarantees are not to be confused with owner priority returns, which reflect a hurdle of a particular performance (such as GOP) to the incentive fee. For example, if the owner priority return is equal to €1,000,000 and the GOP achieved in a particular year is €800,000, then the operator will not receive an incentive fee. If the GOP in a particular year is €1,200,000, then the incentive fee will be payable.

Where the operator fails to receive an incentive fee this is sometimes referred to as a 'stand aside'. Some contracts allow for this to be paid once future profits are earned to cover the shortfall.

The current trend is for a shift away from operator guarantees. Since the events of September 2001, operators have been placing limits on guarantees to exclude force majeure factors in order to cover their future liability. In addition, the various public company scandals in recent years, such as Enron, have led to more caution among listed hotel groups taking on liabilities that are dependent on the performance of other parties. As such, operators will generally require higher fees in return for an operator guarantee and this may not always be cost-effective for the owner. In addition, most contracts will include a cap on the level of operator guarantee, as noted above.

Performance Measures

There are typically two types of performance tests, and often both are used jointly.

- Room revenue per available room (RevPAR) of the subject hotel as a percentage of a mutually agreed competitive set;
- If the GOP achieved for an operating year is less than a pre-agreed percentage of GOP.

Some experts consider that RevPAR is not always a reliable performance measure. Unscrupulous operators can artificially inflate RevPAR performance to meet required standards as such a criterion (RevPAR) might tempt the operator to focus on the revenue line at the expense of profit margins.

Should a force majeure or other similar event happen that is beyond the operator's control then the performance test may not be applicable for that year.

Default at the hand of the operator is usually only possible if either or both tests have been failed over two consecutive years. A performance test frequently only commences from performance stabilisation of the hotel.

Usually the operator negotiates a ‘right to cure’ clause, allowing for the payment of funds to achieve minimum GOP. This ‘right to cure’ can be restricted by the owner to allow termination of the agreement.

Owner Approval

Approval clauses set out the extent to which the consent of the owner is required for decisions affecting the operation of the hotel. These typically include budget, employment of key management positions, outsourcing, capital expenditure, and leases and concessions.

This allows the owner to remain involved with key decisions which could affect cash flow and also allows for cost transparency. In addition, if stipulated, an owner can place restrictions on expenditure (for example, those relating to purchasing systems, concessions or leases).

Owner approval of the annual budget is usually negotiated, but such approval may depend on the conditions of the performance test, and may therefore exclude certain line items.

If a dispute occurs, a dispute procedure is commenced, ending in an arbitration process with an independent expert.

An operator has the responsibility of hiring and training the line-staff **personnel**. In a significant proportion of management agreements, owner approval is only required for the hiring of senior management, such as the general manager, financial controller or director of sales and marketing. In most cases, the owner remains the employer of the hotel’s staff. This enables continuity of employment – and the hotel’s operation – in the event that the contract is terminated. Some senior management may be employed by the operator with the payroll for those staff being charged back to the hotel operation.

An **outsourcing** clause affects the decisions involving the appointment of an external service provider in relation to the hotel’s operations, such as housekeeping or engineering services. The terms of such contracts are usually no longer than 12 months. Owner’s consent is rarely required, unless the contract is significant and above a certain hurdle amount (similar to capital expenditure, where consent is required) or for longer than 12 months.

Leases and concessions relate to the leasing out of hotel space to third parties, such as restaurants, spas, gift shops, beauty salons or retail outlets. Most owners will require restrictions on such agreements as perpetual agreements or longer-term agreements may complicate a future sale, and may not always be the most profitable use of the space in the first place.

Capital Expenditure

The **FF&E** of a hotel are often exposed to heavy use and must be replaced at regular intervals. Periodic replacement of FF&E is essential to maintain the quality, image and income potential of a hotel. As such, a ‘sinking’ fund is set up to accumulate capital for the periodic replacement of FF&E, typically a percentage of gross revenue.

Included in this category are all non-real-estate items that are typically capitalised rather than expensed, which means they are not included in the operating statement, but nevertheless affect an owner’s cash flow. The percentage of FF&E reserve is somewhat dependent on the positioning of the hotel. In general, however, hotel management agreements typically provide for a reserve for the replacement of FF&E of 3-5% of total revenue.

Typically, capital improvements are divided into routine capital improvements (which are funded through the FF&E reserve account), which are required to maintain revenues and profits at their present levels, and discretionary capital improvements (also called ROI capital improvements). These latter capital improvements are investments that are undertaken in order to generate more revenue and profits, such as the conversion of offices into meeting rooms. The latter require owner approval and are in addition to the funds expended from the reserve account.

Within a management contract the obligation falls upon the owner to provide funds to maintain the hotel according to the relevant brand standards. If management elects to postpone a required repair, they have not eliminated or saved the expenditure, but merely deferred payment until a later date. A hotel that has operated with a lower than normal maintenance budget is likely to have accumulated a considerable amount of deferred maintenance. An insufficient FF&E reserve will eventually negatively impact the standard or grading of a property, and may also lead to a decline in the hotel's performance and its value.

Non-Compete Clause

An integral component of a market area's supply and demand relationship that has a direct impact on performance is the current and anticipated supply of competitive hotel facilities.

By including a non-compete clause in a management contract, an owner has an assurance that no other property with the same brand is allowed to open within a certain radius of the subject hotel, typically for the whole duration of the agreement or at least for a defined period, in order to minimize or even pre-empt any form of cannibalisation either from the same brand or another brand of the same company. Depending on the location, size of the city and the type of brand, this may vary significantly. More up-market brands typically have a larger radius than budget and mid-market hotels.

Additionally, operators with a larger portfolio of brands may be able to negotiate the exclusion of certain brands, or the exclusion of all brands but for a shorter length of time.

Negotiations for the determination of the non-compete clause may centre on the following.

- Those brands that will be included in the exclusion clause;
- The term of the exclusion period;
- The provision of an impact study to help determine whether there will be a material effect on the hotel's occupancy and/or average room rate arising from the establishment of a similarly branded hotel.

Dispute Resolution

Typical disputes between a hotel owner and the operator may involve the budget, the performance clauses, the capital expenditure required or changes in management. Key dispute terms that need to be considered are listed below.

- Arbitration – That is, when will the arbitration process occur, who will arbitrate, and so forth;
- Expenses – Who will pay for the dispute process;
- Jurisdiction and Venue – Where will the legal proceedings take place, and which laws and legislations will preside;
- Severance.

Disputes may be resolved in several ways, although they are most often resolved through arbitration or an independent expert; in some cases they may also involve the courts.

Termination

Each party may terminate an agreement for a variety of reasons; typically included are bankruptcy, fraud, condemnation, performance not met and, sometimes, sale. We have focussed on two of these: termination on sale and termination without cause.

Termination on sale provides the owner the opportunity to realise the investment, and sell the hotel unencumbered, therefore potentially achieving a higher sales price, whilst also offering more flexibility to the owner and any potential investor. There is typically a sliding scale of compensation paid to the operator, based usually on a multiple of average annual fees earned. The scale reflects the number of years remaining but is often in the range of one to three times.

Termination without cause is designed to achieve a dignified end to a contract. A similar compensation structure would apply. Many operators are reluctant to accept such a condition and it is rarely incorporated into an agreement that also includes an operator guarantee. When included, this clause allows for the termination of an agreement because of default due to, for example, force majeure.

Power Balance

The increase in the number of hotel operators and expansion of global hotel brands into Europe has placed pressure on operators to offer more competitive terms to owners. At the same time, owners have become more knowledgeable and savvy when negotiating management contract terms as the increased sophistication of hotel investors has led to a better understanding of hotel operations.

The combined effect has been that the balance of power has largely shifted more in favour of the owner when contracting with many operators. Owners can now negotiate terms which increase their control, flexibility and leverage in the business and finances of operating decisions, while operators face more performance tests and incentives. Owners are increasingly thinking beyond profit and loss and have become more involved in key decisions, although there is still an obligation to limit this to key matters and not to interfere with the day-to-day running of the business.

Notwithstanding this, we consider that the most desirable outcome is to achieve a 'win-win' between owner and operator, with neither suffering from unduly onerous conditions and each party fully appreciating the needs of the other.

Sale and Manage Back Deals

Reducing asset intensity, also known as separating the property ('the bricks') from the operation ('the brains'), has become a key reason for hotel operators divesting of their property interests in today's market. By selling hotel assets with a management contract in place, hotel operators have gained a considerable sum of capital that can be put towards refurbishment of retained assets, used to fund acquisition and development activity in new markets and brands, or that can be returned to shareholders, as well as reducing their exposure to risks associated with asset ownership.

In addition, the emergence of property, institutional and private equity investors, as proven by the weight of capital invested in the sector in 2005 and 2006, confirms the increasing acceptance of hotels as a mainstream asset class.

These two developments, along with the compression of hotel property yields, have created a very attractive market for sale and manage back deals. In recent years, a significant proportion of hotel transactions were prominent sale and manage back deals; this trend is expected to continue.

Another, partly related trend is the emergence of 'manchises', whereby hotel owners engage a hotel

operating company for an initial period of time, say three to five years, after which the contract reverts to a franchise contract whereby the owner assumes management responsibility and retains the operator's brand, for which an annual franchise fee is payable. To the outside world there is no apparent change. This is particularly advantageous to help hotel operating companies launch new brands, enabling string operating controls to be made in the initial years as the brand is going through its 'ramping up' period.

Lease Implications

Concerns have been raised regarding the theoretical legal interpretation of hotel management contracts and whether they could potentially give the operator sufficient rights to be considered a lessee. This would be an issue in countries which place social and employee obligations on a lessee, such as France or Belgium, or where tax issues come into play, such as in the UK.

According to Bruce Parmley, a partner with law firm Hogan & Hartson, a management contract would normally only be considered a lease if the operator carries the risk of the business. Management contracts normally clearly state that the agreement is neither a venture, partnership agreement or a lease, thereby ensuring that, from a legal perspective, the agreement cannot be interpreted as a lease.

Conclusion

The increased knowledge of owners and their understanding of market dynamics, together with the surge of brand operators intensifying competition in today's market through consolidation and globalisation, enable owners to be in a much stronger bargaining position when negotiating management agreements. As such, pressure has been placed on operators to amend agreement terms that were historically in their favour to terms that now favour the owner.

Despite this, operators are able to divest their physical assets in order to concentrate on their core competency, which is the operation, not ownership, of hotels, while simultaneously reducing their risk associated with such assets.

Source: Bader, Elana and Amir Lababedi. Hotel Management Contracts in Europe. Hospitality Net. Retrieved October 1, 2009, from <http://www.hospitalitynet.org/news/4031966.search?query=elana+bader+amir+lababedi>

Annex 15

Guidelines for developing trek trails

Along the Route: The infrastructure along the route will depend on whether it will be developed for tea-house trekking, designated trail or wilderness trek. It should include the following:

Designated Campsites: Campsites on trails and wilderness treks should be located at least 50 meters away from the water source. It should be a barren patch of land to avoid disturbance to vegetation. The wind direction should also be taken into consideration. Tent plinths, i.e. raised flat spots for erecting tents should be located such that they allow for natural drainage of rain water away from the tent. Toilet tents should be erected at least 50 meters away from the water source and away from habitation tents. Care should be taken to prevent waste from kitchen such as kerosene, vegetables etc., from flowing into the water source. The number of campsites should be kept optimum to avoid congestion of trekkers. This would depend on the inflow of trekkers and the type of treks, i.e. wilderness trek or designated trail. In case of designated trails campsite should be sized to accommodate at least ten and maximum fifteen double sleeping tents with a separation of two meters between tent pads (based on campsite standards in Makalu-Barun Conservation Area of Nepal). The numbers should be restricted to ten in wilderness treks. Campsites should have areas marked for keeping the pack animals.

Bridle path & bridges: The bridle path should be stone paved or hardened with rammed earth. The practice of having timber logs for bridle paths as exists from Tshoka to Dzungri should not be followed. Wherever possible, bridges should be constructed having a minimum width of 1.5 meters. Preferably all bridges should have railings. In case of suspension bridges the suspension towers can be designed to serve as watch towers also. Usually a bridge spans a river or a stream and hence the watch tower would definitely be of use to view the surrounding. Care should be taken that the watch towers do not obscure the panorama of the area. The condition of the bridges should be surveyed at the start and end of the trekking season to arrive at the needs for strengthening, renovating or reconstructing as the case may be.

Emergency shelters: These should be sited at appropriate location in between the nodes. These would be more needed in the high altitude treks of moderately strenuous and strenuous grades as per the on-site situation.

Signs & signage: Signs and signage would be required at the road head as well as along the route these should include the following:

- A schematic map showing the location of the starting point and important nodes with their altitudes and distances displayed at the starting point. North direction should be clearly highlighted.
- Information on existence of Tourist Information Centres, Health Centre and Police Station at the road head with their location should be displayed at strategic road turnings on the approach road and at important points such as market area, bus stop etc.
- The code of conduct for the trekkers should be boldly displayed at the starting point along with information such as entrance fees, camera charges, video shooting charges etc.
- Along the route there should be emergency trail markers made of reflective paint or surface mounted on poles at least three meters above the ground level.
- Showing the right direction for the trekkers. It is particularly essential at passes and areas prone to weather.

- At intermediate places on the route there should be signs showing “**YOU ARE HERE**” and the direction and distance of the nearest node (Camp site, village guest house, yak shed etc.) and emergency shelter from that point.
- At the nodes and along the route signs should indicate designated campsites, area for toilet tents, refuse pits, village guest houses, altitude of the place, area for tying pack animals etc.
- Sacred areas such as groves, stones, mani walls, Chorten etc. should be marked by displaying “**SACRED SITE DO NOT MISUSE**”. In case of Chortens and mani walls the clockwise direction for movement should be marked with an arrow showing “**THIS WAY**”.
- All signs and signage should be designed so as not to interfere with sacred sites and the panoramic views of the location.
- In high altitude areas the signs and symptoms of altitude sickness and first aid actions should be displaced on hoardings near camp sites and village guest houses.
- Other relevant signs such as **STEEP ASCEND AHEAD, WEAK BRIDGE, NARROW TRAIL, WILDLIFE ACTIVE, SILENCE ZONE, WILDLIFE SIGHTINGS, ROUTE DIVERSION** etc. should be displayed at appropriate locations along the route
- Names of important flora, important landmarks such as rivers, lakes, waterfalls, passes, viewpoint, if any, names of peaks and their positions in respective direction should also be marked.
- All the sign boards should be in English, Hindi, Nepali and Bhutia script and the font size, placard size, writing style, colour combination etc. should be standardized.

Accommodation for tea-house trekking: Neat and clean accommodation facilities is a prerequisite for promoting tea house trekking. This can be provided in the form of paying guest or in village guest houses. In a paying guest accommodation one or two rooms in the villager’s house should be furnished as guest rooms using local materials. The rooms should have attached toilets and basic requirements such as a writing table, warm bedding and lighting. The village guest houses should be constructed on community lands that are not used for agricultural purposes. The guest house should have three to four rooms preferably with bunk beds and attached toilets, kitchen and dining area. They could also include a small display area showcasing the natural and cultural heritage of the area. This will serve as an interpretation centre for the village. It should include a combined a semi-open sit out for small gatherings where the local communities to stage cultural programmes for the trekkers.

Other design considerations:

- The siting of the building should be such that it does not obscure panoramic views.
- The site chosen should be such that it makes maximum use of natural light for heating, lighting, and other energy consumption.
- The design of the building should be in the local style incorporating principles of passive solar building design.
- The sewage and waste water from the guest house should be treated and used for maintaining the gardens around the guest house.

- There should be minimum landscaping around the building to prevent giving an artificial look to the settings.
- All guest houses need not have an interpretation centre and these should be planned according to the village size and its location on the route. It should be at a place where trekkers are likely to spend more than one night.
- Tea-house trekking will benefit the local community in the villages along the trek routes.
- These treks can be opened for back packers also as tour operators are not much interested in them due to low profit margin. Thus, it will have a wider market reach.
- These treks can be marketed as all season treks as the main unique selling point is the monasteries.
- The ecological sensitivity of the treks is low compared to other treks and hence they can have trekker's inflow throughout the year. Sikkim has good potential but needs to be aligned with a trek route.
- A survey should be undertaken for identifying villages where guest houses and eating facilities can be constructed.

Common Guidelines

- The trek routes should not have trekkers hut in all future developments. The trekkers hut design module should be improved upon and used for village guest houses along tea-house trekking routes.
- As of now the trek routes are being developed and marketed by tour operators. There is no detail information available on the trek routes. Itineraries of all the 22 treks documented in the report should be made available for the tourists so that they can pick and choose.
- Hotel owners should be encouraged to develop and market the local cuisine, which right now is limited to thukpa and momo. Training should be offered by a noted catering agency or a noted chef with financial incentives in the beginning. The training programmes could be repeated at regular intervals.
- All the roads heads should have a tourist information centre and local Tourism Development Committee. The local NGOs, Hotel Owners, Tour Operators and representatives of guides and porters should be a part of the committee. Many such committees like KEEP (Khedi Eco Tourism & Eco Development Programme), RTDC (Rabong Tourism Development Committee) and the KCC (Khangchendzonga Conservation Committee) already exist. These models should be emulated at other areas.
- TAAS representatives with the help of these local committees should undertake a survey at the starting and end of every season to assess the infrastructure status and environmental status of the trek. Litters should be brought back and a plan of action for repair and restoration method should then be formulated and executed.
- For routes to be developed for tea-house trekking a Community Tourism Management Council (CTMC) consisting of elderly people, women and youth of the villages along the route should

Annex 15 Guidelines for developing trek trails

be constituted. The CTMC will look after the development and management of the village guest houses and other infrastructure. The CTMC will also ensure that the guides, porters and trekkers follow the code of conduct.

- Kerosene depots should be established at road heads for ready availability of kerosene for trekkers. This will reduce the probability of fuel wood being used.
- The government of India has introduced small 5kg LPGs in Himachal Pradesh (meant to be distributed to all hilly states). These should be made available at road head as they are easy to carry.
- Space heating devices made of LPG are also available in the market. Though these are expensive, tour operators should be encouraged to use them for the trekkers as well as for guides and porters. This will ensure a definite stop on use of fuel wood for making camp fires.
- There should be a registered organization of the guides and porters at the road head and uniform rates for the itineraries.
- All the trek routes should be managed by close coordination between TAAS, Forest Department, Wild Life Department, Tourism Department and local Tourism Development Committees and NGOs.
- A development authority should be constituted for developing and managing the road heads.
- Trekking gear should be made available on hire for back packers at the respective road heads. The Tourism Development Committee of that road head can be one of the authorised agencies to hire these.
- Many guides and porters have the habit of taking the village dogs along with them on the treks. These animals interfere with the wildlife and also can spread diseases to the wild animals. Hence this practice should be stopped by sensitizing the guides and porters. The problem is more relevant for treks passing through the protected area.
- All the necessary permits, fees, permissions for using trekkers hut etc. should be made available at the road head through the Tourist Information Centre managed by the Tourism Development Committee. This will save time and money of the trekker. Most importantly, reducing the frustration of running from pillar to post is very crucial for getting repeat visitors and have good word to mouth publicity.
- The authorities should develop norms for support staff trekker ration and the number of pack animals to be allowed on a trek. This will vary from trek to trek depending upon the terrain and duration of trek.
- A monitoring mechanism should be developed to ensure that tour operators follow the code of conduct and trekking norms.
- Localised radio communication for emergency operations should be installed in the wilderness trek routes. License to possess and operate low power radio communication of appropriate range in an approved frequency should be given to authorised tour operators. One set of radio communication should be given to the police station at or nearest to the road head.

Annex 16

Technical details for the development of the Golspie Highland Wildcat Mountain Bike Trails in Scotland

Excerpts from *Paths for All* webpage on the Golspie Highland Wildcat Trails

A lot of the specifications for purpose-built mountain bike trails have been developed by the International Mountain Biking Association in America. These specifications have been adapted to cope with the UK climate. Design work of the Forestry Commission and specialist design consultants such as Pete Laing have provided a wealth of experience and lessons which the project at Golspie has built on.

Whilst using some of the philosophies of both the lowland and upland path industries, mountain bike trail development has a number of specific features found nowhere else in the path industry.

- Trails are usually one way allowing specific features for uphill and downhill sections.
- Use is very high so braking areas (for example on approach to corners or obstacles) require very durable surfaces.
- Many stonework techniques developed in the upland path industry have been adapted for use on mountain bike trails.
- Drainage and surface features (anchor bars, pitching etc.) provide both trail durability and obstacles to challenge the riding ability of users.
- Pitching uses flat slabs rather than blocks used on upland paths.
- Stone cross drains are used for small water crossings but the gap between stones is narrow enough to allow a wheel to roll over it.
- The prevalence of sandstone in the area provided a wealth of material on site ideal for both aggregate and pitched paths. This material has maximised the natural feel of the trails and ensured they blend in well with the surrounding landscape.
- Plant and machinery access was possible on the whole site. This allowed the use of very large stones for features and obstacles.
- Skilled operators and careful supervision are essential to make the trails natural looking and avoid too many straight lines – a common feature of some machine built paths.
- Wherever possible bedrock was incorporated into the route. This is mainly to provide more obstacles and features but also provides maximum durability for downhill sections.

Source: Golspie Highland Wildcat Trails: Technical Details. *Paths for All*. Retrieved July 2, 2009, from <http://www.pathsforall.org.uk/outdooraccess/GolspieBikeTrails.asp#TechnicalDetails>

Annex 17

Mechanism of collection of recyclable waste from households and commercial establishments

A. Mechanism of collection of recyclable waste from households

The recyclable waste from the vehicle accessible as well as vehicle inaccessible areas will be collected twice a week in the afternoon at 2 and 6 pm by the backpackers (sanitation staff) on pre-notified days and it will be widely publicized.

It is estimated that there are about 8,129 households in the 15 identified tourist villages. These houses are to be serviced manually by deploying sanitation staff. Sanitation staff will be deployed for doorstep collection of the recyclable waste. A sanitation staff will be deployed for four hours a day for picking up the waste from the houses using shoulder bin that will be carried on the back (Figure 1). Backpacker bin will be better choice as weight get transferred on both shoulders. The shoulder bin will be made of strong plastic (preferably HDPE) having 80 litre capacity. The backpackers will have appropriate uniform and health safety tools and equipment. Assuming that on an average each backpacker will cover about 100 houses per day the total number of backpackers will be 90. The total number of 80 litre capacity backpacker bins required is 100 (with 10% standby).



Figure 1: Back-packer with a collection bin

B. Mechanism of collection of recyclable waste from commercial establishments

120 decorative covered litter bins, each having capacity of 1m³, will be placed at the market places and near other commercial establishments for temporary storage of the recyclable wastes such as soft drinks bottles and cans, plastic bottles, ice cream boxes, chocolate wrappers, etc. Owner of the commercial establishments will be made responsible for putting such waste generated from their establishments into these bins. The market associations will also be involved to oversee this activity. The waste stored in the bins will be collected by the backpackers who will collect the household waste and will be loaded to the transport vehicle for onward transportation to Siliguri for processing.

Annex 18 Proposed infrastructure development

Table 1 Proposed infrastructure development

Forest management unit Division Sub-Division Range Block	Current staff deployment to frontline offices				No. of clusters	Proposed physical infrastructure development											
	DFO	ACF	Range Officer	Block Officer		Buildings				Equipment							
						Office/quarter			Check post	Transportation				Computer set	Communication	Fire fighting	
						Renovation	Large	Small		Vehicle	Patrolling vehicle	Truck	Pickup truck				Motorcycle
HQ						1	6			1		1		1	6	1	
Sikkim Biodiversity Centre										1			1		6		
East	12									1				1			
Gangtok		8								1							
Gangtok			13		3		1						1		6		
Gangtok				16									1	1			1
Pangthang				1													1
Tadong				1													1
(Kyongnosla WLS)			2		1		1						1	1			
(Kyongnosla WLS)				2									1	1			1
Ranipool			1		2		1						1		5		
Assamlenzey				1													1
Ranipool				5									1				1
Rumtek				1									1				1
Singtam			2		3		1								6		
Rangpo				2										1			1
Rorathang				1													1
Sang														1			1
Singtam				4									1	1			1
Tumin			2		1										1		
Tumin				1									1				1
Pakyong		4															
Pakyong			2		2		1	1							1		
Pakyong				2										1			1
Pathing					1		1								1		
Pathing													1		1		1
Phadhamchen			1		1										3		
Nathang														1			1
Phadhamchen													1				1
(Fambonglho WLS)			2				1								2		
(Fambonglho WLS)				1									1		1		1
Rongli		4															
Rongli			2		2		1								4		
Rhennock				1									1				1
Rongli				4									1				1
(Pangolakha WLS)				3													1

Note: At HQ, one community centre has been requested in addition to 6 large offices/quarters.

Table 1 Proposed infrastructure development (continued)

Forest management unit Division Sub-Division Range Block	Current staff deployment to frontline offices				No. of clusters	Proposed physical infrastructure development											
	DFO	ACF	Range Officer	Block Officer		Buildings				Equipment							
						Office/quarter			Check post	Transportation				Computer set	Communication	Fire fighting	
						Renovation	Large	Small		Vehicle	Patrolling vehicle	Truck	Pickup truck				Motorcycle
North	4									1				1			
Chungthang		1															
Chungthang			3		1			1							3		
Chungthang Shipgyer (Shingba WLS)				2						1				1			1
				1													1
Lachen					1									1	2		1
Lachen Thanggu				1													1
Lachung					1			1							2		
Lachung										1				1			1
Mangan		8															
Dzongu			2		1				1						2		
Lower Dzongu														1			1
Upper Dzongu				1										1			1
Mangan			5		2			1							4		
Mangan Naga				4										1			1
														1			1
Phodong			3		1			1							2		
Kabi				3										1			1
Phodong														1			1
South	4									1				1			
Mamchi		7															
Namchi			3		3			1		1				1	4		
Namchi (Kitam WLS)				11										1			1
				1										1			1
Melli			3		3			1		1					4		
Jorthang														1			1
Manjhitar														1			1
Melli				1									1	1			1
Namthang			3		1			1							2		
Mamring				1										1			1
Namthang				2													1
Temi					2				1					1	1		
Temi				1										1			1
Rabong		3															
Lingmo			1		1			1							2		
Lingi										1				1			1
Lingmo				1										1			1
Rabong			2		3			1						1	6		
Kewzing				1										1			1
Rabongla				1													1
Ravenglag				2										1			1
Yangyong														1			1
(Maenam WLS)				2										1			1

Table 1 Proposed infrastructure development (continued)

Forest management unit Division Sub-Division Range Block	Current staff deployment to frontline offices				No. of clusters	Proposed physical infrastructure development											
	DFO	ACF	Range Officer	Block Officer		Buildings				Equipment							
						Renovation	Large	Small	Check post	Transportation							
										Vehicle	Patrolling vehicle	Truck	Pickup truck	Motorcycle	Computer set	Communication	Fire fighting
West	4																
Gyalzing		5															
Gyalzing			4		3		1						1	3			1
Gyalzing				10									1				1
Legship																	1
Pelling				1													1
Tashiding			1		1								1		2		
Tashiding				2										1			1
Yoksom			1		1		1	1					1		2		
Khechepery														1			1
Yoksum				4									1				1
Soreng		6															
Dentam			1		1		1	1					1		2		
Bermiok				1										1			1
Dentam				1									1	1			1
Sombaria			1		1		1						1		3		
Hillay				1										1			1
Sombaria				1									1	1			1
Soreng			1		3		1	2					1		4		
Naya Bazar														1			1
Siribadam														1			1
Soreng				1									1	1			1
(Barsey WLS) (Barsay WLS)			2												2		1
(KNP)																	
(North)		1															
(Chungthang) (Chungthang)			2				1								2		
(Dzongu)		1												1			1
(Dzongu)			1												2		
(West)		1					1							1	2		1
Total	25	48	66	104	46	1	14	16	10	7	24	2	20	60	100	1	64
Provided by other component															31		
Net total						1	14	16	10	7	24	2	20	60	69	1	64

Annex 19 Current conditions of Forest Department facilities

1. Forest Department Headquarters



Accumulated garbage



Decayed toilet doors



Broken sink without water



Broken flush lever (no water)

2. Forest Colony (staff quarters), Gangtok



Old garage with broken tin roof



Broken tin roof of garage

Annex 19 Current conditions of Forest Department facilities



Forest guard's residence with traditional structure reinforced by bamboo



Forest guard's residence without proper water supply



Forest guard's residence with traditional structure



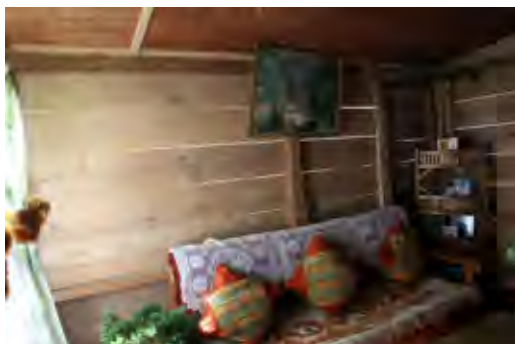
Forest guard's residence without proper drainage



Block Officer's old residence



Block Officer's residence with broken roof



Temporary living room in Block Officer's residence



Block Officer's residence



Forest Guard's temporary house



Interior of Forest Guard's temporary house



Landslide at Forest Guard's residence



Old building of Forest Guard's residence

3. Block Office facilities in Panthang, Gangtok



Broken-down office



Dilapidated toilet



Old and dilapidated staff quarters



Dilapidated office

4. Range Office facilities in Rabang, South Sikkim



Abandoned office



Dilapidated office of Wildlife Circle



Office abandoned after fire



Dilapidated office of Territorial Circle

5. Range Office in Kyongnosla Alpine Wildlife Sanctuary



Kitchen of Range Office of Territorial Circle



Broken-down office of Wildlife Circle



Old office of Wildlife Circle



Bed room inside office

6. Permanent structures in Khangchendzonga National Park (Yuksom area)



Unmaintained public convenience



Resting area



Suspension bridge



Abandoned rest house

7. Forest rest houses in various locations



Old colonial-style rest house in Yumthang



Inside the rest house in Yumthang



Forest rest house in Sombaria under outsourced management



Old forest rest house in Lachung, North District

8. Nurseries



Overview of Panthang Range Office nursery



Potted seedlings at Panthang Range Office nursery



Tree seedlings at Panthang Range Office nursery



Medicinal plant nursery in Kyongnosla Alpine Wildlife Sanctuary

9. Ex-situ and in-situ conservation facilities



Butterfly park under construction (near Mangan)



Gate of Shingba Rhododendron Sanctuary

Annex 20 Summary of cost estimate by subcomponent

Table 1 Summary of cost estimate by subcomponent

Component	Total (INR)	% to each component total	% to all component total
Component Total	2,781,132,565		100.0%
C1 Preparatory work	491,000	100.0%	0.0%
C1-1 Organizational reform of Forest Department			
C1-1-1 Organizational reform of Forest Department			
C1-2 Establishment of project implementation structure	20,000	4.1%	0.0%
C1-2-1 Establishment of project implementation structure	20,000	4.1%	0.0%
C1-3 Preparation of implementation manual	471,000	95.9%	0.0%
C1-3-1 Preparation of implementation manual	471,000	95.9%	0.0%
C1-4 Development of annual work plan and budget			
C1-4-1 Development of annual work plan and budget			
C2 Forest and biodiversity conservation	357,493,302	100.0%	12.9%
C2-1 Enhancement and management of forest and biodiversity information base	75,340,118	21.1%	2.7%
C2-1-1 Update of topographical and land use map	37,677,180	10.5%	1.4%
C2-1-2 Inventory and monitoring of biodiversity	31,111,776	8.7%	1.1%
C2-1-3 Study of impacts of climate change and grazing in the Himalayan ecosystem	6,551,162	1.8%	0.2%
C2-2 Enhancement of the basis for forest management and biodiversity conservation	73,837,124	20.7%	2.7%
C2-2-1 Redefinition of protected area boundaries and improvement of the protected area network	23,713,040	6.6%	0.9%
C2-2-2 Management and conservation of flagship species habitats	25,374,464	7.1%	0.9%
C2-2-3 Enhancement of working plans and establishment of forest management zones	24,749,620	6.9%	0.9%
C2-3 Facilitation of inscription process of Khangchendzonga Biosphere Reserve on the World Heritage List	2,286,500	0.6%	0.1%
C2-3-1 Facilitation of inscription process of Khangchendzonga Biosphere Reserve on the World Heritage List	2,286,500	0.6%	0.1%
C2-4 Ex-situ conservation and promotion of biodiversity conservation	206,029,560	57.6%	7.4%
C2-4-1 Ex-situ conservation of biodiversity	167,059,800	46.7%	6.0%
C2-4-2 Knowledge generation and dissemination of biodiversity and best practice information	20,128,560	5.6%	0.7%
C2-4-3 Promotion of biodiversity conservation in religious areas	18,841,200	5.3%	0.7%
C3 Ecotourism	1,149,500,398	100.0%	41.3%
C3-1 Formulation of a policy and regulatory environment for ecotourism	3,679,600	0.3%	0.1%
C3-1-1 Formulation of an ecotourism policy	1,628,000	0.1%	0.1%
C3-1-2 Improving tourism operating conditions in Sikkim	2,051,600	0.2%	0.1%
C3-2 Ecotourism marketing	299,429,159	26.0%	10.8%
C3-2-1 Establishing Ecotourism Marketing Cell	5,310,659	0.5%	0.2%
C3-2-2 Formulation and implementation of a marketing strategy	285,500,000	24.8%	10.3%
C3-2-3 Selection of a funding scheme to finance subsequent marketing strategies			
C3-2-4 Creating links between tour operators and local communities offering tourism services	8,618,500	0.7%	0.3%
C3-3 Development of ecotourism areas with respect to specific market segments	639,264,396	55.6%	23.0%
C3-3-1 Construction and management of high-end ecolodges	424,201,760	36.9%	15.3%
C3-3-2 Development of trekking routes	140,900,000	12.3%	5.1%
C3-3-3 Development of mountain bike trails	60,110,000	5.2%	2.2%
C3-3-4 Development of rock climbing areas	5,085,200	0.4%	0.2%
C3-3-5 Development of wildlife-watching areas	8,967,436	0.8%	0.3%
C3-4 Development of tourist facilities	144,822,480	12.6%	5.2%
C3-4-1 Construction of interpretation centres and renovation of forest rest houses (FRHs)	144,822,480	12.6%	5.2%
C3-5 Introduction of solid waste management at tourism areas linked to the priority villages	37,304,763	3.2%	1.3%
C3-5-1 Comprehensive study for baseline information on solid waste management	1,348,267	0.1%	0.0%
C3-5-2 Operating solid waste management functions	35,956,496	3.1%	1.3%
C3-6 Establishment of Ecotourism Development Corporation	25,000,000	2.2%	0.9%
C3-6-1 Establishment of Ecotourism Development Corporation	25,000,000	2.2%	0.9%

Annex 20 Summary of cost estimate by subcomponent

Table 1 Summary of cost estimate by subcomponent (continued)

Component	Total (INR)	% to each component total	% to all component total
C4 Joint forest management	389,152,031	100.0%	14.0%
C4-1 Preparation work	4,444,000	1.1%	0.2%
C4-1-1 Preparation of JFMC/EDC/PSS management manual	2,282,000	0.6%	0.1%
C4-1-2 Marketing study	2,152,000	0.6%	0.1%
C4-1-3 Formation of district facilitation teams	10,000	0.0%	0.0%
C4-2 Establishment of committees for joint forest management and biodiversity conservation	77,940,000	20.0%	2.8%
C4-2-1 Selection of villages for JFMC/EDC/PSS activities			
C4-2-2 Establishment of committees and planning of activities	23,940,000	6.2%	0.9%
C4-2-3 Entry point activities	54,000,000	13.9%	1.9%
C4-3 Forest management and biodiversity conservation activities	243,586,431	62.6%	8.8%
C4-3-1 Forest management and biodiversity conservation	239,236,431	61.5%	8.6%
C4-3-2 Action research on sustainable use of forest resources	4,350,000	1.1%	0.2%
C4-4 Income generation activities	21,600,000	5.6%	0.8%
C4-4-1 Formation of self help groups			
C4-4-2 Microfinance	21,600,000	5.6%	0.8%
C4-5 Capacity development	41,581,600	10.7%	1.5%
C4-5-1 Training on management of JFMCs, EDCs and PSSs	2,022,400	0.5%	0.1%
C4-5-2 Technical training on forest management and biodiversity conservation	10,800,000	2.8%	0.4%
C4-5-3 Training on business management	3,645,600	0.9%	0.1%
C4-5-4 Skills development training on IGAs	9,039,600	2.3%	0.3%
C4-5-5 Exposure visits	3,840,000	1.0%	0.1%
C4-5-6 Training on ecotourism	12,234,000	3.1%	0.4%
C4-6 Monitoring			
C4-6-1 Monitoring			
C4-7 Village Development Fund			
C4-7-1 Village Development Fund			
C5 Organisational strengthening of the Forest Department	636,300,320	100.0%	22.9%
C5-1 Improvements of infrastructure and equipment	340,198,220	53.5%	12.2%
C5-1-1 Development of infrastructure and equipment improvement plan	520,000	0.1%	0.0%
C5-1-2 Construction and renovation of offices and residences	268,556,020	42.2%	9.7%
C5-1-3 Procurement of equipment	71,122,200	11.2%	2.6%
C5-2 Training of the Forest Department officers and frontline staff members	33,886,500	5.3%	1.2%
C5-2-1 Biodiversity management	19,604,100	3.1%	0.7%
C5-2-2 Forest management	12,960,000	2.0%	0.5%
C5-2-3 Ecotourism	802,200	0.1%	0.0%
C5-2-4 Monitoring and evaluation	520,200	0.1%	0.0%
C5-3 Establishment of sustainable finance mechanism			
C5-3-1 Establishment of sustainable finance mechanism			
C5-4 Project Management Unit	262,215,600	41.2%	9.4%
C5-4-1 Project Management Unit	262,215,600	41.2%	9.4%
C6 Consultancy services	248,195,514	100.0%	8.9%
C6-1 Consultancy services	248,195,514	100.0%	8.9%
C6-1-1 Consultancy services	248,195,514	100.0%	8.9%

Annex 21 Summary of cost estimate by subcomponent and year

Table 1 Summary of cost estimate by subcomponent and year

CID	Component	(INR 000)												Total	% to Total
		FY01	FY02	FY03	FY04	FY05	FY06	FY07	FY08	FY09	FY10	FY11	FY12		
C	Component Total	114,690	359,205	546,734	590,128	503,995	283,910	160,174	89,721	78,850	53,724	2,781,133	491	100.0%	
C1	Preparatory work	491												0.0%	
C1-1	Reorganization of the Forest Department	20											20	0.0%	
C1-1-1	Reorganization of the Forest Department	20											20	0.0%	
C1-2	Establishment of project implementation structure													0.0%	
C1-2-1	Establishment of project implementation structure	471											471	0.0%	
C1-3	Preparation of implementation manual													0.0%	
C1-3-1	Preparation of implementation manual	471											471	0.0%	
C1-4	Development of annual work plan and budget													0.0%	
C1-4-1	Development of annual work plan and budget													0.0%	
C2	Forest and biodiversity conservation	51,760	114,230	45,678	37,854	21,213	27,758	24,169	16,088	13,044	5,700	357,493		12.9%	
C2-1	Enhancement and management of forest and biodiversity information base	240	29,932	14,272	10,119	4,690	4,160	3,957	4,160	3,808		75,340		2.7%	
C2-1-1	Update of topographical and land use map	240	22,979	8,543	4,914	149	352	149	352			37,677		1.4%	
C2-1-2	Inventory and monitoring of biodiversity		4,453	3,808	3,808	3,808	3,808	3,808	3,808	3,808		31,112		1.1%	
C2-1-3	Study of impacts of climate change and grazing in the Himalayan ecosystem		2,500	1,921	1,398	733						6,551		0.2%	
C2-2	Enhancement of the basis for forest management and biodiversity conservation		7,510	13,077	12,991	7,146	14,221	11,820	3,536	3,536		73,837		2.7%	
C2-2-1	Redefinition of protected area boundaries and improvement of the protected area network		2,605	9,455	3,611	5,221	2,821					23,713		0.9%	
C2-2-2	Management and conservation of flagship species habitats		7,510	6,936		5,464	5,464					25,374		0.9%	
C2-2-3	Enhancement of working plans and establishment of forest management zones			3,536	3,536	3,536	3,536					24,750		0.9%	
C2-3	Facilitation of inscription process of Khangchendzonga Biosphere Reserve on the World Heritage List		2,287									2,287		0.1%	
C2-3-1	Facilitation of inscription process of Khangchendzonga Biosphere Reserve on the World Heritage List		2,287									2,287		0.1%	
C2-4	Ex-situ conservation and promotion of biodiversity conservation	51,520	74,500	18,329	14,744	9,377	9,377	8,392	8,392	5,700	5,700	206,030		7.4%	
C2-4-1	Ex-situ conservation of biodiversity	51,520	61,620	12,152	10,567	5,200	5,200	5,200	5,200	5,200	5,200	167,060		6.0%	
C2-4-2	Knowledge generation and dissemination of biodiversity and best practice information		10,189	3,485	1,485	1,485	500	500	500	500	500	20,129		0.7%	
C2-4-3	Promotion of biodiversity conservation in religious areas		2,692	2,692	2,692	2,692	2,692	2,692	2,692	2,692	2,692	18,841		0.7%	
C3	Ecotourism	20,977	213,568	379,300	339,294	149,050	41,516	41,516	3,766	1,015	1,015	1,149,500		41.3%	
C3-1	Formulation of a policy and regulatory environment for ecotourism		3,680									3,680		0.1%	
C3-1-1	Formulation of an ecotourism policy		1,628									1,628		0.1%	
C3-1-2	Improving tourism operating conditions in Sikkim		2,052									2,052		0.1%	
C3-2	Ecotourism marketing	16,082	41,572	51,322	52,322	96,322	38,765	38,765	1,015	1,015	1,015	299,429		10.8%	
C3-2-1	Establishing Ecotourism Marketing Cell	3,079	308	308	1,308	308	308					5,311		0.2%	
C3-2-2	Formulation and implementation of a marketing strategy	12,500	40,250	50,000	50,000	95,000	37,750					285,500		10.3%	
C3-2-3	Selection of a funding scheme to finance subsequent marketing strategies													0.3%	
C3-2-4	Creating links between tour operators and local communities offering tourism services	503	1,015	1,015	1,015	1,015	1,015	1,015	1,015	1,015	1,015	8,619		0.3%	
C3-3	Development of ecotourism areas with respect to specific market segments	1,216	106,953	277,616	212,338	40,364	388	388	388			639,264		23.0%	
C3-3-1	Construction and management of high-end ecotourism areas	1,216	72,851	206,209	138,950	4,976						424,202		15.3%	
C3-3-2	Development of trekking routes		21,900	41,000	45,000	33,000						140,900		5.1%	
C3-3-3	Development of mountain bike trails		12,110	24,000	24,000							60,110		2.2%	
C3-3-4	Development of rock climbing areas		3,650	359	359	359						5,085		0.2%	
C3-3-5	Development of wildlife-watching areas		92	2,757	4,030	2,030	30	30	30			8,967		0.3%	
C3-4	Development of tourist facilities		47,194	48,004	47,794	610	610	610	610			144,822		5.2%	
C3-4-1	Construction of interpretation centres and renovation of forest rest houses (FRHs)		47,194	48,004	47,794	610	610	610	610			144,822		5.2%	
C3-5	Introduction of solid waste management at tourism areas linked to the priority villages		17,849	2,357	1,840	11,753	1,753	1,753	1,753			37,305		1.3%	
C3-5-1	Comprehensive study for baseline information on solid waste management		1,348									1,348		0.0%	
C3-5-2	Operating solid waste management functions		16,501	2,357	1,840	11,753	1,753	1,753	1,753			35,956		1.3%	
C3-6	Establishment of Ecotourism Development Corporation											25,000		0.9%	
C3-6-1	Establishment of Ecotourism Development Corporation											25,000		0.9%	

Annex 21 Summary of cost estimate by subcomponent and year

Table 1 Summary of cost estimate by subcomponent and year (continued)

CID	Component	FY										Total	% to Total
		FY01	FY02	FY03	FY04	FY05	FY06	FY07	FY08	FY09	FY10		
C4	C4 Joint forest management	10	33,150	47,770	63,323	71,965	56,103	42,451	32,128	25,411	16,840	389,152	14.0%
C4-1	C4-1 Preparation work	10	4,434									4,444	0.2%
C4-1-1	C4-1-1 Preparation of JFMC/EDC/PSS management manual		2,282									2,282	0.1%
C4-1-2	C4-1-2 Marketing study		2,152									2,152	0.1%
C4-1-3	C4-1-3 Formation of district facilitation teams	10	19,485	19,485	19,485	19,485						77,940	2.8%
C4-2	C4-2 Establishment of committees for joint forest management and biodiversity conservation												
C4-2-1	C4-2-1 Selection of villages for JFMC/EDC/PSS activities		5,985	5,985	5,985	5,985						23,940	0.9%
C4-2-2	C4-2-2 Establishment of committees and planning of activities		13,500	13,500	13,500	13,500						54,000	1.9%
C4-2-3	C4-2-3 Entry point activities		7,814	18,612	28,452	37,679	42,879	37,483	30,273	23,556	16,840	243,586	8.8%
C4-3	C4-3 Forest management and biodiversity conservation activities		7,814	18,342	27,432	36,659	41,859	36,463	30,273	23,556	16,840	239,236	8.6%
C4-3-1	C4-3-1 Forest management and biodiversity conservation												
C4-3-2	C4-3-2 Action research on sustainable use of forest resources		270	1,020	1,020	1,020						4,350	0.2%
C4-4	C4-4 Income generation activities		5,400	5,400	5,400	5,400						21,600	0.8%
C4-4-1	C4-4-1 Formation of self-help groups		5,400	5,400	5,400	5,400						21,600	0.8%
C4-4-2	C4-4-2 Microfinance		1,417	4,274	9,986	9,402	7,825	4,968	1,855	1,855		41,582	1.5%
C4-5	C4-5 Capacity development		506	506	506	506						2,022	0.1%
C4-5-1	C4-5-1 Training on management of JFMCs, EDCs and PSSs		1,350	2,700	2,700	2,700						10,800	0.4%
C4-5-2	C4-5-2 Technical training on forest management and biodiversity conservation		911	911	911	911						3,646	0.1%
C4-5-3	C4-5-3 Training on business management		1,507	1,507	2,260	2,260						9,040	0.3%
C4-5-4	C4-5-4 Skills development training on IGAs				960	960						3,840	0.1%
C4-5-5	C4-5-5 Exposure visits				2,649	2,065	1,905	1,855	1,855			12,234	0.4%
C4-5-6	C4-5-6 Training on ecotourism												
C4-6	C4-6 Monitoring												
C4-6-1	C4-6-1 Monitoring												
C4-7	C4-7 Village Development Fund												
C4-7-1	C4-7-1 Village Development Fund												
C5	C5 Organisational strengthening of the Forest Department	29,130	135,688	193,771	72,589	34,194	33,358	47,016	32,717	29,613	28,223	636,300	22.9%
C5-1	C5-1 Improvements of infrastructure and equipment	2,908	103,872	162,223	40,903	5,017	3,823	16,746	3,698	504	504	340,198	12.2%
C5-1-1	C5-1-1 Development of infrastructure and equipment improvement plan	520										520	0.0%
C5-1-2	C5-1-2 Construction and renovation of offices and residences		78,658	152,818	37,080							268,556	9.7%
C5-1-3	C5-1-3 Procurement of equipment	2,388	25,214	9,405	3,823	5,017	3,823	16,746	3,698	504	504	71,122	2.6%
C5-2	C5-2 Training of the Forest Department officers and frontline staff members		5,595	5,326	5,465	2,955	3,314	4,048	2,798	2,888	1,498	33,887	1.2%
C5-2-1	C5-2-1 Biodiversity management		4,097	3,760	3,760	1,250	1,588	2,550	1,300	1,300		19,604	0.7%
C5-2-2	C5-2-2 Forest management		1,440	1,440	1,440	1,440	1,440	1,440	1,440	1,440	1,440	12,960	0.5%
C5-2-3	C5-2-3 Ecotourism			69	207	207	228			90		802	0.0%
C5-2-4	C5-2-4 Monitoring and evaluation		58	58	58	58	58	58	58	58	58	520	0.0%
C5-3	C5-3 Establishment of sustainable finance mechanism												
C5-3-1	C5-3-1 Establishment of sustainable finance mechanism												
C5-4	C5-4 Project Management Unit	26,222	26,222	26,222	26,222	26,222	26,222	26,222	26,222	26,222	26,222	262,216	9.4%
C5-4-1	C5-4-1 Project Management Unit	26,222	26,222	26,222	26,222	26,222	26,222	26,222	26,222	26,222	26,222	262,216	9.4%
C6	C6 Consultancy services	33,300	55,161	45,947	37,061	37,329	17,641	5,022	9,767	1,947	248,196	8.9%	
C6-1	C6-1 Consultancy services	33,300	55,161	45,947	37,061	37,329	17,641	5,022	9,767	1,947	248,196	8.9%	
C6-1-1	C6-1-1 Consultancy services	33,300	55,161	45,947	37,061	37,329	17,641	5,022	9,767	1,947	248,196	8.9%	

Annex 21 Summary of cost estimate by subcomponent and year

Component	(INR '000)											Total	% to Total
	FY01	FY02	FY03	FY04	FY05	FY06	FY07	FY08	FY09	FY10	FY11		
C4 Joint forest management	10	33,150	47,770	63,323	71,965	56,103	42,451	32,128	25,411	16,840	389,152	14.0%	
C4-1 Preparation work	10	4,434									4,444	0.2%	
C4-1-1 Preparation of JFMC/EDC/PSS management manual		2,282									2,282	0.1%	
C4-1-2 Marketing study		2,152									2,152	0.1%	
C4-1-3 Formation of district facilitation teams	10										10	0.0%	
C4-2 Establishment of committees for joint forest management and biodiversity conservation		19,485	19,485	19,485	19,485						77,940	2.8%	
C4-2-1 Selection of villages for JFMC/EDC/PSS activities		5,985	5,985	5,985	5,985						23,940	0.9%	
C4-2-2 Establishment of committees and planning of activities		13,500	13,500	13,500	13,500						54,000	1.9%	
C4-2-3 Entry point activities		7,814	18,612	28,452	37,679	42,879	37,483	30,273	23,556	16,840	243,586	8.8%	
C4-3 Forest management and biodiversity conservation activities		7,814	18,342	27,432	36,659	41,859	36,463	30,273	23,556	16,840	239,236	8.6%	
C4-3-1 Forest management and biodiversity conservation			270	1,020	1,020	1,020	1,020				4,350	0.2%	
C4-3-2 Action research on sustainable use of forest resources		5,400	5,400	5,400	5,400						21,600	0.8%	
C4-4 Income generation activities													
C4-4-1 Formation of self help groups		5,400	5,400	5,400	5,400						21,600	0.8%	
C4-4-2 Microfinance		1,417	4,274	9,986	9,402	7,825	4,968	1,855	1,855		41,582	1.5%	
C4-5 Capacity development		506	506	506	506						2,022	0.1%	
C4-5-1 Training on management of JFMCs, EDCs and PSSs		1,350	2,700	2,700	2,700	2,700	1,350				10,800	0.4%	
C4-5-2 Technical training on forest management and biodiversity conservation		911	911	911	911						3,646	0.1%	
C4-5-3 Training on business management		1,507									9,040	0.3%	
C4-5-4 Skills development training on IGAs											3,840	0.1%	
C4-5-5 Exposure visits													
C4-5-6 Training on ecotourism		2,649	2,649	2,649	2,649	1,905	1,905	1,855	1,855		12,234	0.4%	
C4-6 Monitoring													
C4-6-1 Monitoring													
C4-7 Village Development Fund													
C4-7-1 Village Development Fund													
C5 Organisational strengthening of the Forest Department	29,130	135,688	193,771	72,589	34,194	33,358	47,016	32,717	29,613	28,223	636,300	22.9%	
C5-1 Improvements of infrastructure and equipment	2,908	103,872	162,223	40,903	5,017	3,823	16,746	3,698	504	504	340,198	12.2%	
C5-1-1 Development of infrastructure and equipment improvement plan	520										520	0.0%	
C5-1-2 Construction and renovation of offices and residences		78,658	152,818	37,080							268,556	9.7%	
C5-1-3 Procurement of equipment	2,388	25,214	9,405	3,823	5,017	3,823	16,746	3,698	504	504	71,122	2.6%	
C5-2 Training of the Forest Department officers and frontline staff members		5,595	5,326	5,465	2,955	3,314	4,048	2,798	2,888	1,498	33,887	1.2%	
C5-2-1 Biodiversity management		4,097	3,760	3,760	1,250	1,588	2,550	1,300	1,300		19,604	0.7%	
C5-2-2 Forest management		1,440	1,440	1,440	1,440	1,440	1,440	1,440	1,440	1,440	12,960	0.5%	
C5-2-3 Ecotourism			69	207	207	228			90		802	0.0%	
C5-2-4 Monitoring and evaluation		58	58	58	58	58	58	58	58	58	520	0.0%	
C5-3 Establishment of sustainable finance mechanism													
C5-3-1 Establishment of sustainable finance mechanism													
C5-4 Project Management Unit	26,222	26,222	26,222	26,222	26,222	26,222	26,222	26,222	26,222	26,222	262,216	9.4%	
C5-4-1 Project Management Unit	26,222	26,222	26,222	26,222	26,222	26,222	26,222	26,222	26,222	26,222	262,216	9.4%	
C6 Consultancy services	33,300	55,161	45,947	37,061	37,329	17,641	5,022	5,022	9,767	1,947	248,196	8.9%	
C6-1 Consultancy services	33,300	55,161	45,947	37,061	37,329	17,641	5,022	5,022	9,767	1,947	248,196	8.9%	
C6-1-1 Consultancy services	33,300	55,161	45,947	37,061	37,329	17,641	5,022	5,022	9,767	1,947	248,196	8.9%	

Annex 22

Detailed cost estimate by subcomponent and year

Table C1-1-1 Reorganization of the Forest Department

Component and cost items	Quantity			Unit cost	Total	Detailed estimates
	a	b	c=a*b	d	e=c*d	
C1 Preparatory work						
C1-1 Reorganization of the Forest Department						
C1-1-1 Reorganization of the Forest Department						
<i>Fiscal Year 1</i>						
(a) Reorganization of the Forest Department						
<i>Fiscal Year 2</i>						
<i>Fiscal Year 3</i>						
<i>Fiscal Year 4</i>						
<i>Fiscal Year 5</i>						
<i>Fiscal Year 6</i>						
<i>Fiscal Year 7</i>						
<i>Fiscal Year 8</i>						
<i>Fiscal Year 9</i>						
<i>Fiscal Year 10</i>						

Table C1-2-1 Establishment of project implementation structure

Component and cost items	Quantity			Unit cost	Total	Detailed estimates
	a	b	c=a*b	d	e=c*d	
C1 Preparatory work						
C1-2 Establishment of project implementation structure						
C1-2-1 Establishment of project implementation structure						20,000
<i>Fiscal Year 1</i>						20,000
(a) Establishment of the PMU including the placement of Forest Department officials						
(b) Establishment of the HPSC						
(c) Drafting and acquiring approval of the governing rules for the PMU						
(d) Registration of the PMU as a society						
(e) Procurement of contractual staff for the PMU						10,000
Advertising	1 set	1 unit	1	10,000		10,000
(f) Procurement of the PMCs						10,000
Call for tender (tender document and advertising)	1 set	1 unit	1	10,000		10,000
<i>Fiscal Year 2</i>						
<i>Fiscal Year 3</i>						
<i>Fiscal Year 4</i>						
<i>Fiscal Year 5</i>						
<i>Fiscal Year 6</i>						
<i>Fiscal Year 7</i>						
<i>Fiscal Year 8</i>						
<i>Fiscal Year 9</i>						
<i>Fiscal Year 10</i>						

Table C1-3-1 Preparation of implementation manual

Component and cost items	Quantity			Unit cost	Total	Detailed estimates
	a	b	c=a*b	d	e=c*d	
C1 Preparatory work						
C1-3 Preparation of implementation manual						
C1-3-1 Preparation of implementation manual						471,000
<i>Fiscal Year 1</i>						471,000
(a) Development of project implementation manual						125,000
Printing	1 set	250 copy	250	500		125,000
(b) Familiarization of the Project						346,000
One-day workshop	50 person	4 district	200	1,730		346,000 Table D2-5
<i>Fiscal Year 2</i>						
<i>Fiscal Year 3</i>						
<i>Fiscal Year 4</i>						
<i>Fiscal Year 5</i>						
<i>Fiscal Year 6</i>						
<i>Fiscal Year 7</i>						
<i>Fiscal Year 8</i>						
<i>Fiscal Year 9</i>						
<i>Fiscal Year 10</i>						

Annex 22 Detailed cost estimate by subcomponent and year

Table C1-4-1 Development of annual work plan and budget

Component and cost items	Quantity		Unit cost d	Total e=c*d	Detailed estimates
	a	b			
C1 Preparatory work					
C1-4 Development of annual work plan and budget					
C1-4-1 Development of annual work plan and budget					
<i>Fiscal Year 1</i>					
(a) Development of annual work plan and budget					
<i>Fiscal Year 2</i>					
<i>Fiscal Year 3</i>					
<i>Fiscal Year 4</i>					
<i>Fiscal Year 5</i>					
<i>Fiscal Year 6</i>					
<i>Fiscal Year 7</i>					
<i>Fiscal Year 8</i>					
<i>Fiscal Year 9</i>					
<i>Fiscal Year 10</i>					

Table C2-1-1 Update of topographical and land use map

Component and cost items	Quantity		Unit cost d	Total e=c*d	Detailed estimates
	a	b			
C2 Forest and biodiversity conservation					
C2-1 Enhancement and management of forest and biodiversity information base					
C2-1-1 Update of topographical and land use map				37,677,180	
<i>Fiscal Year 1</i>				240,000	
(b) Training and capacity building				240,000	
Core staff advanced training Dehradun	2 person	120 days	240	1,000	240,000
<i>Fiscal Year 2</i>				22,979,072	
(a) Digital map preparation and procurement of equipment				21,521,072	
RS/GIS Hardware & Software	1 unit	1 set	1	15,439,000	15,439,000 Table D2-1. A
Data Procurement	1 unit	1 set	1	6,082,072	6,082,072 Table D2-2. A
(b) Training and capacity building				1,458,000	
Operational training at Dehradun	27 person	54 days	1,458	1,000	1,458,000
<i>Fiscal Year 3</i>				8,542,554	
(a) Digital map preparation and procurement of equipment				8,542,554	
Data Procurement	1 unit	1 set	1	4,561,554	4,561,554 Table D2-2. A
Map digitizing	1 unit	1 set	1	3,832,000	3,832,000 Table D2-3. A
RS/GIS Hardware & Software operation cost	1 unit	1 set	1	149,000	149,000 Table D2-1. B
<i>Fiscal Year 4</i>				4,913,554	
(a) Digital map preparation and procurement of equipment				4,710,554	
Data Procurement	1 unit	1 set	1	4,561,554	4,561,554 Table D2-2. A
RS/GIS Hardware & Software operation cost	1 unit	1 set	1	149,000	149,000 Table D2-1. B
(b) Training and capacity building				203,000	
Advance refresher OJT	29 person	7 days	203	1,000	203,000
<i>Fiscal Year 5</i>				149,000	
(a) Digital map preparation and procurement of equipment				149,000	
RS/GIS Hardware & Software operation cost	1 unit	1 set	1	149,000	149,000 Table D2-1. B
<i>Fiscal Year 6</i>				352,000	
(a) Digital map preparation and procurement of equipment				149,000	
RS/GIS Hardware & Software operation cost	1 unit	1 set	1	149,000	149,000 Table D2-1. B
(b) Training and capacity building				203,000	
Advance refresher OJT	29 person	7 days	203	1,000	203,000
<i>Fiscal Year 7</i>				149,000	
(a) Digital map preparation and procurement of equipment				149,000	
RS/GIS Hardware & Software operation cost	1 unit	1 set	1	149,000	149,000 Table D2-1. B
<i>Fiscal Year 8</i>				352,000	
(a) Digital map preparation and procurement of equipment				149,000	
RS/GIS Hardware & Software operation cost	1 unit	1 set	1	149,000	149,000 Table D2-1. B
(b) Training and capacity building				203,000	
Advance refresher OJT	29 person	7 days	203	1,000	203,000
<i>Fiscal Year 9</i>					
<i>Fiscal Year 10</i>					

Annex 22 Detailed cost estimate by subcomponent and year

Table C2-1-2 Inventory and monitoring of biodiversity

Component and cost items	Quantity		Unit cost d	Total e=c*d	Detailed estimates
	a	b			
C2 Forest and biodiversity conservation					
C2-1 Enhancement and management of forest and biodiversity information base					
C2-1-2 Inventory and monitoring of biodiversity					31,111,776
<i>Fiscal Year 1</i>					
<i>Fiscal Year 2</i>					4,453,326
(a) Rapid biodiversity survey					4,453,326
One group with 4 specialists	1 group	325 days	325	11,718	3,808,350 Annex 24
DBH tape	4 unit	1 set	4	250	1,000
50 m Rolling tape	4 unit	1 set	4	2,500	10,000
Sunto Clinometer and compass	4 unit	1 set	4	12,200	48,800
Sunto Altimeter	4 unit	1 set	4	1,700	6,800
Binocular Nikon 8x42 Trail blazer	4 unit	1 set	4	6,240	24,960
GPS	4 unit	1 set	4	11,800	47,200
7 Megapixel Digital Camera	4 unit	1 set	4	7,200	28,800
Sleeping bag	20 unit	1 set	20	4,500	90,000
Mattress	20 unit	1 set	20	400	8,000
2 person Tent	10 unit	1 set	10	15,000	150,000
4 person Tent	12 unit	1 set	12	17,500	210,000
First Aid Kit	6 unit	1 set	6	900	5,400
Animals of India	4 books	1 set	4	1,536	6,144
Pocket Guide to the Birds of the Indian Subcontinent	4 books	1 set	4	1,968	7,872
<i>Fiscal Year 3</i>					3,808,350
(a) Rapid biodiversity survey					3,808,350
One group with 4 specialists	1 group	325 days	325	11,718	3,808,350 Annex 24
<i>Fiscal Year 4</i>					3,808,350
(a) Rapid biodiversity survey					3,808,350
One group with 4 specialists	1 group	325 days	325	11,718	3,808,350 Annex 24
<i>Fiscal Year 5</i>					3,808,350
(a) Rapid biodiversity survey					3,808,350
One group with 4 specialists	1 group	325 days	325	11,718	3,808,350 Annex 24
<i>Fiscal Year 6</i>					3,808,350
(a) Rapid biodiversity survey					3,808,350
One group with 4 specialists	1 group	325 days	325	11,718	3,808,350 Annex 24
<i>Fiscal Year 7</i>					3,808,350
(a) Rapid biodiversity survey					3,808,350
One group with 4 specialists	1 group	325 days	325	11,718	3,808,350 Annex 24
<i>Fiscal Year 8</i>					3,808,350
(a) Rapid biodiversity survey					3,808,350
One group with 4 specialists	1 group	325 days	325	11,718	3,808,350 Annex 24
<i>Fiscal Year 9</i>					3,808,350
(a) Rapid biodiversity survey					3,808,350
One group with 4 specialists	1 group	325 days	325	11,718	3,808,350 Annex 24
<i>Fiscal Year 10</i>					

Annex 22 Detailed cost estimate by subcomponent and year

Table C2-1-3 Study of impacts of climate change and grazing in the Himalayan ecosystem

Component and cost items	Quantity		Unit cost d	Total e=c*d	Detailed estimates
	a	b			
C2 Forest and biodiversity conservation					
C2-1 Enhancement and management of forest and biodiversity information base					
C2-1-3 Study of impacts of climate change and grazing in the Himalayan ecosystem					6,551,162
<i>Fiscal Year 1</i>					
<i>Fiscal Year 2</i>					2,500,000
(a) Study of impacts of climate change in the Himalayan ecosystem					2,500,000
Procurement of climatological equipment	1 unit	1 set	1	2,500,000	2,500,000
<i>Fiscal Year 3</i>					1,921,122
(a) Study of impacts of climate change in the Himalayan ecosystem					852,500
Advertising set	3 newspaper	1 week	3	40,000	120,000
Alpine climate Expert	1 person	1 month	1	300,000	300,000 Annex 24
In-state expert	1 person	1 month	1	80,000	80,000 Annex 24
In-state research assistants	2 person	2 month	4	12,000	48,000
Field crew (porters and guide)	5 person	21 days	105	500	52,500
field logistics/Camp facilities	4 person	21 days	84	3,000	252,000
(b) Study of impacts of grazing in the Himalayan ecosystem					1,068,622
Graduate Researcher	3 person	12 month	36	20,000	720,000
Supervisor	1 person	1 month	1	100,000	100,000 Annex 24
Sleeping bag	6 person	1 unit	6	4,500	27,000
Back pack	6 person	1 unit	6	1,990	11,940
Mattress	6 person	1 unit	6	400	2,400
DBH Tape	3 unit	1 unit	3	250	750
Rolling measuring tape	3 unit	1 unit	3	2,500	7,500
Binocular Nikon 8x42 Trail blazer	3 unit	1 unit	3	6,240	18,720
GPS	3 unit	1 unit	3	11,800	35,400
Sunto Clinometer and compass	3 unit	1 unit	3	12,200	36,600
Altimeter	3 unit	1 unit	3	1,700	5,100
2 person Tent	6 unit	1 unit	6	15,000	90,000
First Aid Kit	3 unit	1 unit	3	900	2,700
Indian Animals of India	3 book	1 unit	3	1,536	4,608
Pocket Guide to the Birds of the Indian Subcontinent	3 book	1 unit	3	1,968	5,904
<i>Fiscal Year 4</i>					1,397,540
(a) Study of impacts of climate change in the Himalayan ecosystem					732,500
Alpine climate Expert	1 person	1 month	1	300,000	300,000
In-state expert	1 person	1 month	1	80,000	80,000
In-state research assistants	2 person	2 month	4	12,000	48,000
Field crew	5 person	21 days	105	500	52,500
field logistics/Camp facilities	4 person	21 days	84	3,000	252,000
(b) Study of impacts of grazing in the Himalayan ecosystem					665,040
Graduate Researcher	3 person	12 month	36	12,000	432,000
Supervisor	1 person	3 month	3	33,000	99,000
Sleeping bag	6 person	1 unit	6	4,500	27,000
Back pack	6 person	1 unit	6	1,990	11,940
Mattress	6 person	1 unit	6	400	2,400
2 person Tent	6 unit	1 unit	6	15,000	90,000
First Aid Kit	3 unit	1 unit	3	900	2,700
<i>Fiscal Year 5</i>					732,500
(a) Study of impacts of climate change in the Himalayan ecosystem					732,500
Alpine climate Expert	1 person	1 month	1	300,000	300,000
In-state expert	1 person	1 month	1	80,000	80,000
In-state research assistants	2 person	2 month	4	12,000	48,000
Field crew	5 person	21 days	105	500	52,500
field logistics/Camp facilities	4 person	21 days	84	3,000	252,000
<i>Fiscal Year 6</i>					
<i>Fiscal Year 7</i>					
<i>Fiscal Year 8</i>					
<i>Fiscal Year 9</i>					
<i>Fiscal Year 10</i>					

Annex 22 Detailed cost estimate by subcomponent and year

Table C2-2-1 Redefinition of protected area boundaries and improvement of the protected area network

Component and cost items	Quantity			Unit cost	Total	Detailed estimates
	a	b	c=a*b	d	e=c*d	
C2 Forest and biodiversity conservation						
C2-2 Enhancement of the basis for forest management and biodiversity conservation						
C2-2-1 Redefinition of protected area boundaries and improvement of the protected area network					23,713,040	
<i>Fiscal Year 1</i>						
<i>Fiscal Year 2</i>						
<i>Fiscal Year 3</i>					2,605,100	
(a) Extension and rationalization of protected and primary forest area boundaries					2,605,100	
In-state research assistants	8 person	6 months	48	12,000	576,000	
Camp facilities and field logistics	8 person	120 days	960	2,000	1,920,000	
GPS	1 unit	2 set	2	11,800	23,600	
Sleeping bag	1 unit	4 set	4	4,500	18,000	
Mattress	1 unit	4 set	4	400	1,600	
2 person Tent	1 unit	2 set	2	15,000	30,000	
4 person Tent	1 unit	2 set	2	17,500	35,000	
First Aid Kit	1 unit	1 set	1	900	900	
<i>Fiscal Year 4</i>					9,455,440	
(a) Extension and rationalization of protected and primary forest area boundaries					3,618,140	
Field crew	10 person	160 days	1,600	500	800,000	
Camp facilities and field logistics	8 person	160 days	1,280	2,000	2,560,000	
Sunto Clinometer and compass	1 unit	1 unit	1	12,200	12,200	
Sunto Altimeter	1 unit	1 unit	1	1,700	1,700	
Binocular Nikon 8x42 Trail blazer	1 unit	1 unit	1	6,240	6,240	
GPS	1 unit	1 unit	1	11,800	11,800	
Sleeping bag	1 unit	6 unit	6	4,500	27,000	
Mattress	1 unit	6 unit	6	400	2,400	
2 person Tent	1 unit	6 unit	6	15,000	90,000	
4 person Tent	1 unit	6 unit	6	17,500	105,000	
First Aid Kit	1 unit	2 unit	2	900	1,800	
(c) Establishment of new national parks					2,226,800	
Field crew	4 person	120 days	480	500	240,000	
Camp facilities and field logistics	8 person	120 days	960	2,000	1,920,000	
2 person Tent	1 unit	2 unit	2	15,000	30,000	
4 person Tent	1 unit	2 unit	2	17,500	35,000	
First Aid Kit	1 unit	2 unit	2	900	1,800	
(d) Improvement and monitoring of the protected area management plans					3,610,500	
Protected area expert	1 person	4 month	4	300,000	1,200,000	
In-state research assistants	2 person	8 month	16	12,000	192,000	
Field logistics/Camp facilities	4 person	120 days	480	3,000	1,440,000	
Public awareness	8 village	50 village	400	1,730	692,000	Table D2-5. A
Workshop	1 set	50 person	50	1,730	86,500	Table D2-5. A
<i>Fiscal Year 5</i>					3,610,500	
(d) Improvement and monitoring of the protected area management plans					3,610,500	
Protected area expert	1 person	4 month	4	300,000	1,200,000	
In-state research assistants	2 person	8 month	16	12,000	192,000	
Field logistics/Camp facilities	4 person	120 days	480	3,000	1,440,000	
Public awareness	8 village	50 village	400	1,730	692,000	Table D2-5. A
Workshop	1 set	50 person	50	1,730	86,500	Table D2-5. A
<i>Fiscal Year 6</i>					5,221,250	
(b) Establishment of protected area boundary pillars					2,820,750	
Park boundary pillars	1 unit	375 set	375	7,522	2,820,750	
(d) Improvement and monitoring of the protected area management plans					2,400,500	
Protected area expert	1 person	4 month	4	300,000	1,200,000	
In-state research assistants	2 person	2 month	4	12,000	48,000	
field logistics/Camp facilities	4 person	60 days	240	3,000	720,000	
Public awareness	4 village	50 village	200	1,730	346,000	
Workshop	1 set	50 person	50	1,730	86,500	
<i>Fiscal Year 7</i>					2,820,750	
(b) Establishment of protected area boundary pillars					2,820,750	
Park boundary pillars	1 unit	375 set	375	7,522	2,820,750	
<i>Fiscal Year 8</i>						
<i>Fiscal Year 9</i>						
<i>Fiscal Year 10</i>						

Annex 22 Detailed cost estimate by subcomponent and year

Table C2-2-2 Management and conservation of flagship species habitats						
Component and cost items	Quantity		Unit cost d	Total e=c*d	Detailed estimates	
	a	b				
C2 Forest and biodiversity conservation						
C2-2 Enhancement of the basis for forest management and biodiversity conservation						
C2-2-2 Management and conservation of flagship species habitats				25,374,464		
<i>Fiscal Year 1</i>						
<i>Fiscal Year 2</i>				7,510,464		
(a) Management and conservation of flagship species habitats				7,510,464		
Flagship species surveyor (incl. travel & accom.)	8 person	12 month	96	40,000	3,840,000	Annex 24
In-state research assistants	6 person	8 month	48	12,000	576,000	
Field logistics/Camp facilities	4 person	120 days	480	3,000	1,440,000	
Field crew (porters and guide)	6 person	360 days	2,160	500	1,080,000	
Sunto Clinometer and compass	6 unit	1 unit	6	12,200	73,200	
Sunto Altimeter	6 unit	1 unit	6	1,700	10,200	
Binocular Nikon 8x42 Trail blazer	6 unit	1 unit	6	6,240	37,440	
GPS	6 unit	1 unit	6	11,800	70,800	
Sleeping bag	12 unit	1 unit	12	4,500	54,000	
Mattress	6 unit	1 unit	6	400	2,400	
2 person Tent	6 unit	1 unit	6	15,000	90,000	
4 person Tent	12 unit	1 unit	12	17,500	210,000	
First Aid Kit	6 unit	1 unit	6	900	5,400	
Indian Animals of India	6 book	1 books	6	1,536	9,216	
Pocket Guide to the Birds of the Indian Subcontinent	6 book	1 books	6	1,968	11,808	
<i>Fiscal Year 3</i>					6,936,000	
(a) Management and conservation of flagship species habitats				6,936,000		
Flagship species surveyor (incl. travel & accom.)	8 person	12 month	96	40,000	3,840,000	Annex 24
In-state research assistants	6 person	8 month	48	12,000	576,000	
Field logistics/Camp facilities	4 person	120 days	480	3,000	1,440,000	
Field crew (porters and guide)	6 person	360 days	2,160	500	1,080,000	
<i>Fiscal Year 4</i>						
<i>Fiscal Year 5</i>						
<i>Fiscal Year 6</i>					5,464,000	
(a) Management and conservation of flagship species habitats				5,464,000		
Flagship species surveyor (incl. travel & accom.)	8 person	8 month	64	40,000	2,560,000	Annex 24
In-state research assistants	8 person	4 month	32	12,000	384,000	
Field logistics/Camp facilities	4 person	120 days	480	3,000	1,440,000	
Field crew (porters and guide)	6 person	360 days	2,160	500	1,080,000	
<i>Fiscal Year 7</i>					5,464,000	
(a) Management and conservation of flagship species habitats				5,464,000		
Flagship species surveyor (incl. travel & accom.)	8 person	8 month	64	40,000	2,560,000	Annex 24
In-state research assistants	8 person	4 month	32	12,000	384,000	
Field logistics/Camp facilities	4 person	120 days	480	3,000	1,440,000	
Field crew (porters and guide)	6 person	360 days	2,160	500	1,080,000	
<i>Fiscal Year 8</i>						
<i>Fiscal Year 9</i>						
<i>Fiscal Year 10</i>						

Annex 22 Detailed cost estimate by subcomponent and year

Table C2-2-3 Enhancement of working plans and establishment of forest management zones

Component and cost items	Quantity		Unit cost d	Total e=c*d	Detailed estimates
	a	b			
C2 Forest and biodiversity conservation					
C2-2 Enhancement of the basis for forest management and biodiversity conservation					
C2-2-3 Enhancement of working plans and establishment of forest management zones					24,749,620
Fiscal Year 1					
Fiscal Year 2					
Fiscal Year 3					3,535,660
(a) Enhancement of working plans and establishment of forest management zones					3,535,660
Clearance of forest boundary survey line	1 unit	20 km	20	15,600	312,000 Schedule of Rates
Boundary pillars (2.14m steel pole with concrete base)	10 pillar	20 km	200	7,522	1,504,400 Schedule of Rates
Working plan survey	1 unit	60 plot	60	7,472	448,320 Schedule of Rates
Tree enumeration work under working plan for plantation	1 unit	40 plot	40	2,690	107,600 Schedule of Rates
Field work for preparation of preliminary working plan report	1 unit	20 compartn	20	4,167	83,340 Schedule of Rates
In-state research assistants	2 person	12 month	24	12,000	288,000
Miscellaneous (equipment and consumables)	1 lump sum	1 unit	1	100,000	100,000
Workshop	4 set	100 person	400	1,730	692,000 Table D2-5. A
Fiscal Year 4					3,535,660
(a) Enhancement of working plans and establishment of forest management zones					3,535,660
Clearance of forest boundary survey line	1 unit	20 km	20	15,600	312,000 Schedule of Rates
Boundary pillars (2.14m steel pole with concrete base)	10 pillar	20 km	200	7,522	1,504,400 Schedule of Rates
Working plan survey	1 unit	60 plot	60	7,472	448,320 Schedule of Rates
Tree enumeration work under working plan for plantation	1 unit	40 plot	40	2,690	107,600 Schedule of Rates
Field work for preparation of preliminary working plan report	1 unit	20 compartn	20	4,167	83,340 Schedule of Rates
In-state research assistants	2 person	12 month	24	12,000	288,000
Miscellaneous (equipment and consumables)	1 lump sum	1 unit	1	100,000	100,000
Workshop	4 set	100 person	400	1,730	692,000 Table D2-5. A
Fiscal Year 5					3,535,660
(a) Enhancement of working plans and establishment of forest management zones					3,535,660
Clearance of forest boundary survey line	1 unit	20 km	20	15,600	312,000 Schedule of Rates
Boundary pillars (2.14m steel pole with concrete base)	10 pillar	20 km	200	7,522	1,504,400 Schedule of Rates
Working plan survey	1 unit	60 plot	60	7,472	448,320 Schedule of Rates
Tree enumeration work under working plan for plantation	1 unit	40 plot	40	2,690	107,600 Schedule of Rates
Field work for preparation of preliminary working plan report	1 unit	20 compartn	20	4,167	83,340 Schedule of Rates
In-state research assistants	2 person	12 month	24	12,000	288,000
Miscellaneous (equipment and consumables)	1 lump sum	1 unit	1	100,000	100,000
Workshop	4 set	100 person	400	1,730	692,000 Table D2-5. A
Fiscal Year 6					3,535,660
(a) Enhancement of working plans and establishment of forest management zones					3,535,660
Clearance of forest boundary survey line	1 unit	20 km	20	15,600	312,000 Schedule of Rates
Boundary pillars (2.14m steel pole with concrete base)	10 pillar	20 km	200	7,522	1,504,400 Schedule of Rates
Working plan survey	1 unit	60 plot	60	7,472	448,320 Schedule of Rates
Tree enumeration work under working plan for plantation	1 unit	40 plot	40	2,690	107,600 Schedule of Rates
Field work for preparation of preliminary working plan report	1 unit	20 compartn	20	4,167	83,340 Schedule of Rates
In-state research assistants	2 person	12 month	24	12,000	288,000
Miscellaneous (equipment and consumables)	1 lump sum	1 unit	1	100,000	100,000
Workshop	4 set	100 person	400	1,730	692,000 Table D2-5. A
Fiscal Year 7					3,535,660
(a) Enhancement of working plans and establishment of forest management zones					3,535,660
Clearance of forest boundary survey line	1 unit	20 km	20	15,600	312,000 Schedule of Rates
Boundary pillars (2.14m steel pole with concrete base)	10 pillar	20 km	200	7,522	1,504,400 Schedule of Rates
Working plan survey	1 unit	60 plot	60	7,472	448,320 Schedule of Rates
Tree enumeration work under working plan for plantation	1 unit	40 plot	40	2,690	107,600 Schedule of Rates
Field work for preparation of preliminary working plan report	1 unit	20 compartn	20	4,167	83,340 Schedule of Rates
In-state research assistants	2 person	12 month	24	12,000	288,000
Miscellaneous (equipment and consumables)	1 lump sum	1 unit	1	100,000	100,000
Workshop	4 set	100 person	400	1,730	692,000 Table D2-5. A
Fiscal Year 8					3,535,660
(a) Enhancement of working plans and establishment of forest management zones					3,535,660
Clearance of forest boundary survey line	1 unit	20 km	20	15,600	312,000 Schedule of Rates
Boundary pillars (2.14m steel pole with concrete base)	10 pillar	20 km	200	7,522	1,504,400 Schedule of Rates
Working plan survey	1 unit	60 plot	60	7,472	448,320 Schedule of Rates
Tree enumeration work under working plan for plantation	1 unit	40 plot	40	2,690	107,600 Schedule of Rates
Field work for preparation of preliminary working plan report	1 unit	20 compartn	20	4,167	83,340 Schedule of Rates
In-state research assistants	2 person	12 month	24	12,000	288,000
Miscellaneous (equipment and consumables)	1 lump sum	1 unit	1	100,000	100,000
Workshop	4 set	100 person	400	1,730	692,000 Table D2-5. A
Fiscal Year 9					3,535,660
(a) Enhancement of working plans and establishment of forest management zones					3,535,660
Clearance of forest boundary survey line	1 unit	20 km	20	15,600	312,000 Schedule of Rates
Boundary pillars (2.14m steel pole with concrete base)	10 pillar	20 km	200	7,522	1,504,400 Schedule of Rates
Working plan survey	1 unit	60 plot	60	7,472	448,320 Schedule of Rates
Tree enumeration work under working plan for plantation	1 unit	40 plot	40	2,690	107,600 Schedule of Rates
Field work for preparation of preliminary working plan report	1 unit	20 compartn	20	4,167	83,340 Schedule of Rates
In-state research assistants	2 person	12 month	24	12,000	288,000
Miscellaneous (equipment and consumables)	1 lump sum	1 unit	1	100,000	100,000
Workshop	4 set	100 person	400	1,730	692,000 Table D2-5. A
Fiscal Year 10					3,535,660
(a) Enhancement of working plans and establishment of forest management zones					3,535,660
Clearance of forest boundary survey line	1 unit	20 km	20	15,600	312,000 Schedule of Rates
Boundary pillars (2.14m steel pole with concrete base)	10 pillar	20 km	200	7,522	1,504,400 Schedule of Rates
Working plan survey	1 unit	60 plot	60	7,472	448,320 Schedule of Rates
Tree enumeration work under working plan for plantation	1 unit	40 plot	40	2,690	107,600 Schedule of Rates
Field work for preparation of preliminary working plan report	1 unit	20 compartn	20	4,167	83,340 Schedule of Rates
In-state research assistants	2 person	12 month	24	12,000	288,000
Miscellaneous (equipment and consumables)	1 lump sum	1 unit	1	100,000	100,000
Workshop	4 set	100 person	400	1,730	692,000 Table D2-5. A

Annex 22 Detailed cost estimate by subcomponent and year

Table C2-3-1 Facilitation of inscription process of Khangchendzonga Biosphere Reserve on the World Heritage List						
Component and cost items	Quantity		Unit cost	Total	Detailed estimates	
	a	b	c=a*b	d		
C2 Forest and biodiversity conservation						
C2-3 Facilitation of inscription process of Khangchendzonga Biosphere Reserve on the World Heritage List						
C2-3-1 Facilitation of inscription process of Khangchendzonga Biosphere Reserve on the World Heritage List				2,286,500		
<i>Fiscal Year 1</i>						
<i>Fiscal Year 2</i>				<i>2,286,500</i>		
(a) Case history documentation and review						
National Experts	2 person	3 month	6	300,000	1,800,000	Annex 24
Preparation and delivery of the document	1 set	1 unit	1	400,000	400,000	
Workshop	1 set	50 person	50	1,730	86,500	Table D2-5. A
<i>Fiscal Year 3</i>						
<i>Fiscal Year 4</i>						
<i>Fiscal Year 5</i>						
<i>Fiscal Year 6</i>						
<i>Fiscal Year 7</i>						
<i>Fiscal Year 8</i>						
<i>Fiscal Year 9</i>						
<i>Fiscal Year 10</i>						

Annex 22 Detailed cost estimate by subcomponent and year

Component and cost items	Quantity			Unit cost d	Total e=c*d	Detailed estimates
	a	b	c=a*b			
Table C2-4-1 Ex-situ conservation of biodiversity						
C2 Forest and biodiversity conservation						
C2-4 Ex-situ conservation and promotion of biodiversity conservation						
C2-4-1 Ex-situ conservation of biodiversity						167,059,800
Fiscal Year 1						51,520,000
(a) Construction and establishment of a butterfly park						36,060,000
Tender doc/advertising for construction work	1 unit	1 set	1	10,000		
Construction work	0.50 unit	1 set	0.50	70,000,000	35,000,000	Annex 9
Architect's fee (3% of civil cost)	1 firm	1 set	1	1,050,000	1,050,000	
(b) Construction and establishment of a bird park						15,460,000
Tender doc/advertising for construction work	1 unit	1 set	1	10,000	10,000	
Construction work	0.50 unit	1 set	0.50	30,000,000	15,000,000	Annex 9
Architect's fee (3% of civil cost)	1 firm	1 set	1	450,000	450,000	
Fiscal Year 2						61,620,000
(a) Construction and establishment of a butterfly park						36,360,000
Construction work	0.50 unit	1 set	0.50	70,000,000	35,000,000	Annex 9
Architect's fee (3% of civil cost)	1 firm	1 set	1	1,050,000	1,050,000	
Selection of management firm (tender docs)	1 unit	1 set	1	10,000	10,000	
Training of management firm staff	3 person	2 times	6	50,000	300,000	
(b) Construction and establishment of a bird park						15,760,000
Construction work	0.50 unit	1 set	0.50	30,000,000	15,000,000	Annex 9
Architect's fee (3% of civil cost)	1 firm	1 set	1	450,000	450,000	
Selection of management firm (tender docs)	1 unit	1 set	1	10,000	10,000	
Training of management firm staff	3 person	2 times	6	50,000	300,000	
(c) Creation and management of propagation nursery						9,500,000
Creation of propagation nursery (lowland)	4 unit	1 set	4	1,000,000	4,000,000	Table D4-11-3
Creation of propagation nursery (highland)	1 unit	1 set	1	1,500,000	1,500,000	Table D4-11-3
Creation of floriculture nursery	1 unit	2 set	2	2,000,000	4,000,000	Table D4-11-4
Fiscal Year 3						12,152,470
(a) Construction and establishment of a butterfly park						150,000
Training of management firm staff	3 person	1 times	3	50,000	150,000	
(b) Construction and establishment of a bird park						150,000
Training of management firm staff	3 person	1 times	3	50,000	150,000	
(c) Creation and management of propagation nursery						5,200,000
Management of propagation nursery (lowland)	4 unit	1 set	4	600,000	2,400,000	Table D4-11-5
Management of propagation nursery (highland)	1 unit	1 set	1	800,000	800,000	Table D4-11-5
Management of floriculture nursery	1 unit	2 set	2	1,000,000	2,000,000	Table D4-11-6
(d) Construction of main office building of Himalayan Zoological Park and veterinary care facility						6,652,470
Tender doc/advertising for construction work	1 set	1 unit	1	10,000	10,000	
Construction of main office	1 set	1 unit	1	6,449,000	6,449,000	Table D2-6
Architect's fee (3% of civil cost)	1 firm	1 unit	1	193,470	193,470	
Fiscal Year 4						10,567,330
(d) Construction of main office building of Himalayan Zoological Park and veterinary care facility						5,367,330
Construction of zookeepers office and quarters	1 set	1 unit	1	5,211,000	5,211,000	Table D2-7 & 8
Architect's fee (3% of civil cost)	1 firm	1 unit	1	156,330	156,330	
(c) Creation and management of propagation nursery						5,200,000
Management of propagation nursery (lowland)	4 unit	1 set	4	600,000	2,400,000	Table D4-11-5
Management of propagation nursery (highland)	1 unit	1 set	1	800,000	800,000	Table D4-11-5
Management of floriculture nursery	1 unit	2 set	2	1,000,000	2,000,000	Table D4-11-6
Fiscal Year 5						5,200,000
(c) Creation and management of propagation nursery						5,200,000
Management of propagation nursery (lowland)	4 unit	1 set	4	600,000	2,400,000	Table D4-11-5
Management of propagation nursery (highland)	1 unit	1 set	1	800,000	800,000	Table D4-11-5
Management of floriculture nursery	1 unit	2 set	2	1,000,000	2,000,000	Table D4-11-6
Fiscal Year 6						5,200,000
(c) Creation and management of propagation nursery						5,200,000
Management of propagation nursery (lowland)	4 unit	1 set	4	600,000	2,400,000	Table D4-11-5
Management of propagation nursery (highland)	1 unit	1 set	1	800,000	800,000	Table D4-11-5
Management of floriculture nursery	1 unit	2 set	2	1,000,000	2,000,000	Table D4-11-6
Fiscal Year 7						5,200,000
(c) Creation and management of propagation nursery						5,200,000
Management of propagation nursery (lowland)	4 unit	1 set	4	600,000	2,400,000	Table D4-11-5
Management of propagation nursery (highland)	1 unit	1 set	1	800,000	800,000	Table D4-11-5
Management of floriculture nursery	1 unit	2 set	2	1,000,000	2,000,000	Table D4-11-6
Fiscal Year 8						5,200,000
(c) Creation and management of propagation nursery						5,200,000
Management of propagation nursery (lowland)	4 unit	1 set	4	600,000	2,400,000	Table D4-11-5
Management of propagation nursery (highland)	1 unit	1 set	1	800,000	800,000	Table D4-11-5
Management of floriculture nursery	1 unit	2 set	2	1,000,000	2,000,000	Table D4-11-6
Fiscal Year 9						5,200,000
(c) Creation and management of propagation nursery						5,200,000
Management of propagation nursery (lowland)	4 unit	1 set	4	600,000	2,400,000	Table D4-11-5
Management of propagation nursery (highland)	1 unit	1 set	1	800,000	800,000	Table D4-11-5
Management of floriculture nursery	1 unit	2 set	2	1,000,000	2,000,000	Table D4-11-6
Fiscal Year 10						5,200,000
(c) Creation and management of propagation nursery						5,200,000
Management of propagation nursery (lowland)	4 unit	1 set	4	600,000	2,400,000	Table D4-11-5
Management of propagation nursery (highland)	1 unit	1 set	1	800,000	800,000	Table D4-11-5
Management of floriculture nursery	1 unit	2 set	2	1,000,000	2,000,000	Table D4-11-6

Annex 22 Detailed cost estimate by subcomponent and year

Table C2-4-2 Knowledge generation and dissemination of biodiversity and best practice information						
Component and cost items	Quantity		Unit cost d	Total e=c*d	Detailed estimates	
	a	b				
C2 Forest and biodiversity conservation						
C2-4 Ex-situ conservation and promotion of biodiversity conservation						
C2-4-2 Knowledge generation and dissemination of biodiversity and best practice information					20,128,560	
Fiscal Year 1						
Fiscal Year 2					10,188,560	
(a) Establishment of Sikkim Biodiversity Centre						
1) Architects reviews the plans of the facilities and call for tender for construction firms						
Tender doc/advertising	1 set	1 unit	1	10,000	10,000	
2) Selection of construction firms, and construction						
Construction of Sikkim Biodiversity Centre	1 facility	1 unit	1	7,552,000	7,552,000	Table D2-9
Construction of a large interpretation centre (cost to be met by Ecotourism Component)						Table D2-10
Architect's fee (3% of civil cost)	1 firm	1 unit	1	226,560	226,560	
3) Enhancement of the water analysis lab						
Water Analysis lab equipment	0.50 unit	1 set	0.50	4,000,000	2,000,000	Table D2-4. A
Limnology expert	1 person	4 month	4	100,000	400,000	Annex 24
Fiscal Year 3					3,485,000	
(a) Establishment of Sikkim Biodiversity Centre						
3) Enhancement of the water analysis lab						
Water Analysis lab equipment	0.50 unit	1 set	0.50	4,000,000	2,000,000	Table D2-4. A
(b) Grant scheme for enhancement of biodiversity research and extension						
College graduates field grant	2 person	6 month	12	10,000	120,000	
University/college nature workshop	1 set	50 person	50	1,730	86,500	Table D2-5. A
Teachers' nature workshop	1 set	50 person	50	1,730	86,500	Table D2-5. A
School student workshop	4 set	50 person	200	1,730	346,000	Table D2-5. A
Annual protected area manager's meeting	1 set	50 person	50	1,730	86,500	Table D2-5. A
Annual PSS meeting	1 set	50 person	50	1,730	86,500	Table D2-5. A
Annual JFM meeting	1 set	50 person	50	1,730	86,500	Table D2-5. A
Annual EDC meeting	1 set	50 person	50	1,730	86,500	Table D2-5. A
(c) Production and dissemination of booklets of best practices						
Production and dissemination of booklets	1 unit	1 set	1	500,000	500,000	
Fiscal Year 4					1,485,000	
(b) Grant scheme for enhancement of biodiversity research and extension						
College graduates field grant	2 person	6 month	12	10,000	120,000	
University/college nature workshop	1 set	50 person	50	1,730	86,500	Table D2-5. A
Teachers' nature workshop	1 set	50 person	50	1,730	86,500	Table D2-5. A
School student workshop	4 set	50 person	200	1,730	346,000	Table D2-5. A
Annual protected area manager's meeting	1 set	50 person	50	1,730	86,500	Table D2-5. A
Annual PSS meeting	1 set	50 person	50	1,730	86,500	Table D2-5. A
Annual JFM meeting	1 set	50 person	50	1,730	86,500	Table D2-5. A
Annual EDC meeting	1 set	50 person	50	1,730	86,500	Table D2-5. A
(c) Production and dissemination of booklets of best practices						
Production and dissemination of booklets	1 unit	1 set	1	500,000	500,000	
Fiscal Year 5					1,485,000	
(b) Grant scheme for enhancement of biodiversity research and extension						
College graduates field grant	2 person	6 month	12	10,000	120,000	
University/college nature workshop	1 set	50 person	50	1,730	86,500	Table D2-5. A
Teachers' nature workshop	1 set	50 person	50	1,730	86,500	Table D2-5. A
School student workshop	4 set	50 person	200	1,730	346,000	Table D2-5. A
Annual protected area manager's meeting	1 set	50 person	50	1,730	86,500	Table D2-5. A
Annual PSS meeting	1 set	50 person	50	1,730	86,500	Table D2-5. A
Annual JFM meeting	1 set	50 person	50	1,730	86,500	Table D2-5. A
Annual EDC meeting	1 set	50 person	50	1,730	86,500	Table D2-5. A
(c) Production and dissemination of booklets of best practices						
Production and dissemination of booklets	1 unit	1 set	1	500,000	500,000	
Fiscal Year 6					1,485,000	
(b) Grant scheme for enhancement of biodiversity research and extension						
College graduates field grant	2 person	6 month	12	10,000	120,000	
University/college nature workshop	1 set	50 person	50	1,730	86,500	Table D2-5. A
Teachers' nature workshop	1 set	50 person	50	1,730	86,500	Table D2-5. A
School student workshop	4 set	50 person	200	1,730	346,000	Table D2-5. A
Annual protected area manager's meeting	1 set	50 person	50	1,730	86,500	Table D2-5. A
Annual PSS meeting	1 set	50 person	50	1,730	86,500	Table D2-5. A
Annual JFM meeting	1 set	50 person	50	1,730	86,500	Table D2-5. A
Annual EDC meeting	1 set	50 person	50	1,730	86,500	Table D2-5. A
(c) Production and dissemination of booklets of best practices						
Production and dissemination of booklets	1 unit	1 set	1	500,000	500,000	
Fiscal Year 7					500,000	
(c) Production and dissemination of booklets of best practices						
Production and dissemination of booklets	1 unit	1 set	1	500,000	500,000	
Fiscal Year 8					500,000	
(c) Production and dissemination of booklets of best practices						
Production and dissemination of booklets	1 unit	1 set	1	500,000	500,000	
Fiscal Year 9					500,000	
(c) Production and dissemination of booklets of best practices						
Production and dissemination of booklets	1 unit	1 set	1	500,000	500,000	
Fiscal Year 10					500,000	
(c) Production and dissemination of booklets of best practices						
Production and dissemination of booklets	1 unit	1 set	1	500,000	500,000	

Annex 22 Detailed cost estimate by subcomponent and year

Table C2-4-3 Promotion of biodiversity conservation in religious areas

Component and cost items	Quantity		Unit cost	Total	Detailed estimates
	a	b	c=a*b	d	e=c*d
C2 Forest and biodiversity conservation					
C2-4 Ex-situ conservation and promotion of biodiversity conservation					
C2-4-3 Promotion of biodiversity conservation in religious areas				18,841,200	
<i>Fiscal Year 1</i>					
<i>Fiscal Year 2</i>				2,691,600	
(a) Promotion biodiversity conservation in monasteries, secret groves and other religious areas				2,691,600	
Planting and first year maintenance	1 unit	20 areas	20	134,580	2,691,600 Table D4-11
<i>Fiscal Year 3</i>				2,691,600	
(a) Promotion biodiversity conservation in monasteries, secret groves and other religious areas				2,691,600	
Planting and first year maintenance	1 unit	20 areas	20	134,580	2,691,600 Table D4-11
<i>Fiscal Year 4</i>				2,691,600	
(a) Promotion biodiversity conservation in monasteries, secret groves and other religious areas				2,691,600	
Planting and first year maintenance	1 unit	20 areas	20	134,580	2,691,600 Table D4-11
<i>Fiscal Year 5</i>				2,691,600	
(a) Promotion biodiversity conservation in monasteries, secret groves and other religious areas				2,691,600	
Planting and first year maintenance	1 unit	20 areas	20	134,580	2,691,600 Table D4-11
<i>Fiscal Year 6</i>				2,691,600	
(a) Promotion biodiversity conservation in monasteries, secret groves and other religious areas				2,691,600	
Planting and first year maintenance	1 unit	20 areas	20	134,580	2,691,600 Table D4-11
<i>Fiscal Year 7</i>				2,691,600	
(a) Promotion biodiversity conservation in monasteries, secret groves and other religious areas				2,691,600	
Planting and first year maintenance	1 unit	20 areas	20	134,580	2,691,600 Table D4-11
<i>Fiscal Year 8</i>				2,691,600	
(a) Promotion biodiversity conservation in monasteries, secret groves and other religious areas				2,691,600	
Planting and first year maintenance	1 unit	20 areas	20	134,580	2,691,600 Table D4-11
<i>Fiscal Year 9</i>					
<i>Fiscal Year 10</i>					

Annex 22 Detailed cost estimate by subcomponent and year

Table C3-1-1 Formulation of an ecotourism policy						
Component and cost items	Quantity			Unit cost	Total	Detailed estimates
	a	b	c=a*b	d	e=c*d	
C3 Ecotourism						
C3-1 Formulation of a policy and regulatory environment for ecotourism						
C3-1-1 Formulation of an ecotourism policy					1,628,000	
<i>Fiscal Year 1</i>						
<i>Fiscal Year 2</i>					<i>1,628,000</i>	
(a) Set up ecotourism policy committee and development of draft policy					806,000	
Call for tender (tender document and advertising)	1 set	1 unit	1	10,000	10,000	
Engage a consultant to formulate the policy	1 person	90 days	90	7,000	630,000	
Travel cost (flights to/from Gangtok including transfers)	1 person	1 flight	1	16,000	16,000	
Newspaper advertising	3 newspapers	1 week	3	40,000	120,000	
Cable TV advertising	1 cable TV	1 week	1	30,000	30,000	
(b) Public hearing in 4 districts					452,000	
Event management (INR 2,000 for 5 days)	1 person	4 districts	4	10,000	40,000	
Assistants INR 500 a day for 3 days	2 person	4 districts	8	3,000	24,000	
Renting hall	1 hall	4 districts	4	10,000	40,000	
Travel of officers and media (5 cars at INR 2,000 x 3 days)	5 car	4 districts	20	6,000	120,000	
hire audiovisual system	1 unit	4 districts	4	4,000	16,000	
hire sound system	1 unit	4 districts	4	5,000	20,000	
Photography and video including copies	1 contract	4 districts	4	20,000	80,000	
Banners	1 set	4 districts	4	20,000	80,000	
Contingency	1 unit	4 districts	4	5,000	20,000	
5 pages X 300 copies X 4 (per district)	1,500 page	4 district	6,000	2	12,000	
(c) Finalization and campaign of policy					370,000	
Document production	5 pages	1,000 docs.	5,000	30	150,000	
Media announcement (3 newspapers: 2 English, 1 Nepali)	3 newspapers	1 set	3	40,000	120,000	
Media announcement	1 cable TV	1 week	1	30,000	30,000	
Media conference (Forest Department hall)	1 hall	1 district	1	10,000	10,000	
Press kit/releases (local and all India)	1 kit	1	1	10,000	10,000	
Document to explain the policy - send to trade media	1,000 docs.	1 set	1,000	50	50,000	
<i>Fiscal Year 3</i>						
<i>Fiscal Year 4</i>						
<i>Fiscal Year 5</i>						
<i>Fiscal Year 6</i>						
<i>Fiscal Year 7</i>						
<i>Fiscal Year 8</i>						
<i>Fiscal Year 9</i>						
<i>Fiscal Year 10</i>						

Annex 22 Detailed cost estimate by subcomponent and year

Table C3-1-2 Improving tourism operating conditions in Sikkim

Component and cost items	Quantity		Unit cost	Total	Detailed estimates
	a	b	c=a*b	e=c*d	
C3 Ecotourism					
C3-1 Policy and regulatory environment for ecotourism promotion					
C3-1-2 Improving tourism operating conditions in Sikkim					2,051,600
<i>Fiscal Year 1</i>					
<i>Fiscal Year 2</i>					2,051,600
(a) Economic impact study regarding entry and travel restrictions					1,422,000
Call for tender (tender document and advertising)	1 set	1 unit	1	10,000	10,000
Engage a consultant	1 person	70 days	70	20,000	1,400,000
Travel cost (flights to/from Delhi)	1 person	1 flight	1	12,000	12,000
(b) Dissemination of study results and public campaign					629,600
Hotel nights 20 x INR 7,000 x 2	20 person	1 night	20	14,000	280,000
Cars 20 x INR 2000 x 3	20 car	1 day	20	6,000	120,000
Lunches for 70 people at INR 350 a head	70 person	1 time	70	350	24,500
Tea breaks - 2 at INR 15 - 70 people	70 person	1 time	70	30	2,100
Banners	2 banner	1 time	2	1,500	3,000
sound system	1 set	1 time	1	5,000	5,000
Photography, video shoot	1 set	1 time	1	10,000	10,000
Conference pack: 200 x 100	200 unit	1 set	200	100	20,000
Sikkim souvenirs for Delhi delegates i.e. book or handicraft	20 unit	1 set	20	500	10,000
Contingency	1 unit	1 set	1	10,000	10,000
Press release by copy writer	1 press releas	1 set	1	10,000	10,000
Delegation visits to Delhi (Flights to/from Delhi)	5 person	1 flights	5	12,000	60,000
Delegation visits to Delhi (Lodging and expenses)	5 person	5 days	25	3,000	75,000
<i>Fiscal Year 3</i>					
<i>Fiscal Year 4</i>					
<i>Fiscal Year 5</i>					
<i>Fiscal Year 6</i>					
<i>Fiscal Year 7</i>					
<i>Fiscal Year 8</i>					
<i>Fiscal Year 9</i>					
<i>Fiscal Year 10</i>					

Annex 22 Detailed cost estimate by subcomponent and year

Table C3-2-1 Establishing an Ecotourism Marketing Cell

Component and cost items	Quantity		Unit cost d	Total e=c*d	Detailed estimates
	a	b			
C3 Ecotourism					
C3-2 Ecotourism marketing					
C3-2-1 Establishing an Ecotourism Marketing Cell				5,310,659	
<i>Fiscal Year 1</i>					
<i>Fiscal Year 2</i>				3,079,043	
(a) Establishing Ecotourism Marketing Cell				3,079,043	
Newspaper advertising	3 newspapers	1 week	3	40,000	120,000
Desktop comp. HCL 6040	7 unit	1 set	7	39,500	276,500
Laptop comp. HP 1204 TU 14.1" screen	5 unit	1 set	5	47,500	237,500
Land service (server, cables, etc.)	1 unit	1 set	1	54,600	54,600
Printer HP A3	4 unit	1 set	4	17,500	70,000
Scanning machine	2 unit	1 set	2	5,500	11,000
Photocopier	1 unit	1 set	1	8,800	8,800
Projector	1 unit	1 set	1	48,000	48,000
Screen with tripod 60x80	1 unit	1 set	1	4,500	4,500
Audiovisual system - TV and DVD	1 unit	1 set	1	40,500	40,500
Computer software	12 unit	3 sets	36	20,000	720,000
Invertors 1400VA24 volts	1 unit	1 set	1	7,800	7,800
Desks	12 unit	1 set	12	8,990	107,880
Chairs	24 unit	1 set	24	3,990	95,760
Book shelves	12 unit	1 set	12	10,990	131,880
Cabinet	8 unit	1 set	8	10,990	87,920
Car - 4 wheel drive	1 unit	1 set	1	561,059	561,059
Car - utility	1 unit	1 set	1	495,344	495,344
<i>Fiscal Year 3</i>				307,904	
(a) Establishing Ecotourism Marketing Cell				307,904	
Replacement of goods (10% of the goods in FY2)	10%	1 set	10%	3,079,043	307,904
<i>Fiscal Year 4</i>				307,904	
(a) Establishing Ecotourism Marketing Cell				307,904	
Replacement of goods (10% of the goods in FY2)	10%	1 set	10%	3,079,043	307,904
<i>Fiscal Year 5</i>				1,307,904	
(a) Establishing Ecotourism Marketing Cell				1,307,904	
Replacement of goods (10% of the goods in FY2)	10%	1 set	10%	3,079,043	307,904
Legal cost for establishment of corporation	1 unit	1 set	1	1,000,000	1,000,000
<i>Fiscal Year 6</i>				307,904	
(a) Establishing Ecotourism Marketing Cell				307,904	
Replacement of goods (10% of the goods in FY2)	10%	1 set	10%	3,079,043	307,904
<i>Fiscal Year 7</i>					
<i>Fiscal Year 8</i>					
<i>Fiscal Year 9</i>					
<i>Fiscal Year 10</i>					

Annex 22 Detailed cost estimate by subcomponent and year

Table C3-2-2 Formulation and implementation of a marketing strategy						
Component and cost items	Quantity		Unit cost d	Total e=c*d	Detailed estimates	
	a	b				
C3 Ecotourism						
C3-2 Ecotourism marketing						
C3-2-2 Formulation and implementation of a marketing strategy				285,500,000		
<i>Fiscal Year 1</i>						
<i>Fiscal Year 2</i>						
(a) Formulation of the 5-year strategy						
(b) Implementation of the 5-year strategy						
				12,500,000		
Advertising/promotion/marketing	1 unit	1 set	1	6,250,000	6,250,000	
PR/events and festivals	1 unit	1 set	1	2,500,000	2,500,000	
Market research	1 unit	1 set	1	1,875,000	1,875,000	
Product/sales/trade promotion	1 unit	1 set	1	1,250,000	1,250,000	
Chief Executive	1 unit	1 set	1	625,000	625,000	
<i>Fiscal Year 3</i>				40,250,000		
(b) Implementation of the 5-year strategy						
				40,250,000		
Advertising/promotion/marketing	1 budget	1 set	1	15,000,000	15,000,000	
PR/events and festivals	1 budget	1 set	1	10,000,000	10,000,000	
Market research	1 budget	1 set	1	7,500,000	7,500,000	
Product/sales/trade promotion	1 budget	1 set	1	5,000,000	5,000,000	
Chief Executive	1 budget	1 set	1	2,500,000	2,500,000	
Events and festivals	5 events	1 set	5	50,000	250,000	
<i>Fiscal Year 4</i>				50,000,000		
(b) Implementation of the 5-year strategy						
				50,000,000		
Advertising/promotion/marketing	1 budget	1 set	1	25,000,000	25,000,000	
PR/events and festivals	1 budget	1 set	1	10,000,000	10,000,000	
Market research	1 budget	1 set	1	7,500,000	7,500,000	
Product/sales/trade promotion	1 budget	1 set	1	5,000,000	5,000,000	
Chief Executive	1 budget	1 set	1	2,000,000	2,000,000	
Events and festivals	10 events	1 set	10	50,000	500,000	
<i>Fiscal Year 5</i>				50,000,000		
(b) Implementation of the 5-year strategy						
				50,000,000		
Advertising/promotion/marketing	1 budget	1 set	1	25,000,000	25,000,000	
PR/events and festivals	1 budget	1 set	1	10,000,000	10,000,000	
Market research	1 budget	1 set	1	7,500,000	7,500,000	
Product/sales/trade promotion	1 budget	1 set	1	5,000,000	5,000,000	
Chief Executive	1 budget	1 set	1	2,000,000	2,000,000	
Events and festivals	10 events	1 set	10	50,000	500,000	
<i>Fiscal Year 6</i>				50,000,000		
(b) Implementation of the 5-year strategy						
				50,000,000		
Advertising/promotion/marketing	1 budget	1 set	1	25,000,000	25,000,000	
PR/events and festivals	1 budget	1 set	1	10,000,000	10,000,000	
Market research	1 budget	1 set	1	7,500,000	7,500,000	
Product/sales/trade promotion	1 budget	1 set	1	5,000,000	5,000,000	
Chief Executive	1 budget	1 set	1	2,000,000	2,000,000	
Events and festivals	10 events	1 set	10	50,000	500,000	
<i>Fiscal Year 7</i>				37,750,000		
(b) Implementation of the 5-year strategy						
				37,750,000		
Advertising/promotion/marketing	1 budget	1 set	1	18,750,000	18,750,000	
PR/events and festivals	1 budget	1 set	1	7,500,000	7,500,000	
Market research	1 budget	1 set	1	5,625,000	5,625,000	
Product/sales/trade promotion	1 budget	1 set	1	3,750,000	3,750,000	
Chief Executive	1 budget	1 set	1	1,875,000	1,875,000	
Events and festivals	5 event	1 set	5	50,000	250,000	
<i>Fiscal Year 8</i>				20,000,000		
(b) Implementation of the 5-year strategy						
				20,000,000		
Implementation of follow-up of the 5 year strategy	1 budget	1 set	1	20,000,000	20,000,000	
<i>Fiscal Year 9</i>				15,000,000		
(b) Implementation of the 5-year strategy						
				15,000,000		
Implementation of follow-up of the 5 year strategy	1 budget	1 set	1	15,000,000	15,000,000	
<i>Fiscal Year 10</i>				10,000,000		
(b) Implementation of the 5-year strategy						
				10,000,000		
Implementation of follow-up of the 5 year strategy	1 budget	1 set	1	10,000,000	10,000,000	

Annex 22 Detailed cost estimate by subcomponent and year

Table C3-2-3 Selection of a funding scheme to finance subsequent marketing strategies

Component and cost items	Quantity		Unit cost	Total	Detailed estimates
	a	b	c=a*b	e=c*d	
C3 Ecotourism					
C3-2 Ecotourism marketing					
C3-2-3 Selection of a funding scheme to finance subsequent marketing strategies					
<i>Fiscal Year 1</i>					
<i>Fiscal Year 2</i>					
<i>Fiscal Year 3</i>					
<i>Fiscal Year 4</i>					
<i>Fiscal Year 5</i>					
(a) Research potential funding methods for the ecotourism marketing in Sikkim					
<i>Fiscal Year 6</i>					
(a) Research potential funding methods for the ecotourism marketing in Sikkim					
<i>Fiscal Year 7</i>					
<i>Fiscal Year 8</i>					
<i>Fiscal Year 9</i>					
<i>Fiscal Year 10</i>					

Table C3-2-4 Creating links between tour operators and local communities offering tourism services

Component and cost items	Quantity		Unit cost	Total	Detailed estimates
	a	b	c=a*b	e=c*d	
C3 Ecotourism					
C3-2 Ecotourism marketing					
C3-2-4 Creating links between tour operators and local communities offering tourism services					8,618,500
<i>Fiscal Year 1</i>					
<i>Fiscal Year 2</i>					502,500
(a) Study tour for tour operators from within and outside of Sikkim to visit villages					502,500
Flight Kolkata (two ways)	3 persons	1 time	3	4,000	12,000
Flight Mumbai (two ways)	3 persons	1 time	3	10,000	30,000
Bangalore (two ways)	3 persons	1 time	3	9,000	27,000
Accommodation/food	9 persons	10 days	90	3,000	270,000
Transportation (cars)	3 cars	10 days	30	2,000	60,000
Transport to the airport and back	9 persons	2 times	18	1,500	27,000
Workshop - lunches/snacks 25 ppl X 10 villages	25 persons	10 villages	250	250	62,500
Miscellaneous expenses	1 unit	1 set	1	14,000	14,000
<i>Fiscal Year 3</i>					1,014,500
(a) Study tour for tour operators from within and outside of Sikkim to visit villages					1,014,500
Flight Delhi (two ways)	3 persons	2 time	6	12,000	72,000
Flight Kolkata (two ways)	3 persons	2 time	6	4,000	24,000
Flight Mumbai (two ways)	2 persons	2 time	4	10,000	40,000
Flight Bangalore (two ways)	2 persons	2 time	4	9,000	36,000
Accommodation/food	10 persons	20 days	200	3,000	600,000
Transportation (cars)	3 cars	20 days	60	2,000	120,000
Transport to the airport and back	10 persons	4 times	40	1,500	60,000
Workshop - lunches/snacks 25 ppl X 10 villages	25 persons	10 villages	250	250	62,500
<i>Fiscal Year 4</i>					1,014,500
(a) Study tour for tour operators from within and outside of Sikkim to visit villages					1,014,500
Same as fiscal year 3	1 unit	1 set	1	1,014,500	1,014,500
<i>Fiscal Year 5</i>					1,014,500
(a) Study tour for tour operators from within and outside of Sikkim to visit villages					1,014,500
Same as fiscal year 3	1 unit	1 set	1	1,014,500	1,014,500
<i>Fiscal Year 6</i>					1,014,500
(a) Study tour for tour operators from within and outside of Sikkim to visit villages					1,014,500
Same as fiscal year 3	1 unit	1 set	1	1,014,500	1,014,500
<i>Fiscal Year 7</i>					1,014,500
(a) Study tour for tour operators from within and outside of Sikkim to visit villages					1,014,500
Same as fiscal year 3	1 unit	1 set	1	1,014,500	1,014,500
<i>Fiscal Year 8</i>					1,014,500
(a) Study tour for tour operators from within and outside of Sikkim to visit villages					1,014,500
Same as fiscal year 3	1 unit	1 set	1	1,014,500	1,014,500
<i>Fiscal Year 9</i>					1,014,500
(a) Study tour for tour operators from within and outside of Sikkim to visit villages					1,014,500
Same as fiscal year 3	1 unit	1 set	1	1,014,500	1,014,500
<i>Fiscal Year 10</i>					1,014,500
(a) Study tour for tour operators from within and outside of Sikkim to visit villages					1,014,500
Same as fiscal year 3	1 unit	1 set	1	1,014,500	1,014,500

Annex 22 Detailed cost estimate by subcomponent and year

Table C3-3-1 Development of high-end ecolodges						
Component and cost items	Quantity			Unit cost	Total	Detailed estimates
	a	b	c=a*b	d	e=c*d	
C3 Ecotourism						
C3-3 Development of ecotourism areas with respect to specific market segments						
C3-3-1 Development of high-end ecolodges					424,201,760	
<i>Fiscal Year 1</i>						
<i>Fiscal Year 2</i>					1,216,000	
(a) Recruitment of a hotel management consultant and company					1,216,000	
Consultant	1 person	60 days	60	20,000	1,200,000	Annex 24
Flights to/from Gangtok including transfers	1 person	1 flight	1	16,000	16,000	
<i>Fiscal Year 3</i>					72,850,865	
(a) Recruitment of a hotel management consultant and company					616,000	
Consultant	1 person	30 days	30	20,000	600,000	Annex 24
Flights to/from Gangtok including transfers	1 person	1 trip	1	16,000	16,000	
(b) Construction of ecolodges					67,258,865	
1) Construction of ecolodges 1 and 2						
Selection of construction firms (Tender doc/advertising)	1 set	1 unit	1	10,000	10,000	
Construction of the ecolodges (2184.9m2)	0.67 lodge	1 unit	1	97,448,000	65,290,160	Table D3-1
Architect's fee (3% of civil cost)	1 firm	1 unit	1	1,958,705	1,958,705	
(c) Training of management and service staff					4,976,000	
University fees INR 700,000 for 4 years	16 person	1 year	16	175,000	2,800,000	
Lodging, food and travel INR 120,000	16 person	1 year	16	120,000	1,920,000	
Travel to and from Gangtok including transfer to airport	16 person	1 unit	16	16,000	256,000	
<i>Fiscal Year 4</i>					206,208,880	
(b) Construction of ecolodges					200,752,880	
1) Construction of ecolodges 1 and 2						
Construction of the ecolodges (2184.9m2)	1.33 lodge	1 unit	1	97,448,000	129,605,840	Table D3-1
Architect's fee (3% of civil cost)	1 firm	1 unit	1	3,888,175	3,888,175	
2) Construction of ecolodges 3 and 4						
Selection of construction firms (Tender doc/advertising)	1 set	1 unit	1	10,000	10,000	
Construction of the ecolodges (2184.9m2)	0.67 lodge	1 unit	1	97,448,000	65,290,160	Table D3-1
Architect's fee (3% of civil cost)	1 firm	1 unit	1	1,958,705	1,958,705	
(c) Training of management and service staff					5,456,000	
University fees INR 700,000 for 4 years	16 person	1 year	16	175,000	2,800,000	
Lodging, food and travel INR 120,000	16 person	1 year	16	120,000	1,920,000	
Travel to and from Gangtok including transfer to airport	16 person	1 unit	16	16,000	256,000	
Training of local staff	80 person	4 month	320	1,500	480,000	
<i>Fiscal Year 5</i>					138,950,015	
(b) Construction of ecolodges					133,494,015	
1) Construction of ecolodges 3 and 4						
Construction of the ecolodges (2184.9m2)	1.33 lodge	1 unit	1	97,448,000	129,605,840	Table D3-1
Architect's fee (3% of civil cost)	1 firm	1 unit	1	3,888,175	3,888,175	
(c) Training of management and service staff					5,456,000	
University fees INR 700,000 for 4 years	16 person	1 year	16	175,000	2,800,000	
Lodging, food and travel INR 120,000	16 person	1 year	16	120,000	1,920,000	
Travel to and from Gangtok including transfer to airport	16 person	1 unit	16	16,000	256,000	
Training of local staff	80 person	4 month	320	1,500	480,000	
<i>Fiscal Year 6</i>					4,976,000	
(c) Training of management and service staff					4,976,000	
University fees INR 700,000 for 4 years	16 person	1 year	16	175,000	2,800,000	
Lodging, food and travel INR 120,000	16 person	1 year	16	120,000	1,920,000	
Travel to and from Gangtok including transfer to airport	16 person	1 unit	16	16,000	256,000	
<i>Fiscal Year 7</i>						
<i>Fiscal Year 8</i>						
<i>Fiscal Year 9</i>						
<i>Fiscal Year 10</i>						

Annex 22 Detailed cost estimate by subcomponent and year

Table C3-3-2 Development of trekking routes

Component and cost items	Quantity		Unit cost d	Total e=c*d	Detailed estimates
	a	b			
C3 Ecotourism					
C3-3 Development of ecotourism areas with respect to specific market segments					
C3-3-2 Development of trekking routes				140,900,000	
<i>Fiscal Year 1</i>					
<i>Fiscal Year 2</i>					
<i>Fiscal Year 3</i>				21,900,000	
(a) Selection of trekking route - consultants hired				890,000	
Call for tender (tender doc/advertising)	1 set	1 unit	1	10,000	10,000
Consultant fees	2 person	60 days	120	7,000	840,000 Annex 24
Travel around Sikkim to select the treks	1 car	20 days	20	2,000	40,000
(b) Development and improvement of trekking routes				21,010,000	
Selection of a firm for development (call for tender)	1 set	1 unit	1	10,000	10,000
Tracing of the trails	40 km	1 unit	40	400,000	16,000,000 Table D3-6.A
Development of camping sites including ecological toilets	4 sites	1 unit	5	1,000,000	5,000,000 Table D3-6.B
(c) Marketing of the trekking routes by EMC (costs are met by C3-2-2)					
<i>Fiscal Year 4</i>				41,000,000	
(b) Development and improvement of trekking routes				41,000,000	
Tracing of the trails	90 km	1 unit	90	400,000	36,000,000 Table D3-6.A
Development of camping sites including ecological toilets	9 sites	1 unit	5	1,000,000	5,000,000 Table D3-6.B
(c) Marketing of the trekking routes by EMC (costs are met by C3-2-2)					
<i>Fiscal Year 5</i>				45,000,000	
(b) Development and improvement of trekking routes				45,000,000	
Tracing of the trails	100 km	1 unit	100	400,000	40,000,000 Table D3-6.A
Development of camping sites including ecological toilets	10 sites	1 unit	5	1,000,000	5,000,000 Table D3-6.B
(c) Marketing of the trekking routes by EMC (costs are met by C3-2-2)					
<i>Fiscal Year 6</i>				33,000,000	
(b) Development and improvement of trekking routes				33,000,000	
Tracing of the trails	70 km	1 unit	70	400,000	28,000,000 Table D3-6.A
Development of camping sites including ecological toilets	7 sites	1 unit	5	1,000,000	5,000,000 Table D3-6.B
(c) Marketing of the trekking routes by EMC (costs are met by C3-2-2)					
<i>Fiscal Year 7</i>					
(c) Marketing of the trekking routes by EMC (costs are met by C3-2-2)					
<i>Fiscal Year 8</i>					
(c) Marketing of the trekking routes by EMC (costs are met by C3-2-2)					
<i>Fiscal Year 9</i>					
(c) Marketing of the trekking routes by EMC (costs are met by C3-2-2)					
<i>Fiscal Year 10</i>					
(c) Marketing of the trekking routes by EMC (costs are met by C3-2-2)					

Annex 22 Detailed cost estimate by subcomponent and year

Table C3-3-3 Development of mountain bike trails

Component and cost items	Quantity		Unit cost d	Total e=c*d	Detailed estimates
	a	b			
C3 Ecotourism					
C3-3 Development of ecotourism areas with respect to specific market segments					
C3-3-3 Development of mountain bike trails				60,110,000	
<i>Fiscal Year 1</i>					
<i>Fiscal Year 2</i>					
<i>Fiscal Year 3</i>				12,110,000	
(a) Selection of mountain bike trails				100,000	
Call for tender (tender document and advertising)	1 set	1 unit	1	10,000	10,000
Consultant fees	1 person	10 days	10	7,000	70,000 Annex 24
Travel around Sikkim	1 car	10 days	10	2,000	20,000
(b) Development and improvement of mountain bike trails				12,010,000	
Assignment of contractor	1 set	1 unit	1	10,000	10,000
Development and construction of the trails	20 km	1 unit	20	600,000	12,000,000 Table D3-6.C
(c) Marketing of mountain bike trails by EMC (costs are met by C3-2-2)				24,000,000	
<i>Fiscal Year 4</i>					
(b) Development and improvement of mountain bike trails				24,000,000	
Development and construction of the trails	40 km	1 unit	40	600,000	24,000,000 Table D3-6.C
(c) Marketing of mountain bike trails by EMC (costs are met by C3-2-2)				24,000,000	
<i>Fiscal Year 5</i>					
(b) Development and improvement of mountain bike trails				24,000,000	
Development and construction of the trails	40 km	1 unit	40	600,000	24,000,000 Table D3-6.C
(c) Marketing of mountain bike trails by EMC (costs are met by C3-2-2)				24,000,000	
<i>Fiscal Year 6</i>					
(c) Marketing of mountain bike trails by EMC (costs are met by C3-2-2)				24,000,000	
<i>Fiscal Year 7</i>					
(c) Marketing of mountain bike trails by EMC (costs are met by C3-2-2)				24,000,000	
<i>Fiscal Year 8</i>					
(c) Marketing of mountain bike trails by EMC (costs are met by C3-2-2)				24,000,000	
<i>Fiscal Year 9</i>					
(c) Marketing of mountain bike trails by EMC (costs are met by C3-2-2)				24,000,000	
<i>Fiscal Year 10</i>					
(c) Marketing of mountain bike trails by EMC (costs are met by C3-2-2)				24,000,000	

Annex 22 Detailed cost estimate by subcomponent and year

Table C3-3-4 Development of rock climbing areas						
Component and cost items	Quantity			Unit cost	Total	Detailed estimates
	a	b	c=a*b	d	e=c*d	
C3 Ecotourism						
C3-3 Development of ecotourism areas with respect to specific market segments						
C3-3-4 Development of rock climbing areas					5,085,200	
<i>Fiscal Year 1</i>						
<i>Fiscal Year 2</i>						
<i>Fiscal Year 3</i>						
<i>Fiscal Year 4</i>						
					3,650,000	
(a) Identification and development of areas appropriate for rock climbing					500,000	
Call for tender (tender document and advertising)	1 set	1 unit	1	10,000	10,000	
Consultant fees	1 person	10 days	10	7,000	70,000	Annex 24
Travel around Sikkim	1 car	10 days	10	2,000	20,000	
Development of the areas (clearing and levelling)	1 unit	4 areas	4	100,000	400,000	
(b) Training of local instructors and purchase of equipment					3,150,000	
At Sikkim Mountaineering Institute	1 unit	40 person	40	4,000	160,000	
Set of equipment per instructor	1 set	40 person	40	69,400	2,776,000	Table D3-2. A
Medical equipment (per area)	1 set	4 area	4	53,500	214,000	Table D3-2. B
(c) Marketing of rock climbing opportunities by EMC (costs are met by C3-2-2)						
<i>Fiscal Year 5</i>						
(b) Training of local instructors and purchase of equipment					358,800	
Set of equipment per instructor (replacement and repair: 12%)	1 set	40 person	40	8,328	333,120	Table D3-2. A
Medical equipment (per area)	1 set	4 area	4	6,420	25,680	Table D3-2. B
(c) Marketing of rock climbing opportunities by EMC (costs are met by C3-2-2)						
<i>Fiscal Year 6</i>						
(b) Training of local instructors and purchase of equipment					358,800	
Set of equipment per instructor (replacement and repair: 12%)	1 set	40 person	40	8,328	333,120	Table D3-2. A
Medical equipment (per area)	1 set	4 area	4	6,420	25,680	Table D3-2. B
(c) Marketing of rock climbing opportunities by EMC (costs are met by C3-2-2)						
<i>Fiscal Year 7</i>						
(b) Training of local instructors and purchase of equipment					358,800	
Set of equipment per instructor (replacement and repair: 12%)	1 set	40 person	40	8,328	333,120	Table D3-2. A
Medical equipment (per area)	1 set	4 area	4	6,420	25,680	Table D3-2. B
(c) Marketing of rock climbing opportunities by EMC (costs are met by C3-2-2)						
<i>Fiscal Year 8</i>						
(b) Training of local instructors and purchase of equipment					358,800	
Set of equipment per instructor (replacement and repair: 12%)	1 set	40 person	40	8,328	333,120	Table D3-2. A
Medical equipment (per area)	1 set	4 area	4	6,420	25,680	Table D3-2. B
(c) Marketing of rock climbing opportunities by EMC (costs are met by C3-2-2)						
<i>Fiscal Year 9</i>						
(c) Marketing of rock climbing opportunities by EMC (costs are met by C3-2-2)						
<i>Fiscal Year 10</i>						
(c) Marketing of rock climbing opportunities by EMC (costs are met by C3-2-2)						

Annex 22 Detailed cost estimate by subcomponent and year

Component and cost items	Quantity		Unit cost d	Total e=c*d	Detailed estimates
	a	b			
C3 Ecotourism					
C3-3 Development of ecotourism areas with respect to specific market segments					
C3-3-5 Development of wildlife-watching areas					
				8,967,436	
<i>Fiscal Year 1</i>					
<i>Fiscal Year 2</i>					
				92,000	
(a) Survey of area and selection of locations					
92,000					
Winter survey	4 person	2 month	8	10,000	80,000 Annex 24
Travel to and from areas (Transport)	1 car	6 day	6	2,000	12,000
				2,757,240	
<i>Fiscal Year 4</i>					
(a) Survey of area and selection of locations					
342,000					
Breeding season survey	4 person	3 month	12	10,000	120,000 Annex 24
Transport	1 car	6 day	6	2,000	12,000
Fees and per diem for expert and ornithologist	2 person	15 days	30	7,000	210,000
(b) Preparing areas for wildlife watching					
2,010,000					
Tender doc/advertising	1 set	1 unit	1	10,000	10,000
tracing of paths	20 km	1 unit	20	100,000	2,000,000
(c) Training of wildlife watching guides and equipment purchase					
405,240					
Training for 6 areas	1 set	1 unit	1	159,000	159,000 Table D3-2. C
Set of equipment per instructor	1 set	30 person	30	8,208	246,240 Table D3-2. D
(d) Marketing of wildlife watching areas by EMC (costs are met by C3-2-2)					
				4,029,549	
<i>Fiscal Year 5</i>					
(b) Preparing areas for wildlife watching					
4,000,000					
tracing of paths	40 km	1 unit	40	100,000	4,000,000
(c) Training of wildlife watching guides and equipment purchase					
29,549					
Replacement and repair (12%)	1 set	30 person	30	985	29,549 Table D3-2. D
(d) Marketing of wildlife watching areas by EMC (costs are met by C3-2-2)					
				2,029,549	
<i>Fiscal Year 6</i>					
(b) Preparing areas for wildlife watching					
2,000,000					
tracing of paths	20 km	1 unit	20	100,000	2,000,000
(c) Training of wildlife watching guides and equipment purchase					
29,549					
Replacement and repair (12%)	1 set	30 person	30	985	29,549 Table D3-2. D
(d) Marketing of wildlife watching areas by EMC (costs are met by C3-2-2)					
				29,549	
<i>Fiscal Year 7</i>					
(c) Training of wildlife watching guides and equipment purchase					
29,549					
Replacement and repair (12%)	1 set	30 person	30	985	29,549 Table D3-2. D
(d) Marketing of wildlife watching areas by EMC (costs are met by C3-2-2)					
				29,549	
<i>Fiscal Year 8</i>					
(c) Training of wildlife watching guides and equipment purchase					
29,549					
Replacement and repair (12%)	1 set	30 person	30	985	29,549 Table D3-2. D
(d) Marketing of wildlife watching areas by EMC (costs are met by C3-2-2)					
				29,549	
<i>Fiscal Year 9</i>					
(d) Marketing of wildlife watching areas by EMC (costs are met by C3-2-2)					
				29,549	
<i>Fiscal Year 10</i>					
(d) Marketing of wildlife watching areas by EMC (costs are met by C3-2-2)					
				29,549	

Annex 22 Detailed cost estimate by subcomponent and year

Table C3-4-1 Construction of interpretation centres and renovation of forest rest houses (FRHs)						
Component and cost items	Quantity			Unit cost	Total	Detailed estimates
	a	b	c=a*b	d	e=c*d	
C3 Ecotourism						
C3-4 Development of tourist facilities						
C3-4-1 Construction of interpretation centres and renovation of forest rest houses (FRHs)					144,822,480	
<i>Fiscal Year 1</i>						
<i>Fiscal Year 2</i>						
<i>Fiscal Year 3</i>					<i>47,194,160</i>	
(a) Selection of locations to build the interpretation centres and to renovate FRHs						
(b) Construction of interpretation centres						
Tender doc/advertising	1 set	1 unit	1	10,000	10,000	
Large interpretation centres	3 centres	1 set	3	9,624,000	28,872,000	Table D3-3
Furniture and fittings	3 centres	1 set	3	600,000	1,800,000	Table D3-3
Display	3 centres	1 set	3	400,000	1,200,000	Table D3-3
Architect's fee @ 3% of civil cost	1 firm	1 unit	1	866,160	866,160	
					14,446,000	
(c) Renovation and upgrading of FRHs						
Tender doc/advertising	1 set	1 unit	1	10,000	10,000	
Renovation and upgrading of FRHs	3 FRHs	1 set	3	4,812,000	14,436,000	Table D3-3
					48,004,160	
<i>Fiscal Year 4</i>						
(b) Construction of interpretation centres						
Large interpretation centres	3 centres	1 set	3	9,624,000	28,872,000	Table D3-3
Furniture and fittings	3 centres	1 set	3	600,000	1,800,000	Table D3-3
Display	3 centres	1 set	3	400,000	1,200,000	Table D3-3
Architect's fee @ 3% of civil cost	1 firm	1 unit	1	866,160	866,160	
					14,446,000	
(c) Renovation and upgrading of FRHs						
Tender doc/advertising	1 set	1 unit	1	10,000	10,000	
Renovation and upgrading of FRHs	3 FRHs	1 set	3	4,812,000	14,436,000	Table D3-3
					820,000	
(d) Training of local community members to manage and work in interpretation centres						
Travel to and from Gangtok	14 trainers	1 trip	14	16,000	224,000	
Professional fees/day (including preparation)	14 trainers	4 days	56	7,000	392,000	
Accommodation	14 trainers	4 days	56	2,000	112,000	
Per diem	14 trainers	4 days	56	1,500	84,000	
Miscellaneous costs	1 unit	1 set	1	8,000	8,000	
					47,794,160	
<i>Fiscal Year 5</i>						
(b) Construction of interpretation centres						
Large interpretation centres	3 centres	1 set	3	9,624,000	28,872,000	Table D3-3
Furniture and fittings	3 centres	1 set	3	600,000	1,800,000	Table D3-3
Display	3 centres	1 set	3	400,000	1,200,000	Table D3-3
Architect's fee @ 3% of civil cost	1 firm	1 unit	1	866,160	866,160	
					14,446,000	
(c) Renovation and upgrading of FRHs						
Tender doc/advertising	1 set	1 unit	1	10,000	10,000	
Renovation and upgrading of FRHs	3 FRHs	1 set	3	4,812,000	14,436,000	Table D3-3
					610,000	
(d) Training of local community members to manage and work in interpretation centres						
Travel to and from Gangtok	10 trainers	1 trip	10	16,000	160,000	
Professional fees/day (including preparation)	10 trainers	4 days	40	7,000	280,000	
Accommodation	10 trainers	4 days	40	2,000	80,000	
Per diem	10 trainers	4 days	40	1,500	60,000	
Miscellaneous costs	1 unit	1 set	1	30,000	30,000	
					610,000	
<i>Fiscal Year 6</i>						
(d) Training of local community members to manage and work in interpretation centres						
Travel to and from Gangtok	10 trainers	1 trip	10	16,000	160,000	
Professional fees/day (including preparation)	10 trainers	4 days	40	7,000	280,000	
Accommodation	10 trainers	4 days	40	2,000	80,000	
Per diem	10 trainers	4 days	40	1,500	60,000	
Miscellaneous costs	1 unit	1 set	1	30,000	30,000	
					610,000	
<i>Fiscal Year 7</i>						
(d) Training of local community members to manage and work in interpretation centres						
Travel to and from Gangtok	10 trainers	1 trip	10	16,000	160,000	
Professional fees/day (including preparation)	10 trainers	4 days	40	7,000	280,000	
Accommodation	10 trainers	4 days	40	2,000	80,000	
Per diem	10 trainers	4 days	40	1,500	60,000	
Miscellaneous costs	1 unit	1 set	1	30,000	30,000	
					610,000	
<i>Fiscal Year 8</i>						
(d) Training of local community members to manage and work in interpretation centres						
Travel to and from Gangtok	10 trainers	1 trip	10	16,000	160,000	
Professional fees/day (including preparation)	10 trainers	4 days	40	7,000	280,000	
Accommodation	10 trainers	4 days	40	2,000	80,000	
Per diem	10 trainers	4 days	40	1,500	60,000	
Miscellaneous costs	1 unit	1 set	1	30,000	30,000	
					610,000	
<i>Fiscal Year 9</i>						
<i>Fiscal Year 10</i>						

Annex 22 Detailed cost estimate by subcomponent and year

Table C3-5-1 Comprehensive study for baseline information on solid waste management

Component and cost items	Quantity			Unit cost	Total	Detailed estimates
	a	b	c=a*b	d	e=c*d	
C3 Ecotourism						
C3-5 Introduction of solid waste management at tourism areas linked to the priority villages						
C3-5-1 Comprehensive study for baseline information on solid waste management					1,348,267	
<i>Fiscal Year 1</i>						
<i>Fiscal Year 2</i>						
<i>Fiscal Year 3</i>						
					<i>1,348,267</i>	
(a) Collection and analysis of baseline data					1,348,267	
Tender doc/advertising	1 unit	1 unit	1	10,000	10,000	
Engagement of study team and implementation of study	10 villages	1 unit	10	133,827	1,338,267	Table D3-5. A
<i>Fiscal Year 4</i>						
<i>Fiscal Year 5</i>						
<i>Fiscal Year 6</i>						
<i>Fiscal Year 7</i>						
<i>Fiscal Year 8</i>						
<i>Fiscal Year 9</i>						
<i>Fiscal Year 10</i>						

Annex 22 Detailed cost estimate by subcomponent and year

Table C3-5-2 Operating solid waste management functions

Component and cost items	Quantity		Unit cost d	Total e=c*d	Detailed estimates
	a	b			
C3 Ecotourism					
C3-5 Introduction of solid waste management at tourism areas linked to the priority villages					
C3-5-2 Operating solid waste management functions				35,956,496	
<i>Fiscal Year 1</i>					
<i>Fiscal Year 2</i>					
<i>Fiscal Year 3</i>				16,500,663	
(a) Training on solid waste management				2,280,833	
Engagement of a consultant (tender doc/advertising)	1 unit	1 unit	1	10,000	10,000
Training on waste collection (operators)	10 operators	1 unit	10	51,783	517,833 Table D3-5. C
Training on waste segregation (JFMC/EDC/PSS members)	10 villages	1 unit	10	109,433	1,094,333 Table D3-5. B
Training on local level composting (JFMC/EDC/PSS members)	10 villages	1 unit	10	65,867	658,667 Table D3-5. D
(b) Public awareness campaigns				86,500	
Workshop in Gangtok for tour operators and forest officers	50 person	1 unit	50	1,730	86,500
(c) Procurement of equipment for waste management				14,133,330	
Collection and storage (Various items)	10 villages	1 unit	10	213,333	2,133,330
Transport vehicle (Specialized vehicle)	4 vehicles	1 unit	4	2,500,000	10,000,000 See Note 1
Local Level composting for organic waste	4 metric ton	1 unit	4	500,000	2,000,000
<i>Fiscal Year 4</i>				2,357,333	
(a) Training on solid waste management				2,270,833	
Training on waste collection (operators)	10 operators	1 unit	10	51,783	517,833 Table D3-5. B
Training on waste segregation (JFMC/EDC/PSS members)	10 villages	1 unit	10	109,433	1,094,333 Table D3-5. D
Training on local level composting (JFMC/EDC/PSS members)	10 villages	1 unit	10	65,867	658,667 Table D3-5. D
(b) Public awareness campaigns				86,500	
Workshop in Gangtok for tour operators and forest officers	50 person	1 unit	50	1,730	86,500 Table D3-5. G
<i>Fiscal Year 5</i>				1,839,500	
(a) Training on solid waste management				1,753,000	
Training on waste segregation (JFMC/EDC/PSS members)	10 villages	1 unit	10	109,433	1,094,333 Table D3-5. B
Training on local level composting (JFMC/EDC/PSS members)	10 villages	1 unit	10	65,867	658,667 Table D3-5. D
(b) Public awareness campaigns				86,500	
Workshop in Gangtok for tour operators and forest officers	50 persons	1 unit	50	1,730	86,500
<i>Fiscal Year 6</i>				11,753,000	
(a) Training on solid waste management				1,753,000	
Training on waste segregation (JFMC/EDC/PSS members)	10 villages	1 unit	10	109,433	1,094,333 Table D3-5. B
Training on local level composting (JFMC/EDC/PSS members)	10 villages	1 unit	10	65,867	658,667 Table D3-5. D
(c) Procurement of equipment for waste management				10,000,000	
Transport vehicle (Specialized vehicle)	4 vehicles	1 unit	4	2,500,000	10,000,000 See Note 1
<i>Fiscal Year 7</i>				1,753,000	
(a) Training on solid waste management				1,753,000	
Training on waste segregation (JFMC/EDC/PSS members)	10 villages	1 unit	10	109,433	1,094,333 Table D3-5. B
Training on local level composting (JFMC/EDC/PSS members)	10 villages	1 unit	10	65,867	658,667 Table D3-5. D
<i>Fiscal Year 8</i>				1,753,000	
(a) Training on solid waste management				1,753,000	
Training on waste segregation (JFMC/EDC/PSS members)	10 villages	1 unit	10	109,433	1,094,333 Table D3-5. B
Training on local level composting (JFMC/EDC/PSS members)	10 villages	1 unit	10	65,867	658,667 Table D3-5. D
<i>Fiscal Year 9</i>				1,753,000	
<i>Fiscal Year 10</i>				1,753,000	
(a) Training on solid waste management				1,753,000	
Training on waste segregation (JFMC/EDC/PSS members)	10 villages	1 unit	10	109,433	1,094,333 Table D3-5. B
Training on local level composting (JFMC/EDC/PSS members)	10 villages	1 unit	10	65,867	658,667 Table D3-5. D

Note1: Specification of the specialised waste management vehicle is as follows:

Model:	SK 1615 TC Turbo Heavy-duty Tipper (a type of dump truck manufactured by TATA)
Typical usage:	Heavy duty application-coal, iron ore, over burden, minerals, construction materials - sand, bricks, crushed stones, etc.
Terrain suitability:	All terrain especially meant for off-highway application
Engine:	CUMMINS 6 BT5.9 TC Water cooled, turbo charged diesel engine; 6 inline and 5883 cc engine; 135hp at 2500 rpm
Gross vehicle weight:	16,200kg
Number of wheels:	Front 2 and rear 4

Annex 22 Detailed cost estimate by subcomponent and year

Table C3-6-1 Establishment of Ecotourism Development Corporation

Component and cost items	Quantity		Unit cost	Total	Detailed estimates
	a	b			
C3 Ecotourism					
C3-6 Establishment of Ecotourism Development Corporation					
C3-6-1 Establishment of Ecotourism Development Corporation				25,000,000	
<i>Fiscal Year 1</i>					
<i>Fiscal Year 2</i>					
<i>Fiscal Year 3</i>					
<i>Fiscal Year 4</i>					
<i>Fiscal Year 5</i>				25,000,000	
(a) Establishment of Ecotourism Development Corporation				25,000,000	
Allocation of capital to ED Corporation	1 set	1 unit	1	25,000,000	25,000,000
<i>Fiscal Year 6</i>					
<i>Fiscal Year 7</i>					
<i>Fiscal Year 8</i>					
<i>Fiscal Year 9</i>					
<i>Fiscal Year 10</i>					

Table C4-1-1 Preparation of JFMC/EDC/PSS management manual

Component and cost items	Quantity		Unit cost	Total	Detailed estimates
	a	b			
C4 Joint forest management					
C4-1 Preparation work					
C4-1-1 Preparation of JFMC/EDC/PSS management manual				2,282,000	
<i>Fiscal Year 1</i>					
<i>Fiscal Year 2</i>				2,282,000	
(a) Preparation of JFMC/EDC/PSS management manual				2,282,000	
Tender doc/advertising	1 set	1 unit	1	10,000	10,000
Forest Management Specialist	1 person	45 days	45	7,000	315,000 Annex 24
Community Development Specialist	1 person	45 days	45	7,000	315,000 Annex 24
Flight to and from Gangtok	2 person	1 unit	2	16,000	32,000
Travel to and from Bagdogra (car)	2 person	1 trip	2	2,000	4,000
Accommodation allowance for specialists	2 person	88 night	176	1,000	176,000
Translation: English into Nepali	1 set	1 unit	1	280,000	280,000 Table D4-1
Miscellaneous	1 set	1 set	1	1,150,000	1,150,000 Table D4-2
<i>Fiscal Year 3</i>					
<i>Fiscal Year 4</i>					
<i>Fiscal Year 5</i>					
<i>Fiscal Year 6</i>					
<i>Fiscal Year 7</i>					
<i>Fiscal Year 8</i>					
<i>Fiscal Year 9</i>					
<i>Fiscal Year 10</i>					

Annex 22 Detailed cost estimate by subcomponent and year

Table C4-1-2 Marketing study

Component and cost items	Quantity			Unit cost	Total	Detailed estimates
	a	b	c=a*b	d	e=c*d	
C4 Joint forest management						
C4-1 Preparation work						
C4-1-2 Marketing study					2,152,000	
<i>Fiscal Year 1</i>						
<i>Fiscal Year 2</i>					2,152,000	
(a) Marketing study					2,152,000	
Tender doc/advertising	1 set	1 unit	1	10,000	10,000	
Marketing Specialist	1 person	120 days	120	7,000	840,000	Annex 24
Handicraft Marketing Specialist	1 person	60 days	60	7,000	420,000	Annex 24
Research Assistant	3 person	30 days	90	500	45,000	
Flight to and from Gangtok	2 person	1 unit	2	16,000	32,000	
Travel to and from Bagdogra (car)	2 person	1 trip	2	2,000	4,000	
Accommodation allowance for specialists	2 person	178 night	356	1,000	356,000	
Transport to and from villages	2 car	60 day	120	2,000	240,000	
Miscellaneous	1 set	1 set	1	205,000	205,000	TableD4-3
<i>Fiscal Year 3</i>						
<i>Fiscal Year 4</i>						
<i>Fiscal Year 5</i>						
<i>Fiscal Year 6</i>						
<i>Fiscal Year 7</i>						
<i>Fiscal Year 8</i>						
<i>Fiscal Year 9</i>						
<i>Fiscal Year 10</i>						

Table C4-1-3 Formation of district facilitation teams

Component and cost items	Quantity			Unit cost	Total	Detailed estimates
	a	b	c=a*b	d	e=c*d	
C4 Joint forest management						
C4-1 Preparation work						
C4-1-3 Formation of district facilitation teams					10,000	
<i>Fiscal Year 1</i>					10,000	
(a) Formation of district facilitation teams					10,000	
Tender doc/advertising	1 set	1 unit	1	10,000	10,000	
<i>Fiscal Year 2</i>						
<i>Fiscal Year 3</i>						
<i>Fiscal Year 4</i>						
<i>Fiscal Year 5</i>						
<i>Fiscal Year 6</i>						
<i>Fiscal Year 7</i>						
<i>Fiscal Year 8</i>						
<i>Fiscal Year 9</i>						
<i>Fiscal Year 10</i>						

Table C4-2-1 Selection of villages for JFMC/EDC/PSS activities

Component and cost items	Quantity			Unit cost	Total	Detailed estimates
	a	b	c=a*b	d	e=c*d	
C4 Joint forest management						
C4-2 Establishment of committees for joint forest management and biodiversity conservation						
C4-2-1 Selection of villages for JFMC/EDC/PSS activities						
<i>Fiscal Year 1</i>						
<i>Fiscal Year 2</i>						
<i>Fiscal Year 3</i>						
<i>Fiscal Year 4</i>						
<i>Fiscal Year 5</i>						
<i>Fiscal Year 6</i>						
<i>Fiscal Year 7</i>						
<i>Fiscal Year 8</i>						
<i>Fiscal Year 9</i>						
<i>Fiscal Year 10</i>						

Annex 22 Detailed cost estimate by subcomponent and year

Table C4-2-2 Establishment of committees and planning of activities

Component and cost items	Quantity			Unit cost d	Total e=c*d	Detailed estimates
	a	b	c=a*b			
C4 Joint forest management						
C4-2 Establishment of committees for joint forest management and biodiversity conservation						
C4-2-2 Establishment of committees and planning of activities					23,940,000	
<i>Fiscal Year 1</i>						
<i>Fiscal Year 2</i>					5,985,000	
(a) Establishment of committees					4,365,000	
iii) Demarcation of areas to be managed jointly						
Clearance of forest compartment survey line	8 km	45 village	360	9,000	3,240,000	Schedule of rates
Miscellaneous (paint and/or pillar)	1 unit	45 village	45	25,000	1,125,000	lump sum
(b) Microplanning					1,620,000	
Village gathering for PRA exercise	3 gathering	45 villages	135	12,000	1,620,000	TableD4-4
<i>Fiscal Year 3</i>					5,985,000	
(a) Establishment of committees					4,365,000	
iii) Demarcation of areas to be managed jointly						
Clearance of forest compartment survey line	8 km	45 village	360	9,000	3,240,000	Schedule of rates
Miscellaneous (paint and/or pillar)	1 unit	45 village	45	25,000	1,125,000	lump sum
(b) Microplanning					1,620,000	
Village gathering for PRA exercise	3 gathering	45 villages	135	12,000	1,620,000	TableD4-4
<i>Fiscal Year 4</i>					5,985,000	
(a) Establishment of committees					4,365,000	
iii) Demarcation of areas to be managed jointly						
Clearance of forest compartment survey line	8 km	45 village	360	9,000	3,240,000	Schedule of rates
Miscellaneous (paint and/or pillar)	1 unit	45 village	45	25,000	1,125,000	lump sum
(b) Microplanning					1,620,000	
Village gathering for PRA exercise	3 gathering	45 villages	135	12,000	1,620,000	TableD4-4
<i>Fiscal Year 5</i>					5,985,000	
(a) Establishment of committees					4,365,000	
iii) Demarcation of areas to be managed jointly						
Clearance of forest compartment survey line	8 km	45 village	360	9,000	3,240,000	Schedule of rates
Miscellaneous (paint and/or pillar)	1 unit	45 village	45	25,000	1,125,000	lump sum
(b) Microplanning					1,620,000	
Village gathering for PRA exercise	3 gathering	45 villages	135	12,000	1,620,000	TableD4-4
<i>Fiscal Year 6</i>						
<i>Fiscal Year 7</i>						
<i>Fiscal Year 8</i>						
<i>Fiscal Year 9</i>						
<i>Fiscal Year 10</i>						

Table C4-2-3 Entry point activities

Component and cost items	Quantity			Unit cost d	Total e=c*d	Detailed estimates
	a	b	c=a*b			
C4 Joint forest management						
C4-2 Establishment of committees for joint forest management and biodiversity conservation						
C4-2-3 Entry point activities					54,000,000	
<i>Fiscal Year 1</i>						
<i>Fiscal Year 2</i>					13,500,000	
(a) Entry point activities					13,500,000	
Small-scale infrastructure	1 set	45 villages	45	300,000	13,500,000	TableD4-5
<i>Fiscal Year 3</i>					13,500,000	
(a) Entry point activities					13,500,000	
Construction of community hall	1 hall	45 villages	45	300,000	13,500,000	TableD4-5
<i>Fiscal Year 4</i>					13,500,000	
(a) Entry point activities					13,500,000	
Construction of community hall	1 hall	45 villages	45	300,000	13,500,000	TableD4-5
<i>Fiscal Year 5</i>					13,500,000	
(a) Entry point activities					13,500,000	
Construction of community hall	1 hall	45 villages	45	300,000	13,500,000	TableD4-5
<i>Fiscal Year 6</i>						
<i>Fiscal Year 7</i>						
<i>Fiscal Year 8</i>						
<i>Fiscal Year 9</i>						
<i>Fiscal Year 10</i>						

Annex 22 Detailed cost estimate by subcomponent and year

Table C4-3-1 Forest management and biodiversity conservation

Component and cost items	Quantity		Unit cost d	Total e=c*d	Detailed estimates
	a	b			
C4 Joint forest management					
C4-3 Forest management and biodiversity conservation activities					
C4-3-1 Forest management and biodiversity conservation				239,236,431	
<i>Fiscal Year 1</i>					
<i>Fiscal Year 2</i>				7,813,665	
(a) Forest management and biodiversity conservation				4,756,500	
Fire fighting equipment	1 set	45 village	45	105,700	4,756,500 Table D4-11
(b) Creation and management of nurseries				3,057,165	
Creation of nurseries	5 ha	1 set	5	365,078	1,825,390 Table D4-11
Maintenance of nuersery	5 ha	1 set	5	246,355	1,231,775 Table D4-11
<i>Fiscal Year 3</i>					
(a) Forest management and biodiversity conservation				14,052,600	
Fire fighting equipment	1 set	45 village	45	105,700	4,756,500 Table D4-11
Clearance of forest compartment survey line	8 km	45 village	360	9,000	3,240,000 Schedule of rates
Batch 1: Planting and first year maintenance 1	1 unit	45 village	45	134,580	6,056,100 Table D4-11
(b) Creation and management of nurseries				4,288,940	
Creation of nursery	5 ha	1 set	5	365,078	1,825,390 Table D4-11
Maintenance of nuersery	10 ha	1 set	10	246,355	2,463,550 Table D4-11
<i>Fiscal Year 4</i>					
(a) Forest management and biodiversity conservation				23,745,825	
Fire fighting equipment	1 set	45 village	45	105,700	4,756,500 Table D4-11
Clearance of forest compartment survey line	8 km	90 village	720	9,000	6,480,000 Schedule of rates
Batch 1: Second year maintenance 1	1 unit	45 village	45	8,825	397,125 Table D4-11
Batch 1: Planting and first year maintenance 2	1 unit	45 village	45	134,580	6,056,100 Table D4-11
Batch 2: Planting and first year maintenance 1	1 unit	45 village	45	134,580	6,056,100 Table D4-11
(b) Creation and management of nurseries				3,686,416	
Creation of nursery	2 ha	1 set	2	365,078	730,156 Table D4-11
Maintenance of nuersery	12 ha	1 set	12	246,355	2,956,260 Table D4-11
<i>Fiscal Year 5</i>					
(a) Forest management and biodiversity conservation				33,702,300	
Fire fighting equipment	1 set	45 village	45	105,700	4,756,500 Table D4-11
Clearance of forest compartment survey line	8 km	135 village	1,080	9,000	9,720,000 Schedule of rates
Batch 1: Third year maintenance 1	1 unit	45 village	45	5,850	263,250 Table D4-11
Batch 1: Second year maintenance 2	1 unit	45 village	45	8,825	397,125 Table D4-11
Batch 1: Planting and first year maintenance 3	1 unit	45 village	45	134,580	6,056,100 Table D4-11
Batch 2: Second year maintenance 1	1 unit	45 village	45	8,825	397,125 Table D4-11
Batch 2: Planting and first year maintenance 2	1 unit	45 village	45	134,580	6,056,100 Table D4-11
Batch 3: Planting and first year maintenance 1	1 unit	45 village	45	134,580	6,056,100 Table D4-11
(b) Creation and management of nurseries				2,956,260	
Maintenance of nuersery	12 ha	1 set	12	246,355	2,956,260 Table D4-11
<i>Fiscal Year 6</i>					
(a) Forest management and biodiversity conservation				38,902,275	
Clearance of forest compartment survey line	8 km	180 village	1,440	9,000	12,960,000 Schedule of rates
Batch 1: Third year maintenance 2	1 unit	45 village	45	5,850	263,250 Table D4-11
Batch 1: Second year maintenance 3	1 unit	45 village	45	8,825	397,125 Table D4-11
Batch 1: Planting and first year maintenance 4	1 unit	45 village	45	134,580	6,056,100 Table D4-11
Batch 2: Third year maintenance 1	1 unit	45 village	45	5,850	263,250 Table D4-11
Batch 2: Second year maintenance 2	1 unit	45 village	45	8,825	397,125 Table D4-11
Batch 2: Planting and first year maintenance 3	1 unit	45 village	45	134,580	6,056,100 Table D4-11
Batch 3: Second year maintenance 1	1 unit	45 village	45	8,825	397,125 Table D4-11
Batch 3: Planting and first year maintenance 2	1 unit	45 village	45	134,580	6,056,100 Table D4-11
Batch 4: Planting and first year maintenance 1	1 unit	45 village	45	134,580	6,056,100 Table D4-11
(b) Creation and management of nurseries				2,956,260	
Maintenance of nuersery	12 ha	1 set	12	246,355	2,956,260 Table D4-11

Annex 22 Detailed cost estimate by subcomponent and year

Table C4-3-1 Forest management and biodiversity conservation (continued)

Component and cost items	Quantity		Unit cost d	Total e=c*d	Detailed estimates
	a	b			
Fiscal Year 7					36,462,810
(a) Forest management and biodiversity conservation					33,506,550
Clearance of forest compartment survey line	8 km	180 village	1,440	9,000	12,960,000 Schedule of rates
Batch 1: Third year maintenance 3	1 unit	45 village	45	5,850	263,250 Table D4-11
Batch 1: Second year maintenance 4	1 unit	45 village	45	8,825	397,125 Table D4-11
Batch 2: Third year maintenance 2	1 unit	45 village	45	5,850	263,250 Table D4-11
Batch 2: Second year maintenance 3	1 unit	45 village	45	8,825	397,125 Table D4-11
Batch 2: Planting and first year maintenance 4	1 unit	45 village	45	134,580	6,056,100 Table D4-11
Batch 3: Third year maintenance 1	1 unit	45 village	45	5,850	263,250 Table D4-11
Batch 3: Second year maintenance 2	1 unit	45 village	45	8,825	397,125 Table D4-11
Batch 3: Planting and first year maintenance 3	1 unit	45 village	45	134,580	6,056,100 Table D4-11
Batch 4: Second year maintenance 1	1 unit	45 village	45	8,825	397,125 Table D4-11
Batch 4: Planting and first year maintenance 1	1 unit	45 village	45	134,580	6,056,100 Table D4-11
(b) Creation and management of nurseries					2,956,260
Maintenance of nursery	12 ha	1 set	12	246,355	2,956,260 Table D4-11
Fiscal Year 8					30,272,835
(a) Forest management and biodiversity conservation					27,316,575
Clearance of forest compartment survey line	8 km	180 village	1,440	9,000	12,960,000 Schedule of rates
Batch 1: Third year maintenance 4	1 unit	45 village	45	5,850	263,250 Table D4-11
Batch 2: Third year maintenance 3	1 unit	45 village	45	5,850	263,250 Table D4-11
Batch 2: Second year maintenance 4	1 unit	45 village	45	8,825	397,125 Table D4-11
Batch 3: Third year maintenance 2	1 unit	45 village	45	5,850	263,250 Table D4-11
Batch 3: Second year maintenance 3	1 unit	45 village	45	8,825	397,125 Table D4-11
Batch 3: Planting and first year maintenance 4	1 unit	45 village	45	134,580	6,056,100 Table D4-11
Batch 4: Third year maintenance 1	1 unit	45 village	45	5,850	263,250 Table D4-11
Batch 4: Second year maintenance 2	1 unit	45 village	45	8,825	397,125 Table D4-11
Batch 4: Planting and first year maintenance 1	1 unit	45 village	45	134,580	6,056,100 Table D4-11
(b) Creation and management of nurseries					2,956,260
Maintenance of nursery	12 ha	1 set	12	246,355	2,956,260 Table D4-11
Fiscal Year 9					23,556,360
(a) Forest management and biodiversity conservation					20,600,100
Clearance of forest compartment survey line	8 km	180 village	1,440	9,000	12,960,000 Schedule of rates
Batch 2: Third year maintenance 4	1 unit	45 village	45	5,850	263,250 Table D4-11
Batch 3: Third year maintenance 3	1 unit	45 village	45	5,850	263,250 Table D4-11
Batch 3: Second year maintenance 4	1 unit	45 village	45	8,825	397,125 Table D4-11
Batch 4: Third year maintenance 2	1 unit	45 village	45	5,850	263,250 Table D4-11
Batch 4: Second year maintenance 3	1 unit	45 village	45	8,825	397,125 Table D4-11
Batch 4: Planting and first year maintenance 1	1 unit	45 village	45	134,580	6,056,100 Table D4-11
(b) Creation and management of nurseries					2,956,260
Maintenance of nursery	12 ha	1 set	12	246,355	2,956,260 Table D4-11
Fiscal Year 10					16,839,885
(a) Forest management and biodiversity conservation					13,883,625
Clearance of forest compartment survey line	8 km	180 village	1,440	9,000	12,960,000 Schedule of rates
Batch 3: Third year maintenance 4	1 unit	45 village	45	5,850	263,250 Table D4-11
Batch 4: Third year maintenance 3	1 unit	45 village	45	5,850	263,250 Table D4-11
Batch 4: Second year maintenance 4	1 unit	45 village	45	8,825	397,125 Table D4-11
(b) Creation and management of nurseries					2,956,260
Maintenance of nursery	12 ha	1 set	12	246,355	2,956,260 Table D4-11

Annex 22 Detailed cost estimate by subcomponent and year

Table C4-3-2 Action research on sustainable use of forest resources

Component and cost items	Quantity		Unit cost d	Total e=c*d	Detailed estimates
	a	b			
C4 Joint forest management					
C4-3 Forest management and biodiversity conservation activities					
C4-3-2 Action research on sustainable use of forest resources				4,350,000	
<i>Fiscal Year 1</i>					
<i>Fiscal Year 2</i>					
<i>Fiscal Year 3</i>					
(a) Action research on sustainable use of forest resources				270,000	
Advertising set	3 newspaper	1 week	3	40,000	120,000
Miscellaneous (travel etc.)	1 unit	1 unit	1	150,000	150,000 lump sum
<i>Fiscal Year 4</i>				1,020,000	
(a) Action research on sustainable use of forest resources				1,020,000	
In-state research assistants	5 person	12 month	60	12,000	720,000
Miscellaneous (travel etc.)	1 unit	1 unit	1	300,000	300,000 lump sum
<i>Fiscal Year 5</i>				1,020,000	
(a) Action research on sustainable use of forest resources				1,020,000	
In-state research assistants	5 person	12 month	60	12,000	720,000
Miscellaneous (travel etc.)	1 unit	1 unit	1	300,000	300,000 lump sum
<i>Fiscal Year 6</i>				1,020,000	
(a) Action research on sustainable use of forest resources				1,020,000	
In-state research assistants	5 person	12 month	60	12,000	720,000
Miscellaneous (travel etc.)	1 unit	1 unit	1	300,000	300,000 lump sum
<i>Fiscal Year 7</i>				1,020,000	
(a) Action research on sustainable use of forest resources				1,020,000	
In-state research assistants	5 person	12 month	60	12,000	720,000
Miscellaneous (travel etc.)	1 unit	1 unit	1	300,000	300,000 lump sum
<i>Fiscal Year 8</i>					
<i>Fiscal Year 9</i>					
<i>Fiscal Year 10</i>					

Table C4-4-1 Formation of self help groups

Component and cost items	Quantity		Unit cost d	Total e=c*d	Detailed estimates
	a	b			
C4 Joint forest management					
C4-4 Income generation activities					
C4-4-1 Formation of self help groups					
<i>Fiscal Year 1</i>					
<i>Fiscal Year 2</i>					
<i>Fiscal Year 3</i>					
<i>Fiscal Year 4</i>					
<i>Fiscal Year 5</i>					
<i>Fiscal Year 6</i>					
<i>Fiscal Year 7</i>					
<i>Fiscal Year 8</i>					
<i>Fiscal Year 9</i>					
<i>Fiscal Year 10</i>					

Annex 22 Detailed cost estimate by subcomponent and year

Table C4-4-2 Microfinance scheme						
Component and cost items	Quantity			Unit cost	Total	Detailed estimates
	a	b	c=a*b	d	e=c*d	
C4 Joint forest management						
C4-4 Income generation activities						
C4-4-2 Microfinance scheme					21,600,000	
<i>Fiscal Year 1</i>						
<i>Fiscal Year 2</i>						
<i>Fiscal Year 3</i>					5,400,000	
(a) Block grant to SHGs through JFMC/EDC/PSS (microfinance)					5,400,000	
Block grant to JFMCs, EDCs, PSS's	2 time	45 JFMC	90	60,000	5,400,000	TableD4-6
<i>Fiscal Year 4</i>					5,400,000	
(a) Block grant to SHGs through JFMC/EDC/PSS (microfinance)					5,400,000	
Block grant to JFMCs, EDCs, PSS's	2 time	45 JFMC	90	60,000	5,400,000	TableD4-6
<i>Fiscal Year 5</i>					5,400,000	
(a) Block grant to SHGs through JFMC/EDC/PSS (microfinance)					5,400,000	
Block grant to JFMCs, EDCs, PSS's	2 time	45 JFMC	90	60,000	5,400,000	TableD4-6
<i>Fiscal Year 6</i>					5,400,000	
(a) Block grant to SHGs through JFMC/EDC/PSS (microfinance)					5,400,000	
Block grant to JFMCs, EDCs, PSS's	2 time	45 JFMC	90	60,000	5,400,000	TableD4-6
<i>Fiscal Year 7</i>						
<i>Fiscal Year 8</i>						
<i>Fiscal Year 9</i>						
<i>Fiscal Year 10</i>						

Table C4-5-1 Training on management of JFMCs, EDCs and PSSs						
Component and cost items	Quantity			Unit cost	Total	Detailed estimates
	a	b	c=a*b	d	e=c*d	
C4 Joint forest management						
C4-5 Capacity development						
C4-5-1 Training on management of JFMCs, EDCs and PSSs					2,022,400	
<i>Fiscal Year 1</i>						
<i>Fiscal Year 2</i>					505,600	
(a) Training on management of JFMCs, EDCs and PSSs					505,600	
Training on financial and admin. Management	1 training	8 time	8	63,200	505,600	TableD4-6
<i>Fiscal Year 3</i>					505,600	
(a) Training on management of JFMCs, EDCs and PSSs					505,600	
Training on financial and admin. Management	1 training	8 time	8	63,200	505,600	TableD4-6
<i>Fiscal Year 4</i>					505,600	
(a) Training on management of JFMCs, EDCs and PSSs					505,600	
Training on financial and admin. Management	1 training	8 time	8	63,200	505,600	TableD4-6
<i>Fiscal Year 5</i>					505,600	
(a) Training on management of JFMCs, EDCs and PSSs					505,600	
Training on financial and admin. Management	1 training	8 time	8	63,200	505,600	TableD4-6
<i>Fiscal Year 6</i>						
<i>Fiscal Year 7</i>						
<i>Fiscal Year 8</i>						
<i>Fiscal Year 9</i>						
<i>Fiscal Year 10</i>						

Annex 22 Detailed cost estimate by subcomponent and year

Table C4-5-2 Technical training on forest management and biodiversity conservation

Component and cost items	Quantity			Unit cost	Total	Detailed estimates
	a	b	c=a*b	d	e=c*d	
C4 Joint forest management						
C4-5 Capacity development						
C4-5-2 Technical training on forest management and biodiversity conservation					10,800,000	
<i>Fiscal Year 1</i>						
<i>Fiscal Year 2</i>						
<i>Fiscal Year 3</i>					1,350,000	
(a) Technical training on forest management and biodiversity conservation					1,350,000	
Miscellaneous (refreshment etc.)	200 person day	45 village	9,000	150	1,350,000	
<i>Fiscal Year 4</i>					2,700,000	
(a) Technical training on forest management and biodiversity conservation					2,700,000	
Miscellaneous (refreshment etc.)	200 person day	90 village	18,000	150	2,700,000	
<i>Fiscal Year 5</i>					2,700,000	
(a) Technical training on forest management and biodiversity conservation					2,700,000	
Miscellaneous (refreshment etc.)	200 person day	90 village	18,000	150	2,700,000	
<i>Fiscal Year 6</i>					2,700,000	
(a) Technical training on forest management and biodiversity conservation					2,700,000	
Miscellaneous (refreshment etc.)	200 person day	90 village	18,000	150	2,700,000	
<i>Fiscal Year 7</i>					1,350,000	
(a) Technical training on forest management and biodiversity conservation					1,350,000	
Miscellaneous (refreshment etc.)	200 person day	45 village	9,000	150	1,350,000	
<i>Fiscal Year 8</i>						
<i>Fiscal Year 9</i>						
<i>Fiscal Year 10</i>						

Table C4-5-3 Training on business management

Component and cost items	Quantity			Unit cost	Total	Detailed estimates
	a	b	c=a*b	d	e=c*d	
C4 Joint forest management						
C4-5 Capacity development						
C4-5-3 Training on business management					3,645,600	
<i>Fiscal Year 1</i>						
<i>Fiscal Year 2</i>					911,400	
(a) Training on business management					911,400	
Training on business management for SHG	1 training	21 time	21	43,400	911,400	TableD4-8
<i>Fiscal Year 3</i>					911,400	
(a) Training on business management					911,400	
Training on business management for SHG	1 training	21 time	21	43,400	911,400	TableD4-8
<i>Fiscal Year 4</i>					911,400	
(a) Training on business management					911,400	
Training on business management for SHG	1 training	21 time	21	43,400	911,400	TableD4-8
<i>Fiscal Year 5</i>					911,400	
(a) Training on business management					911,400	
Training on business management for SHG	1 training	21 time	21	43,400	911,400	TableD4-8
<i>Fiscal Year 6</i>						
<i>Fiscal Year 7</i>						
<i>Fiscal Year 8</i>						
<i>Fiscal Year 9</i>						
<i>Fiscal Year 10</i>						

Annex 22 Detailed cost estimate by subcomponent and year

Table C4-5-4 Skills development training on IGAs

Component and cost items	Quantity			Unit cost d	Total e=c*d	Detailed estimates
	a	b	c=a*b			
C4 Joint forest management						
C4-5 Capacity development						
C4-5-4 Skills development training on IGAs					9,039,600	
<i>Fiscal Year 1</i>						
<i>Fiscal Year 2</i>						
<i>Fiscal Year 3</i>					1,506,600	
(a) Skills development training on IGAs					1,506,600	
Skill development training on IGAs	45 village	2 time	90	16,740	1,506,600	TableD4-9
<i>Fiscal Year 4</i>					2,259,900	
(a) Skills development training on IGAs					2,259,900	
Skill development training on IGAs	45 village	3 time	135	16,740	2,259,900	TableD4-9
<i>Fiscal Year 5</i>					2,259,900	
(a) Skills development training on IGAs					2,259,900	
Skill development training on IGAs	45 village	3 time	135	16,740	2,259,900	TableD4-9
<i>Fiscal Year 6</i>					2,259,900	
(a) Skills development training on IGAs					2,259,900	
Skill development training on IGAs	45 village	3 time	135	16,740	2,259,900	TableD4-9
<i>Fiscal Year 7</i>					753,300	
(a) Skills development training on IGAs					753,300	
Skill development training on IGAs	45 village	1 time	45	16,740	753,300	TableD4-9
<i>Fiscal Year 8</i>						
<i>Fiscal Year 9</i>						
<i>Fiscal Year 10</i>						

Table C4-5-5 Exposure visits

Component and cost items	Quantity			Unit cost d	Total e=c*d	Detailed estimates
	a	b	c=a*b			
C4 Joint forest management						
C4-5 Capacity development						
C4-5-5 Exposure visits					3,840,000	
<i>Fiscal Year 1</i>						
<i>Fiscal Year 2</i>						
<i>Fiscal Year 3</i>						
<i>Fiscal Year 4</i>					960,000	
(a) Exposure visits					960,000	
Exposure visit (1 day 30 person to Darjeeling)	1 visit	20 time	20	48,000	960,000	TableD4-10
<i>Fiscal Year 5</i>					960,000	
(a) Exposure visits					960,000	
Exposure visit (1 day 30 person to Darjeeling)	1 visit	20 time	20	48,000	960,000	TableD4-10
<i>Fiscal Year 6</i>					960,000	
(a) Exposure visits					960,000	
Exposure visit (1 day 30 person to Darjeeling)	1 visit	20 time	20	48,000	960,000	TableD4-10
<i>Fiscal Year 7</i>					960,000	
(a) Exposure visits					960,000	
Exposure visit (1 day 30 person to Darjeeling)	1 visit	20 time	20	48,000	960,000	TableD4-10
<i>Fiscal Year 8</i>						
<i>Fiscal Year 9</i>						
<i>Fiscal Year 10</i>						

Annex 22 Detailed cost estimate by subcomponent and year

Table C4-5-6 Training on ecotourism

Component and cost items	Quantity			Unit cost d	Total e=c*d	Detailed estimates
	a	b	c=a*b			
C4 Joint forest management						
C4-5 Capacity development						
C4-5-6 Training on ecotourism					12,234,000	
<i>Fiscal Year 1</i>						
<i>Fiscal Year 2</i>						
<i>Fiscal Year 3</i>						
<i>Fiscal Year 4</i>					2,649,000	
(a) Training of JFMC, EDC, and PSS members					110,000	
Tender doc/advertising	1 set	1 unit	1	10,000	10,000	
Course note printed	1 set	1 unit	1	50,000	50,000	
Instructor fee, per diem	1 set	20 day	20	2,500	50,000	Annex 24
(b) Training of local people and the local private sector					2,539,000	
Tender doc/advertising	1 set	1 unit	1	10,000	10,000	
Delivery of training	1 set	10 village	10	252,900	2,529,000	Table D4-12
<i>Fiscal Year 5</i>					2,065,000	
(a) Training of JFMC, EDC, and PSS members					25,000	
Instructor fee, per diem	1 set	10 day	10	2,500	25,000	Annex 24
(b) Training of local people and the local private sector					1,855,000	
Delivery of training	1 set	10 village	10	185,500	1,855,000	Table D4-12
(c) Ecotourism exposure tour					185,000	
5 exposure trips	1 set	5 trip	5	37000	185,000	Table D4-12
<i>Fiscal Year 6</i>					1,905,000	
(a) Training of JFMC, EDC, and PSS members					50,000	
Instructor fee, per diem	1 set	20 day	20	2,500	50,000	Annex 24
(b) Training of local people and the local private sector					1,855,000	
Delivery of training	1 set	10 village	10	185,500	1,855,000	Table D4-12
<i>Fiscal Year 7</i>					1,905,000	
(a) Training of JFMC, EDC, and PSS members					50,000	
Instructor fee, per diem	1 set	20 day	20	2,500	50,000	Annex 24
(b) Training of local people and the local private sector					1,855,000	
Delivery of training	1 set	10 village	10	185,500	1,855,000	Table D4-12
<i>Fiscal Year 8</i>					1,855,000	
(b) Training of local people and the local private sector					1,855,000	
Delivery of training	1 set	10 village	10	185,500	1,855,000	Table D4-12
<i>Fiscal Year 9</i>					1,855,000	
(b) Training of local people and the local private sector					1,855,000	
Delivery of training	1 set	10 village	10	185,500	1,855,000	Table D4-12
<i>Fiscal Year 10</i>						

Table C4-6-1 Monitoring

Component and cost items	Quantity			Unit cost d	Total e=c*d	Detailed estimates
	a	b	c=a*b			
C4 Joint forest management						
C4-6 Monitoring						
C4-6-1 Monitoring						
<i>Fiscal Year 1</i>						
<i>Fiscal Year 2</i>						
<i>Fiscal Year 3</i>						
<i>Fiscal Year 4</i>						
<i>Fiscal Year 5</i>						
<i>Fiscal Year 6</i>						
<i>Fiscal Year 7</i>						
<i>Fiscal Year 8</i>						
<i>Fiscal Year 9</i>						
<i>Fiscal Year 10</i>						

Annex 22 Detailed cost estimate by subcomponent and year

Table C4-7-1 Village Development Fund

Component and cost items	Quantity			Unit cost	Total	Detailed estimates
	a	b	c=a*b	d	e=c*d	
C4 Joint forest management						
C4-7 Village Development Fund						
C4-7-1 Village Development Fund						
<i>Fiscal Year 1</i>						
<i>Fiscal Year 2</i>						
<i>Fiscal Year 3</i>						
<i>Fiscal Year 4</i>						
<i>Fiscal Year 5</i>						
<i>Fiscal Year 6</i>						
<i>Fiscal Year 7</i>						
<i>Fiscal Year 8</i>						
<i>Fiscal Year 9</i>						
<i>Fiscal Year 10</i>						

Table C5-1-1 Development of infrastructure and equipment improvement plan

Component and cost items	Quantity			Unit cost	Total	Detailed estimates
	a	b	c=a*b	d	e=c*d	
C5 Organisational strengthening of the Forest Department						
C5-1 Improvements of infrastructure and equipment						
C5-1-1 Development of infrastructure and equipment improvement plan					520,000	
<i>Fiscal Year 1</i>					<i>520,000</i>	
(a) Development of infrastructure and equipment improvement plan					520,000	
Infrastructure development expert	1 person	2 month	2	150,000	300,000	
In-state research assistants	2 person	2 month	4	30,000	120,000	
Field logistics	1 unit	2 month	2	50,000	100,000	
<i>Fiscal Year 2</i>						
<i>Fiscal Year 3</i>						
<i>Fiscal Year 4</i>						
<i>Fiscal Year 5</i>						
<i>Fiscal Year 6</i>						
<i>Fiscal Year 7</i>						
<i>Fiscal Year 8</i>						
<i>Fiscal Year 9</i>						
<i>Fiscal Year 10</i>						

Annex 22 Detailed cost estimate by subcomponent and year

Table C5-1-2 Construction and renovation of offices and residences

Component and cost items	Quantity		Unit cost	Total	Detailed estimates
	a	b			
C5 Organisational strengthening of the Forest Department					
C5-1 Improvements of infrastructure and equipment					
C5-1-2 Construction and renovation of offices and residences				268,556,020	
<i>Fiscal Year 1</i>					
<i>Fiscal Year 2</i>				78,658,010	
(a) Renovation and improvement of Headquarter offices and Forest Colony quarters				37,080,000	
Headquarter offices	0.2 unit	1 set	0.2	120,000,000	24,000,000 Table D5-1 (a)
Forest Colony 6 quarters and 1 comm. centre	0.2 unit	1 set	0.2	40,000,000	8,000,000 Table D5-1 (a)
Improvement of facilities in the Forest Colony	0.2 unit	1 set	0.2	20,000,000	4,000,000 Table D5-1 (a)
Architect's fee (3% of civil cost)	1 firm	1 set	1	1,080,000	1,080,000
(b) Renovation and improvement of Range offices and check posts				41,578,010	
Large office and attached quarters	6 unit	1 set	6	2,693,500	16,161,000 Table D5-1 (b)
Small office and attached quarters	10 unit	1 set	10	1,729,000	17,290,000 Table D5-1 (b)
Check post and attached quarters	4 unit	1 set	4	1,729,000	6,916,000 Table D5-1 (b)
Architect's fee (3% of civil cost)	1 firm	1 set	1	1,211,010	1,211,010
<i>Fiscal Year 3</i>				152,818,010	
(a) Renovation and improvement of Headquarter offices and Forest Colony quarters				111,240,000	
Headquarter offices	0.6 unit	1 set	0.6	120,000,000	72,000,000 Table D5-1 (a)
Forest Colony 6 quarters and 1 comm. centre	0.6 unit	1 set	0.6	40,000,000	24,000,000 Table D5-1 (a)
Improvement of facilities in the Forest Colony	0.6 unit	1 set	0.6	20,000,000	12,000,000 Table D5-1 (a)
Architect's fee (3% of civil cost)	1 firm	1 set	1	3,240,000	3,240,000
(b) Renovation and improvement of Range offices and check posts				41,578,010	
Large office and attached quarters	6 unit	1 set	6	2,693,500	16,161,000 Table D5-1 (b)
Small office and attached quarters	10 unit	1 set	10	1,729,000	17,290,000 Table D5-1 (b)
Check post and attached quarters	4 unit	1 set	4	1,729,000	6,916,000 Table D5-1 (b)
Architect's fee (3% of civil cost)	1 firm	1 set	1	1,211,010	1,211,010
<i>Fiscal Year 4</i>				37,080,000	
(a) Renovation and improvement of Headquarter offices and Forest Colony quarters				37,080,000	
Headquarter offices	0.2 unit	1 set	0.2	120,000,000	24,000,000 Table D5-1 (a)
Forest Colony 6 quarters and 1 comm. centre	0.2 unit	1 set	0.2	40,000,000	8,000,000 Table D5-1 (a)
Improvement of facilities in the Forest Colony	0.2 unit	1 set	0.2	20,000,000	4,000,000 Table D5-1 (a)
Architect's fee (3% of civil cost)	1 firm	1 set	1	1,080,000	1,080,000
<i>Fiscal Year 5</i>					
<i>Fiscal Year 6</i>					
<i>Fiscal Year 7</i>					
<i>Fiscal Year 8</i>					
<i>Fiscal Year 9</i>					
<i>Fiscal Year 10</i>					

Annex 22 Detailed cost estimate by subcomponent and year

Table C5-1-3 Procurement of equipment

Component and cost items	Quantity		Unit cost d	Total e=c*d	Detailed estimates
	a	b			
C5 Organisational strengthening of the Forest Department					
C5-1 Improvements of infrastructure and equipment					
C5-1-3 Procurement of equipment					
				71,122,200	
Fiscal Year 1					
				2,388,000	
(a) Procurement of equipment					
2,388,000					
Vehicles	2 unit	1 set	2	1,194,000	2,388,000
Fiscal Year 2					
				25,214,000	
(a) Procurement of equipment					
25,214,000					
Tender doc/advertising for supply of goods	1 unit	1 set	1	10,000	10,000
Vehicles	2 unit	1 set	2	1,194,000	2,388,000
Patrolling vehicles	4 unit	1 set	4	800,000	3,200,000
Vehicles (truck)	1 unit	1 set	1	1,500,000	1,500,000
Vehicles (pickup truck)	6 unit	1 set	6	506,000	3,036,000
Motor cycle	15 unit	1 set	15	78,000	1,170,000
Computer set	34 unit	1 set	34	224,000	7,616,000
Communication system	1 unit	1 set	1	3,000,000	3,000,000
Fire fighting tools	27 unit	1 set	27	122,000	3,294,000
Fiscal Year 3					
				9,405,200	
(a) Procurement of equipment					
9,405,200					
Vehicles	2 unit	1 set	2	1,194,000	2,388,000
Patrolling vehicles	4 unit	1 set	4	800,000	3,200,000
Vehicles (pickup truck)	4 unit	1 set	4	506,000	2,024,000
Motor cycle	15 unit	1 set	15	78,000	1,170,000
Spare parts of vehicles (5% of purchase price)	1 unit	1 set	1	506,200	506,200
Spare parts of motor cycles (10% of purchase price)	1 unit	1 set	1	117,000	117,000
Fiscal Year 4					
				3,823,200	
(a) Procurement of equipment					
3,823,200					
Patrolling vehicles	4 unit	1 set	4	800,000	3,200,000
Spare parts of vehicles (5% of purchase price)	1 unit	1 set	1	506,200	506,200
Spare parts of motor cycles (10% of purchase price)	1 unit	1 set	1	117,000	117,000
Fiscal Year 5					
				5,017,200	
(a) Procurement of equipment					
5,017,200					
Vehicles	1 unit	1 set	1	1,194,000	1,194,000
Patrolling vehicles	4 unit	1 set	4	800,000	3,200,000
Spare parts of vehicles (5% of purchase price)	1 unit	1 set	1	506,200	506,200
Spare parts of motor cycles (10% of purchase price)	1 unit	1 set	1	117,000	117,000
Fiscal Year 6					
				3,823,200	
(a) Procurement of equipment					
3,823,200					
Patrolling vehicles	4 unit	1 set	4	800,000	3,200,000
Spare parts of vehicles (5% of purchase price)	1 unit	1 set	1	506,200	506,200
Spare parts of motor cycles (10% of purchase price)	1 unit	1 set	1	117,000	117,000
Fiscal Year 7					
				16,746,000	
(a) Procurement of equipment					
16,746,000					
Patrolling vehicles	4 unit	1 set	4	800,000	3,200,000
Vehicles (truck)	1 unit	1 set	1	1,500,000	1,500,000
Vehicles (pickup truck)	6 unit	1 set	6	506,000	3,036,000
Motor cycle	15 unit	1 set	15	78,000	1,170,000
Computer set	35 unit	1 set	35	224,000	7,840,000
Fiscal Year 8					
				3,697,800	
(a) Procurement of equipment					
3,697,800					
Vehicles (pickup truck)	4 unit	1 set	4	506,000	2,024,000
Motor cycle	15 unit	1 set	15	78,000	1,170,000
Spare parts of vehicles (5% of purchase price)	1 unit	1 set	1	386,800	386,800
Spare parts of motor cycles (10% of purchase price)	1 unit	1 set	1	117,000	117,000
Fiscal Year 9					
				503,800	
(a) Procurement of equipment					
503,800					
Spare parts of vehicles (5% of purchase price)	1 unit	1 set	1	386,800	386,800
Spare parts of motor cycles (10% of purchase price)	1 unit	1 set	1	117,000	117,000
Fiscal Year 10					
				503,800	
(a) Procurement of equipment					
503,800					
Spare parts of vehicles (5% of purchase price)	1 unit	1 set	1	386,800	386,800
Spare parts of motor cycles (10% of purchase price)	1 unit	1 set	1	117,000	117,000

Annex 22 Detailed cost estimate by subcomponent and year

Table C5-2-1 Biodiversity management

Component and cost items	Quantity		Unit cost d	Total e=c*d	Detailed estimates
	a	b			
C5 Organisational strengthening of the Forest Department					
C5-2 Training of the Forest Department officers and frontline staff members					
C5-2-1 Biodiversity management				19,604,100	
<i>Fiscal Year 1</i>					
<i>Fiscal Year 2</i>				4,097,000	
(a) Training of IFS and SFS officers (short course)					
three-week course on protected area management	5 person	1 course	5	67,500	337,500
(b) Training of IFS and SFS officers (diploma course)					
nine-month diploma course	2 person	1 course	2	604,650	1,209,300
(c) Training of range officers and block officers					
three-week certificate course	10 person	1 course	10	130,020	1,300,200
(d) Overseas exposure training					
two-week overseas exposure training	5 person	1 course	5	250,000	1,250,000
<i>Fiscal Year 3</i>					
(b) Training of IFS and SFS officers (diploma course)					
nine-month diploma course	2 person	1 course	2	604,650	1,209,300
(c) Training of range officers and block officers					
three-week certificate course	10 person	1 course	10	130,020	1,300,200
(d) Overseas exposure training					
two-week overseas exposure training	5 person	1 course	5	250,000	1,250,000
<i>Fiscal Year 4</i>					
(b) Training of IFS and SFS officers (diploma course)					
nine-month diploma course	2 person	1 course	2	604,650	1,209,300
(c) Training of range officers and block officers					
three-week certificate course	10 person	1 course	10	130,020	1,300,200
(d) Overseas exposure training					
two-week overseas exposure training	5 person	1 course	5	250,000	1,250,000
<i>Fiscal Year 5</i>					
(d) Overseas exposure training					
two-week overseas exposure training	5 person	1 course	5	250,000	1,250,000
<i>Fiscal Year 6</i>					
(a) Training of IFS and SFS officers (short course)					
three-week course on protected area management	5 person	1 course	5	67,500	337,500
(d) Overseas exposure training					
two-week overseas exposure training	5 person	1 course	5	250,000	1,250,000
<i>Fiscal Year 7</i>					
(c) Training of range officers and block officers					
three-week certificate course	10 person	1 course	10	130,020	1,300,200
(d) Overseas exposure training					
two-week overseas exposure training	5 person	1 course	5	250,000	1,250,000
<i>Fiscal Year 8</i>					
(c) Training of range officers and block officers					
three-week certificate course	10 person	1 course	10	130,020	1,300,200
<i>Fiscal Year 9</i>					
(c) Training of range officers and block officers					
three-week certificate course	10 person	1 course	10	130,020	1,300,200
<i>Fiscal Year 10</i>					

Annex 22 Detailed cost estimate by subcomponent and year

Table C5-2-2 Forest management						
Component and cost items	Quantity			Unit cost d	Total e=c*d	Detailed estimates
	a	b	c=a*b			
C5 Organisational strengthening of the Forest Department						
C5-2 Training of the Forest Department officers and frontline staff members						
C5-2-2 Forest management					12,960,000	
<i>Fiscal Year 1</i>						
<i>Fiscal Year 2</i>					<i>1,440,000</i>	
(a) Training of all DFOs and below						
two-week certificate course	80 person	1 course	80	18,000	1,440,000	
<i>Fiscal Year 3</i>						
(a) Training of all DFOs and below					1,440,000	
two-week certificate course	80 person	1 course	80	18,000	1,440,000	
<i>Fiscal Year 4</i>						
(a) Training of all DFOs and below					1,440,000	
two-week certificate course	80 person	1 course	80	18,000	1,440,000	
<i>Fiscal Year 5</i>						
(a) Training of all DFOs and below					1,440,000	
two-week certificate course	80 person	1 course	80	18,000	1,440,000	
<i>Fiscal Year 6</i>						
(a) Training of all DFOs and below					1,440,000	
two-week certificate course	80 person	1 course	80	18,000	1,440,000	
<i>Fiscal Year 7</i>						
(a) Training of all DFOs and below					1,440,000	
two-week certificate course	80 person	1 course	80	18,000	1,440,000	
<i>Fiscal Year 8</i>						
(a) Training of all DFOs and below					1,440,000	
two-week certificate course	80 person	1 course	80	18,000	1,440,000	
<i>Fiscal Year 9</i>						
(a) Training of all DFOs and below					1,440,000	
two-week certificate course	80 person	1 course	80	18,000	1,440,000	
<i>Fiscal Year 10</i>						
(a) Training of all DFOs and below					1,440,000	
two-week certificate course	80 person	1 course	80	18,000	1,440,000	

Table C5-2-3 Ecotourism						
Component and cost items	Quantity			Unit cost d	Total e=c*d	Detailed estimates
	a	b	c=a*b			
C5 Organisational strengthening of the Forest Department						
C5-2 Training of the Forest Department officers and frontline staff members						
C5-2-3 Ecotourism					802,200	
<i>Fiscal Year 1</i>						
<i>Fiscal Year 2</i>						
<i>Fiscal Year 3</i>						
(a) Training on ecotourism for selected IFS and SFS officers						
5-day workshop	20 person	1 unit	20	3,450	69,000	Table D2-5
<i>Fiscal Year 4</i>					<i>207,400</i>	
(b) Training on ecotourism for selected officers and frontline staff members of the Forest Department						
One-day workshop	20 person	4 district	80	1,730	138,400	Table D2-5
(a) Training on ecotourism for selected IFS and SFS officers						
5-day workshop	20 person	1 unit	20	3,450	69,000	Table D2-5
<i>Fiscal Year 5</i>					<i>207,400</i>	
(b) Training on ecotourism for selected officers and frontline staff members of the Forest Department						
One-day workshop	20 person	4 district	80	1,730	138,400	Table D2-5
(a) Training on ecotourism for selected IFS and SFS officers						
Five-day workshop	20 person	1 time	20	3,450	69,000	Table D2-5
<i>Fiscal Year 6</i>					<i>228,400</i>	
(b) Training on ecotourism for selected officers and frontline staff members of the Forest Department						
One-day workshop	20 person	4 district	80	1,730	138,400	Table D2-5
(c) Training on ecotourism for the focal person on ecotourism in the Forest Department						
Two-week course	5 person	1 course	5	18,000	90,000	
<i>Fiscal Year 7</i>						
<i>Fiscal Year 8</i>						
<i>Fiscal Year 9</i>						
(c) Training on ecotourism for the focal person on ecotourism in the Forest Department					90,000	
Two-week course	5 person	1 course	5	18,000	90,000	
<i>Fiscal Year 10</i>						

Annex 22 Detailed cost estimate by subcomponent and year

Table C5-2-4 Monitoring and evaluation

Component and cost items	Quantity			Unit cost	Total	Detailed estimates
	a	b	c=a*b	d	e=c*d	
C5 Organisational strengthening of the Forest Department						
C5-2 Training of the Forest Department officers and frontline staff members						
C5-2-4 Monitoring and evaluation					520,200	
<i>Fiscal Year 1</i>						
<i>Fiscal Year 2</i>					<i>57,800</i>	
(a) Annual review meeting					57,800	
Seminar	1 set	20 person	20	2,890	57,800	Table D2-5 (B)
<i>Fiscal Year 3</i>						
(a) Annual review meeting					57,800	
Seminar	1 set	20 person	20	2,890	57,800	
<i>Fiscal Year 4</i>						
(a) Annual review meeting					57,800	
Seminar	1 set	20 person	20	2,890	57,800	
<i>Fiscal Year 5</i>						
(a) Annual review meeting					57,800	
Seminar	1 set	20 person	20	2,890	57,800	
<i>Fiscal Year 6</i>						
(a) Annual review meeting					57,800	
Seminar	1 set	20 person	20	2,890	57,800	
<i>Fiscal Year 7</i>						
(a) Annual review meeting					57,800	
Seminar	1 set	20 person	20	2,890	57,800	
<i>Fiscal Year 8</i>						
(a) Annual review meeting					57,800	
Seminar	1 set	20 person	20	2,890	57,800	
<i>Fiscal Year 9</i>						
(a) Annual review meeting					57,800	
Seminar	1 set	20 person	20	2,890	57,800	
<i>Fiscal Year 10</i>						
(a) Annual review meeting					57,800	
Seminar	1 set	20 person	20	2,890	57,800	

Table C5-3-1 Establishment of sustainable finance mechanism

Component and cost items	Quantity			Unit cost	Total	Detailed estimates
	a	b	c=a*b	d	e=c*d	
C5 Organisational strengthening of the Forest Department						
C5-3 Establishment of sustainable finance mechanism						
C5-3-1 Establishment of sustainable finance mechanism						
<i>Fiscal Year 1</i>						
<i>Fiscal Year 2</i>						
<i>Fiscal Year 3</i>						
<i>Fiscal Year 4</i>						
<i>Fiscal Year 5</i>						
<i>Fiscal Year 6</i>						
<i>Fiscal Year 7</i>						
<i>Fiscal Year 8</i>						
<i>Fiscal Year 9</i>						
<i>Fiscal Year 10</i>						

Annex 22 Detailed cost estimate by subcomponent and year

Table C5-4-1 Project Management Unit

Component and cost items	Quantity			Unit cost d	Total e=c*d	Detailed estimates
	a	b	c=a*b			
C5 Organisational strengthening of the Forest Department						
C5-4 Project Management Unit						
C5-4-1 Project Management Unit					262,215,600	
<i>Fiscal Year 1</i>					<i>26,221,560</i>	
(a) Project management unit at state level					13,605,240	
Project management unit at state level	1 unit	1 set	1	13,605,240	13,605,240	Table D5-2
(b) District facilitation unit					6,784,320	
District facilitation unit	1 unit	1 set	1	6,784,320	6,784,320	Table D5-2
(c) Range supporting unit					5,832,000	
Range supporting unit	1 unit	1 set	1	5,832,000	5,832,000	Table D5-2
<i>Fiscal Year 2</i>					<i>26,221,560</i>	
(a) Project management unit at state level					13,605,240	
Project management unit at state level	1 unit	1 set	1	13,605,240	13,605,240	Table D5-2
(b) District facilitation unit					6,784,320	
District facilitation unit	1 unit	1 set	1	6,784,320	6,784,320	Table D5-2
(c) Range supporting unit					5,832,000	
Range supporting unit	1 unit	1 set	1	5,832,000	5,832,000	Table D5-2
<i>Fiscal Year 3</i>					<i>26,221,560</i>	
(a) Project management unit at state level					13,605,240	
Project management unit at state level	1 unit	1 set	1	13,605,240	13,605,240	Table D5-2
(b) District facilitation unit					6,784,320	
District facilitation unit	1 unit	1 set	1	6,784,320	6,784,320	Table D5-2
(c) Range supporting unit					5,832,000	
Range supporting unit	1 unit	1 set	1	5,832,000	5,832,000	Table D5-2
<i>Fiscal Year 4</i>					<i>26,221,560</i>	
(a) Project management unit at state level					13,605,240	
Project management unit at state level	1 unit	1 set	1	13,605,240	13,605,240	Table D5-2
(b) District facilitation unit					6,784,320	
District facilitation unit	1 unit	1 set	1	6,784,320	6,784,320	Table D5-2
(c) Range supporting unit					5,832,000	
Range supporting unit	1 unit	1 set	1	5,832,000	5,832,000	Table D5-2
<i>Fiscal Year 5</i>					<i>26,221,560</i>	
(a) Project management unit at state level					13,605,240	
Project management unit at state level	1 unit	1 set	1	13,605,240	13,605,240	Table D5-2
(b) District facilitation unit					6,784,320	
District facilitation unit	1 unit	1 set	1	6,784,320	6,784,320	Table D5-2
(c) Range supporting unit					5,832,000	
Range supporting unit	1 unit	1 set	1	5,832,000	5,832,000	Table D5-2
<i>Fiscal Year 6</i>					<i>26,221,560</i>	
(a) Project management unit at state level					13,605,240	
Project management unit at state level	1 unit	1 set	1	13,605,240	13,605,240	Table D5-2
(b) District facilitation unit					6,784,320	
District facilitation unit	1 unit	1 set	1	6,784,320	6,784,320	Table D5-2
(c) Range supporting unit					5,832,000	
Range supporting unit	1 unit	1 set	1	5,832,000	5,832,000	Table D5-2
<i>Fiscal Year 7</i>					<i>26,221,560</i>	
(a) Project management unit at state level					13,605,240	
Project management unit at state level	1 unit	1 set	1	13,605,240	13,605,240	Table D5-2
(b) District facilitation unit					6,784,320	
District facilitation unit	1 unit	1 set	1	6,784,320	6,784,320	Table D5-2
(c) Range supporting unit					5,832,000	
Range supporting unit	1 unit	1 set	1	5,832,000	5,832,000	Table D5-2
<i>Fiscal Year 8</i>					<i>26,221,560</i>	
(a) Project management unit at state level					13,605,240	
Project management unit at state level	1 unit	1 set	1	13,605,240	13,605,240	Table D5-2
(b) District facilitation unit					6,784,320	
District facilitation unit	1 unit	1 set	1	6,784,320	6,784,320	Table D5-2
(c) Range supporting unit					5,832,000	
Range supporting unit	1 unit	1 set	1	5,832,000	5,832,000	Table D5-2
<i>Fiscal Year 9</i>					<i>26,221,560</i>	
(a) Project management unit at state level					13,605,240	
Project management unit at state level	1 unit	1 set	1	13,605,240	13,605,240	Table D5-2
(b) District facilitation unit					6,784,320	
District facilitation unit	1 unit	1 set	1	6,784,320	6,784,320	Table D5-2
(c) Range supporting unit					5,832,000	
Range supporting unit	1 unit	1 set	1	5,832,000	5,832,000	Table D5-2
<i>Fiscal Year 10</i>					<i>26,221,560</i>	
(a) Project management unit at state level					13,605,240	
Project management unit at state level	1 unit	1 set	1	13,605,240	13,605,240	Table D5-2
(b) District facilitation unit					6,784,320	
District facilitation unit	1 unit	1 set	1	6,784,320	6,784,320	Table D5-2
(c) Range supporting unit					5,832,000	
Range supporting unit	1 unit	1 set	1	5,832,000	5,832,000	Table D5-2

Annex 22 Detailed cost estimate by subcomponent and year

Component and cost items	Table C6-1-1 Consultancy services				Total e=c*d	Detailed estimates
	Quantity		Unit cost d	Total e=c*d		
	a	b				
C6 Consultancy services						
C6-1 Consultancy services						
C6-1-1 Consultancy services					248,195,514	
<i>Fiscal Year 1</i>					33,299,792	
(a) International consultant					21,628,141	
International consultant	1 unit	1 set	1	21,628,141	21,628,141	Table D6-1
(b) National consultant					3,015,075	
National consultant	1 unit	1 set	1	3,015,075	3,015,075	Table D6-1
(c) Support staff					437,186	
Support staff	1 unit	1 set	1	437,186	437,186	Table D6-1
(d) Direct cost					8,219,390	
Reimbursable expenses	1 unit	1 set	1	8,219,390	8,219,390	Table D6-1
<i>Fiscal Year 2</i>					55,160,663	
(a) International consultant					32,442,211	
International consultant	1 unit	1 set	1	32,442,211	32,442,211	Table D6-1
(b) National consultant					8,266,332	
National consultant	1 unit	1 set	1	8,266,332	8,266,332	Table D6-1
(c) Support staff					874,372	
Support staff	1 unit	1 set	1	874,372	874,372	Table D6-1
(d) Direct cost					13,577,748	
Reimbursable expenses	1 unit	1 set	1	13,577,748	13,577,748	Table D6-1
<i>Fiscal Year 3</i>					45,946,535	
(a) International consultant					25,683,417	
International consultant	1 unit	1 set	1	25,683,417	25,683,417	Table D6-1
(b) National consultant					8,115,578	
National consultant	1 unit	1 set	1	8,115,578	8,115,578	Table D6-1
(c) Support staff					874,372	
Support staff	1 unit	1 set	1	874,372	874,372	Table D6-1
(d) Direct cost					11,273,168	
Reimbursable expenses	1 unit	1 set	1	11,273,168	11,273,168	Table D6-1
<i>Fiscal Year 4</i>					37,060,764	
(a) International consultant					20,276,382	
International consultant	1 unit	1 set	1	20,276,382	20,276,382	Table D6-1
(b) National consultant					6,859,296	
National consultant	1 unit	1 set	1	6,859,296	6,859,296	Table D6-1
(c) Support staff					874,372	
Support staff	1 unit	1 set	1	874,372	874,372	Table D6-1
(d) Direct cost					9,050,714	
Reimbursable expenses	1 unit	1 set	1	9,050,714	9,050,714	Table D6-1
<i>Fiscal Year 5</i>					37,328,813	
(a) International consultant					20,276,382	
International consultant	1 unit	1 set	1	20,276,382	20,276,382	Table D6-1
(b) National consultant					7,060,302	
National consultant	1 unit	1 set	1	7,060,302	7,060,302	Table D6-1
(c) Support staff					874,372	
Support staff	1 unit	1 set	1	874,372	874,372	Table D6-1
(d) Direct cost					9,117,757	
Reimbursable expenses	1 unit	1 set	1	9,117,757	9,117,757	Table D6-1
<i>Fiscal Year 6</i>					17,640,734	
(a) International consultant					10,814,070	
International consultant	1 unit	1 set	1	10,814,070	10,814,070	Table D6-1
(b) National consultant					1,758,794	
National consultant	1 unit	1 set	1	1,758,794	1,758,794	Table D6-1
(c) Support staff					874,372	
Support staff	1 unit	1 set	1	874,372	874,372	Table D6-1
(d) Reimbursable expenses					4,193,498	
Reimbursable expenses	1 unit	1 set	1	4,193,498	4,193,498	Table D6-1
<i>Fiscal Year 7</i>					5,022,405	
(a) International consultant					1,351,759	
International consultant	1 unit	1 set	1	1,351,759	1,351,759	Table D6-1
(b) National consultant					1,758,794	
National consultant	1 unit	1 set	1	1,758,794	1,758,794	Table D6-1
(c) Support staff					874,372	
Support staff	1 unit	1 set	1	874,372	874,372	Table D6-1
(d) Direct cost					1,037,480	
Reimbursable expenses	1 unit	1 set	1	1,037,480	1,037,480	Table D6-1

Annex 22 Detailed cost estimate by subcomponent and year

Table C6-1-1 Consultancy services (continued)

Component and cost items	Quantity		Unit cost d	Total e=c*d	Detailed estimates
	a	b			
Fiscal Year 8					5,022,405
(a) International consultant				1,351,759	
International consultant	1 unit	1 set	1	1,351,759	Table D6-1
(b) National consultant				1,758,794	
National consultant	1 unit	1 set	1	1,758,794	Table D6-1
(c) Support staff				874,372	
Support staff	1 unit	1 set	1	874,372	Table D6-1
(d) Direct cost				1,037,480	
Reimbursable expenses	1 unit	1 set	1	1,037,480	Table D6-1
Fiscal Year 9					9,766,842
(a) International consultant				4,055,276	
International consultant	1 unit	1 set	1	4,055,276	Table D6-1
(b) National consultant				2,613,065	
National consultant	1 unit	1 set	1	2,613,065	Table D6-1
(c) Support staff				874,372	
Support staff	1 unit	1 set	1	874,372	Table D6-1
(d) Direct cost				2,224,129	
Reimbursable expenses	1 unit	1 set	1	2,224,129	Table D6-1
Fiscal Year 10					1,946,561
(a) International consultant					
International consultant	1 unit	1 set	1		Table D6-1
(b) National consultant				804,020	
National consultant	1 unit	1 set	1	804,020	Table D6-1
(c) Support staff				874,372	
Support staff	1 unit	1 set	1	874,372	Table D6-1
(d) Direct cost				268,169	
Reimbursable expenses	1 unit	1 set	1	268,169	Table D6-1

Detailed Cost Tables

Table D2-1 GIS and remote sensing hardware and software

Cost items	Quantity			Unit cost	Total
	a	b	c=a*b	d	e=c*d
A. GIS and remote sensing hardware and software					15,439,000
Arc Info GIS	1 unit		1	1,975,000	1,975,000
ArcView	27 unit		27	185,000	4,995,000
Erdas Imagine	1 unit		1	1,120,000	1,120,000
ArcPad	27 unit		27	65,000	1,755,000
Desktop computer	31 unit		31	50,000	1,550,000
Server machine	1 unit		1	175,000	175,000
GPS Receiver	27 unit		27	85,000	2,295,000
Laptop	2 unit		2	50,000	100,000
Laser Printer	1 unit		1	25,000	25,000
Plotter A-0 Size	1 unit		1	200,000	200,000
Scanner A-0 Size	1 unit		1	1,000,000	1,000,000
Website design/dev	1 unit		1	100,000	100,000
Hosting of Website	1 unit		1	5,000	5,000
Maintenance	1 unit		1	20,000	20,000
Printer and Plotter Ink	1 unit		1	100,000	100,000
Plotting Papers	1 unit		1	24,000	24,000
B. Replacement and operation costs					149,000
Annual Operation/Maintenance	1 unit		1	20,000	20,000
Printer and Plotter Ink	1 unit		1	100,000	100,000
Plotting Papers	1 unit		1	24,000	24,000
Web hosting					5,000

Table D2-2 GIS and remote sensing hardware and software (maps and digital data)

Cost items	Scale	Remarks	Coverage	Quantity		Unit cost		Total
				a	b	c=a*b	d	e=c*d
A. GIS and remote sensing hardware and software								15,205,180
Quick Bird satellite data (resolution 1.0m; Scheme 1)	N.A.	Digital	Sikkim	7,096 Km ²	3 set	21,288	700	14,901,600
Village Cadastral Maps	1:4000/6000	Print	Sikkim	454 sheets	1 set	454	500	227,000
Thematic maps								
Geomorphology/ Landforms	1:250000	Print	Sikkim	4 sheets	1 set	4	1,000	4,000
Geology Lithology	1:250000	Print	Sikkim	4 sheets	1 set	4	1,000	4,000
Soil Map	1:100000	Print	Sikkim	1 sheets	1 set	1	20,000	20,000
Landuse map	1:50000	Print	Sikkim	16 sheets	2 set	32	1,000	32,000
Geotechnical map / Land Hazard	1:50000	Print	Sikkim	16 sheets	1 set	16	1,000	16,000
Topographical Maps	1:25000	Print	Sikkim	20 sheets	1 set	20	29	580
Year-wise data procurement								
Total								15,205,180
Fiscal year 2							40%	6,082,072
Fiscal year 3							30%	4,561,554
Fiscal year 4							30%	4,561,554

Annex 22 Detailed cost estimate by subcomponent and year

Table D2-3 Outsourcing task for map preparation (digitizing)

Cost items	Scale	Quantity			Unit cost	Total
		a	b	c=a*b	d	e=c*d
A. Outsourcing task for map preparation (digitizing)						3,832,000
Toposheets						
Communication Network,	1:25000	64 sheets		64	1,000	64,000
Settlements	1:50000	64 sheets		64	1,000	64,000
Contours/DEM	Contor interval 20 m	64 sheets		64	2,500	160,000
Drainage/WB/Hydrology	1:25000	64 sheets		64	1,250	80,000
Slope	1:25000	64 sheets		64	1,000	64,000
Thematic maps						
Geomorphology/ Landforms	1:250000	1 sheets		1	10,000	10,000
Geology Lithology	1:250000	1 sheets		1	10,000	10,000
Soil Map	1:100000	10 sheets		10	4,000	40,000
Landuse map	1:50000	16 sheets		16	15,000	240,000
Geotechnical map / Land Hazard	1:50000	16 sheets		16	2,000	32,000
Climatic Maps	1:50000	16 sheets		16	2,000	32,000
Land capability map	1:50000	16 sheets		16	5,000	80,000
Erosion Intensity map	1:50000	16 sheets		16	3,000	48,000
Forest Map						
Reserve forest cover	1:50000	16 sheets		16	25,000	400,000
Protected forest cover	1:50000	16 sheets		16	25,000	400,000
Forest compartment	1:50000	16 sheets		16	25,000	400,000
Forest class	1:50000	16 sheets		16	25,000	400,000
Forest density	1:50000	16 sheets		16	25,000	400,000
Cadastral						
Land parcel boundary	1:4000/6000	454 sheets		454	2,000	908,000

Annex 22 Detailed cost estimate by subcomponent and year

Table D2-4 Water analysis lab equipment

Cost items	Specification	Quantity a	Unit cost d	Total c=a*b
A. Water Analysis lab equipment				8,736,000
1) For standard analysis				
Dissolved oxygen meter (For field work)	YSI Model: 57	1 unit	200,000	200,000
pH meter (For field work)	Mettler Delta 320	1 unit	80,000	80,000
Conductivity meter (For field work)	Orion USA	1 unit	95,000	95,000
Turbidimeter (For field work)	Hach 2100P Portable turbidimeter	1 unit	85,000	85,000
Secchi disc (20 cm diameter) and rope	Water transparency measurement	1 unit	40,000	40,000
Underwater photometer	Tokyokoden ANA-200 for light attenuation measurem	1 unit	100,000	100,000
Glass thermometer		1 unit	1,000	1,000
Cooler (0 - 100C)	To store chemicals safely	1 unit	250,000	250,000
Dessicator with dry dessicant		1 unit	175,000	175,000
Drying self, quick dry	Mechnl convection w/ transformer	1 unit	100,000	100,000
Slide warmer		1 unit	100,000	100,000
Air conditioner (cool only)	National 18000 BTU	1 unit	140,000	140,000
2) For nutrients & chlorophyll analysis				
Vacuum pump with vacuum flask & ceramic funnel	Filter nutrients & chlorophyll san\mple	1 unit	75,000	75,000
Electronic Balance	Model: R-200 D (4 decimal)	1 unit	260,000	260,000
Spectrophotometer	Nutrient & chlorophyll analysis	1 unit	450,000	450,000
Autoclave (53 liter)	ALP 40 Litre, Nutrient analysis	1 unit	450,000	450,000
Freezer (Deep freezer)	Model: KHF-510	1 unit	200,000	200,000
Thermostat Dryer	Model: MOV-212	1 unit	150,000	150,000
Drying oven	Model: DNS-115S 220V	1 unit	140,000	140,000
Homogenizer	Model: AM-8, 220 volt	1 unit	250,000	250,000
Ultrasonic cleaner (with transformer)	Model: UA 200	1 unit	160,000	160,000
Quick drying self cabinet	650x550x1660mm, 30-100C	1 unit	350,000	350,000
Refrigerator show case for reagents	MPR-161D	1 unit	150,000	150,000
Incubator (ISUZU)	2-2316, SST-11	1 unit	200,000	200,000
Centrifuge w/tubes and timer	Hitachi EBA-3C (Germany)	1 unit	75,000	75,000
Air conditioner (cool only)	National 18000 BTU	1 unit	140,000	140,000
Hematcrit centrifuge	M-15-3 with roter 59v & 58volt	1 unit	185,000	185,000
Quick drying self cabinet	650x550x1660mm, 30-100C	1 unit	135,000	135,000
Heat/cool unit	UTCH-5, Universal Marine Ind.	1 unit	230,000	230,000
Microscope with Camara	OLYMPUS	1 unit	290,000	290,000
Distillation plant		1 unit	250,000	250,000
Cold handling cabinet (cooling chamber)		1 unit	550,000	550,000
Refrigetator	2 door 470 liter	1 unit	150,000	150,000
Magnetic stirrer with magnet		1 unit	50,000	50,000
Auto power voltage stabilizer	Model: ASA-30 II	1 unit	100,000	100,000
Hematcrit centrifuge	Hettich German	1 unit	120,000	120,000
Sterilization cabinet	For glassware drying	1 unit	175,000	175,000
Dessicator with dry desiccant		1 unit	60,000	60,000
3) For plankton analysis				
Van dorm/Kemerrer water sampler with massenger (deep water sample for plankton, nutrients and chlorophyll)	Water sampler for deep water like lakes	1 unit	125,000	125,000
Column sampler (for shallow water sampling like ponds)	Water sampler for shallow water bodies like ponds	1 unit	10,000	10,000
Wisconsin plankton net- sampler with messenger (for deep water bodies like lakes)	Net of 70-80 µmm mesh size for zooplankton	1 unit	75,000	75,000
Wisconsin plankton net- without messenger (for shallow water bodies like ponds)	Net of 70-80 µmm mesh size for zooplankton	1 unit	60,000	60,000
Compound microscope	Plankton analysis	1 unit	125,000	125,000
Sedgewick-Rafter with cover slip	For zooplankton analysis	1 unit	10,000	10,000
Hematositometer counting chamber with cover slip	For phytoplankton analysis	1 unit	50,000	50,000
Photomicrography for Microscope	Model: HFS-DX-35	1 unit	300,000	300,000
GVC Microscope video display system		1 unit	320,000	320,000
Mud sampler	15 CM size	1 unit	100,000	100,000
Profile projector screen microscope	Model: V-10	1 unit	650,000	650,000
D0, nutrients , primary productivity & chlorophyll	See Details in comment box	1 unit	200,000	200,000

Annex 22 Detailed cost estimate by subcomponent and year

Table D2-5 Cost of workshop and public awareness per one person

Cost items	Quantity		Unit cost d	Total e=c*d
	a	b		
A. Cost of workshop and public awareness per one person				1,730
Total cost of workshop and public awareness for 50 participants				86,500
Workshop material				
Toolkit for participants, 50 pax	50 participants		300	15,000
Preparation of workshop materials	5 day		5,000	25,000
Designing and printing of references	50 participants		250	12,500
Other expenses				
Consultancy fee and allowance	1 day		7,000	7,000
Assistant's fee and allowance	1 day		2,000	2,000
Conference hall	1 day		2,000	2,000
Equipment rental charges (LCD Projector, Laptop etc.)	1 day		3,000	3,000
Food expenses (lunch, tea and snacks)	50 participants		300	15,000
Misc expenses (cost of certificates, etc.)	50 participants		100	5,000

Annex 22 Detailed cost estimate by subcomponent and year

Table D2-6 Construction of main office building of Himalayan Zoological Park and veterinary care facility: Estimate for the cost of construction of Main Office Block

1.) Earthwork excavation works in Foundation trenches all complete, As per the direction of Engineer In charge.	208.08cum	@Rs.961.90/10cum	Rs.20,015.00
2.) P/l hand packed stone soling works All complete..	62.33 cum	@Rs.351.51/cum	Rs. 21,909.00
3.) P/l cement concrete works all Complete.	62.33 cum	@Rs. 2520.07/cum	Rs. 157,075.00
4.) P/l in position of r.c.c. 1:2:4 c.c. All complete.	90.88 cum	@Rs. 3090.48/cum	Rs. 280,862.00
5.) S/B/P in position for steel reinforcement works all complete.	118.14qtls	@Rs. 4083.97/qtls	Rs.482,480.00
6.) P/L first class brick work in half Brick thick in superstructure All complete.	289.44 sqm	@Rs.4289.03/10 sqm	Rs.124,141.00
7.) Formwork	One job	L.S.	Rs.550,000/-
8.) P/f/f of dressed salwood frames In super structure.	2.23 cum	@Rs.35,596.85/cum	Rs. 79,380.00
9.) P/f/f in position of fully panelled Shutters in 40 mm thick panels.	40.14 sqm	@Rs.1743.65/sqm	Rs.69,990.00
10.) P/f/f in position of fully glazed Shutters, 3mm thick glass panes All complete.	51.02sqm	@Rs.1463.07/sqm	Rs.74,645.00
11.) P/l 12 mm thick cement plastering In 1:3 mix in superstructure all Complete including curing.	1821.33sqm	@Rs.844.25/10sqm	Rs. 153,765.00
12.) P/l glazed ceramic tiles of approved Quality and pattern all complete.	127.77sqm	@Rs.16,495.40/10sqm	Rs. 210,761.00
13.) P/L wooden panelling work of Fine wood work of materials Of approved quality and pattern All complete.	1120 sqft	@Rs.145/sqft	Rs.162,400.00

Annex 22 Detailed cost estimate by subcomponent and year

Table D2-6 Construction of main office building of Himalayan Zoological Park and veterinary care facility: Estimate for the cost of construction of Main Office Block (continued)

14.) P/L ready mix paints of standard Quality as per the need of the Proposed structure.	101.55sqm	@Rs.346.97/10sqm	Rs. 3,523.00
15.) P/l external paints in the superstructure.	298.88sqm	@Rs.469.32/10sqm	Rs. 14,027.00
16.) P/f/f G.C.I roofing works in M.S. Rod brackets, limpets, washer, Gutter etc, all complete with Priming.	3072.50sqft	@Rs.135/sqft	Rs.414,787.00
17.) P/l 40 mm thick 1:2:4 c.c. Flooring with neat coat of Cement base.	533.92sqm	@Rs.185.25/sqm	Rs.98,908.00
18.) P/l wooden ceiling work of Fine wood work of superior Quality materials all complete.	266.96sqm	@Rs.1601.21/sqm	Rs.427,459.00
19.) P/l heritage design façade in the Interior and exterior structure Of materials of approved quality And pattern all complete.	2080 sqft	@Rs. 90/sqft	Rs.187,200.00
20.) Carriage of stock materials.	904.53 qtls	@Rs.93.53/qtls.	Rs. 8,460.00
21.) Carriage of non stock materials.	805.08 cum	@Rs.5782.04/10cum	<u>Rs. 465,500.00</u>
			Rs. 4,007,287 .00 (x)
General Abstract cost :			
a.) Main civil structure of the building		- Rs. 40,07,287.00	-(x)
b.) Water supply and sanitation - Rs. 5,00,910.00			
c.) Electrification works @ 12.5% of (x)			- Rs. 500,910.00
d.) Finishing, furnishing items including furniture @ 8% of (x)			<u>- Rs. 320,582.00</u>
e.) Escalation charges @ 7% per annum, so considering for three years it will be come around 21% 21 % of (y)			<u>Rs. 1,119,234.00</u>
			Total Rs. 6,448,923.00
			<u>Rounded: Rs. 6,449,000.00</u>

Annex 22 Detailed cost estimate by subcomponent and year

Table D2-7 Construction of main office building of Himalayan Zoological Park and veterinary care facility: Estimate for the cost of construction of Zoo Keepers Office (two units.)

1.) Earthwork excavation works in foundation trenches all complete, as per the direction of Engineer in charge.	98.03cum	@Rs.961.90/10cum	Rs. 9,429.00
2.) P/l hand packed stone soling works All complete..	18.02 cum	@Rs.351.51/cum	Rs. 6,334.00
3.) P/l cement concrete works all Complete.	18.02 cum	@Rs. 2520.07/cum	Rs. 45,411.00
4.) P/l in position of r.c.c. 1:2:4 c.c. All complete.	22.05 cum	@Rs. 3090.48/cum	Rs. 68,145.00
5.) S/B/P in position for steel reinforcement works all complete.	28.66qtls	@Rs. 4083.97/qtls	Rs. 117,046.00
6.) P/L first class brick work in half Brick thick in superstructure All complete.	90.01 sqm	@Rs.4289.03/10 sqm	Rs. 38,605.00
7.) Formwork One job	L.S.		Rs.170,000/-
8.) P/f/f of dressed salwood frames In super structure.	0.71 cum	@Rs.35,596.85/cum	Rs. 25,273.00
9.) P/f/f in position of fully panelled Shutters in 40 mm thick panels.	13.66 sqm	@Rs.1743.65/sqm	Rs. 23,818.00
10.) P/f/f in position of fully glazed Shutters, 3mm thick glass panes	All complete. 25.09sqm	@Rs.1463.07/sqm	Rs. 36,708.00
11.) P/l 12 mm thick cement plastering In 1:3 mix in superstructure all Complete including curing.	521.34sqm	@Rs.844.25/10sqm	Rs.44,014.00
12.) P/l glazed ceramic tiles of approved Quality and pattern all complete.	18.05sqm	@Rs.16,495.40/10sqm	Rs. 29,774.00
13.) P/L wooden panelling work of Fine wood work of materials Of approved quality and pattern All complete.	180 sqft	@Rs.145/sqft	Rs. 26,100.00
14.) P/L ready mix paints of standard quality as per the need of the proposed structure.	49.31sqm	@Rs.346.97/10sqm	Rs. 1,710.00
15.) P/l external paints in the superstructure.	98.77sqm	@Rs.469.32/10sqm	Rs.4,635.00

Annex 22 Detailed cost estimate by subcomponent and year

Table D2-7 Construction of main office building of Himalayan Zoological Park and veterinary care facility: Estimate for the cost of construction of Zoo Keepers Office (two units.) (continued)

16.) P/f/f G.C.I roofing works in M.S. Rod brackets, limpets, washer, Gutter etc, all complete with Priming.	1204sqft	@Rs.135/sqft	Rs. 162,540.00
17.) P/l 40 mm thick 1:2:4 c.c. Flooring with neat coat of Cement base.	89.31sqm	@Rs.185.25/sqm	Rs. 16,544.00
18.) P/l wooden ceiling work of Fine wood work of superior Quality materials all complete.	95.44sqm	@Rs.1601.21/sqm	Rs. 152,819 .00
19.) P/L heritage design façade in the Interior and exterior structure Of materials of approved quality And pattern all complete.	160 sqft	@Rs. 90/sqft	Rs. 14,400.00
20.) Carriage of stock materials. 21.)	301.23 qtls	@Rs.93.53/qtls.	Rs. 2,817.00
22.) Carriage of non stock materials.	205.02 cum	@Rs.5782.04/10cum	Rs. 118,543.00
			Rs. 1,114,665.00 –(X)
General Abstract cost :			
a.) Main civil structure of the building			- Rs.1,114,665 .00 –(X)
b.) Water supply and sanitation @12.5% of (x)			- Rs. 1,39,333.00
c.) Electrification works @ 12.5% of (x)			- Rs. 1,39,333 .00
d.) Finishing, furnishing items including furniture @ 5% of (x)			- Rs. <u>55,733.00</u>
e.) Escalation charges @ 7% per annum, so considering for three years it will be come around 21% 21 % of (y)			Rs. 304,303.00 Rs.1,753,367.00
			Rounded: Rs.1,753,000.00

Annex 22 Detailed cost estimate by subcomponent and year

Table D2-8 Construction of main office building of Himalayan Zoological Park and veterinary care facility: Estimate for the cost of construction of Class II Quarter for two units

1.) Earthwork excavation works in Foundation trenches all complete, As per the direction of Engineer In charge.	179.05cum	@Rs.961.90/10cum	Rs. 17,222.00
2.) P/l hand packed stone soling works All complete..	40.04 cum	@Rs.351.51/cum	Rs.14,074.00
3.) P/l cement concrete works all Complete.	40.04 cum	@Rs. 2520.07/cum	Rs. 100,903.00
4.) P/l in position of r.c.c. 1:2:4 c.c. All complete.	41.55 cum	@Rs. 3090.48/cum	Rs.128,409.00
5.) S/B/P in position for steel reinforcement works all complete.	54.01qtls	@Rs. 4083.97/qtls	Rs. 220,575.00
6.) P/L first class brick work in half Brick thick in superstructure All complete.	168.55 sqm	@Rs.4289.03/10 sqm	Rs. 72,291.00
7.) Formwork One job		L.S.	Rs.310,000/-
8.) P/f/f of dressed salwood frames In super structure.	1.48 cum	@Rs.35,596.85/cum	Rs. 52,683.00
9.) P/f/f in position of fully panelled Shutters in 40 mm thick panels.	21.46 sqm	@Rs.1743.65/sqm	Rs. 37,418.00
10.) P/f/f in position of fully glazed Shutters, 3mm thick glass panes All complete.	40.89sqm	@Rs.1463.07/sqm	Rs. 59,824.00
11.) P/l 12 mm thick cement plastering In 1:3 mix in superstructure all Complete including curing.	1298.54sqm	@Rs.844.25/10sqm	Rs. 109,629.00
12.) P/l glazed ceramic tiles of approved Quality and pattern all complete.	78.44sqm	@Rs.16,495.40/10sqm	Rs. 129,389.00
13.) P/L wooden panelling work of Fine wood work of materials Of approved quality and pattern All complete.	640 sqft	@Rs.145/sqft	Rs. 92,800.00
14.) P/L ready mix paints of standard Quality as per the need of the Proposed structure.	82.22 sqm	@Rs.346.97/10sqm	Rs. 2,852.00

Annex 22 Detailed cost estimate by subcomponent and year

Table D2-8 Construction of main office building of Himalayan Zoological Park and veterinary care facility: Estimate for the cost of construction of Class II Quarter for two units (continued)

15.) P/l external paints in the superstructure.	173.04 sqm	@Rs.469.32/10sqm	Rs. 8,121.00
16.) P/f/f G.C.I roofing works in M.S. Rod brackets, limpets, washer, Gutter etc, all complete with Priming.	2108sqft	@Rs.135/sqft	Rs. 284,580.00
17.) P/l 40 mm thick 1:2:4 c.c. Flooring with neat coat of Cement base.	169.98sqm	@Rs.185.25/sqm	Rs. 31,488.00
18.) P/l wooden ceiling work of Fine wood work of superior Quality materials all complete.	173.33sqm	@Rs.1601.21/sqm	Rs. 277,537.00
19.) P/l heritage design façade in the Interior and exterior structure Of materials of approved quality And pattern all complete.	250 sqft	@Rs. 90/sqft	Rs. 22,500.00
20.) Carriage of stock materials.	604.12 qtls	@Rs.93.53/qtls.	Rs. 5,650 .00
21.) Carriage of non stock materials.	295.11 cum	@Rs.5782.04/10cum	<u>Rs.170,633 .00</u>
			Rs..21,48,578.00 – (x)
General Abstract cost :			
a.) Main civil structure of the building			- Rs. 2,148,578.0
b.) Water supply and sanitation @12.5% of (x)			- Rs. 268,572 .00
c.) Electrification works @ 12.5% of (x)			- Rs. 268,572 .00
d.) Finishing, furnishing items including furniture @ 8 % of (x)			<u>- Rs. 171,886.00</u>
			Rs. 2,857,608.00 –(y)
e.) Escalation charges @ 7% per annum, so considering for three years it will be come around 21 % of (y)			<u>Rs. 600,097.00</u>
			Rs. 3,457,705.00
			<u>Rounded: Rs. 3,458,000.00</u>

Annex 22 Detailed cost estimate by subcomponent and year

Table D2-9 Construction of main office building of Himalayan Zoological Park and veterinary care facility: Estimate for the cost of construction of Bio Diversity Centre

1.) Earthwork excavation works in foundation trenches all complete, as per the direction of Engineer in charge.	398.08cum	@Rs.961.90/10cum	Rs.38,291.00
2.) P/l hand packed stone soling works All complete..	78.98 cum	@Rs.351.51/cum	Rs.27,762.00
3.) P/l cement concrete works all Complete.	78.98 cum	@Rs. 2520.07/cum	Rs.199,035.00
4.) P/l in position of r.c.c. 1:2:4 c.c. All complete.	81.05 cum	@Rs. 3090.48/cum	Rs.250,483.00
5.) S/B/P in position for steel reinforcement works all complete.	105.36qtls	@Rs. 4083.97/qtls	Rs. 430,287.00
6.) P/L first class brick work in half Brick thick in superstructure All complete.	345.07 sqm	@Rs.4289.03/10 sqm	Rs. 148,001.00
7.) Formwork One job	L.S.		Rs.650,000.00/-
8.) P/f/f of dressed salwood frames In super structure.	2.49 cum	@Rs.35,596.85/cum	Rs. 88,636.00
9.) P/f/f in position of fully panelled Shutters in 40 mm thick panels.	62.88 sqm	@Rs.1743.65/sqm	Rs.109,640.00
10.) P/f/f in position of fully glazed Shutters, 3mm thick glass panes All complete.	79.82sqm	@Rs.1463.07/sqm	Rs.116,782.00
11.) P/l 12 mm thick cement plastering In 1:3 mix in superstructure all Complete including curing.	1922.04sqm	@Rs.844.25/10sqm	Rs.162,268.00
12.) P/l glazed ceramic tiles of approved Quality and pattern all complete.	138.45sqm	@Rs.16,495.40/10sqm	Rs.228,378.00
13.) P/L wooden panelling work of Fine wood work of materials Of approved quality and pattern All complete.	1200 sqft	@Rs.145/sqft	Rs.174,000 .00
14.) P/L ready mix paints of standard Quality as per the need of the Proposed structure.	149.70sqm	@Rs.346.97/10sqm	Rs.5,194.00
15.) P/l external paints in the superstructure.	377.02 sqm	@Rs.469.32/10sqm	Rs.17,694.00

Annex 22 Detailed cost estimate by subcomponent and year

Table D2-9 Construction of main office building of Himalayan Zoological Park and veterinary care facility: Estimate for the cost of construction of Bio Diversity Centre (continued)

16.) P/f/f G.C.I roofing works in M.S. Rod brackets, limpets, washer, Gutter etc, all complete with Priming.	4300sqft	@Rs.135/sqft	Rs.580,500.00
17.) P/l 40 mm thick 1:2:4 c.c. Flooring with neat coat of Cement base.	785.55sqm	@Rs.185.25/sqm	Rs.145,523.00
18.) P/l wooden ceiling work of Fine wood work of superior Quality materials all complete.	265.44sqm	@Rs.1601.21/sqm	Rs.425,025.00
19.) P/l heritage design façade in the Interior and exterior structure Of materials of approved quality And pattern all complete.	1750 sqft	@Rs. 90/sqft	Rs.157,500.00
20.) Carriage of stock materials.	904.44 qtls	@Rs.93.53/qtls.	Rs.8,459.00
21.) Carriage of non stock materials.	855.08 cum	@Rs.5782.04/10cum	Rs. 494,410.00
			Rs. 4,457,868.00-(x)
General Abstract cost :			
a.) Main civil structure of the building			- Rs. 4,457,868.00 -(x)
b.) Water supply and sanitation @12.5% of (x)			- Rs. 557,233.00
c.) Electrification works @ 12.5% of (x)			- Rs.557,233.00
d.) Finishing, furnishing items including furniture @ 15% of (x)			- Rs. 668,680.00
			Rs. 6,241,014.00 -(y)
e.) Escalation charges @ 7% per annum, so considering for three years it will be come around 21% 21 % of (y)			Rs. 1,310,612.00
			Rs. 7,551,626.00
		<u>Rounded:</u>	<u>Rs. 7,552,000.00</u>

Table D2-10 Estimate for the construction of nature interpretation centre (large)

ESTIMATE FOR THE CONSTRUCTION OF NATURE INTERPRETATION CENTRE (large)

GENERAL ABSTRACT

1 Construction of main building	A	Rs.5,078,400
2 Site Levelling & Protective Works	@10%of A	Rs.507,840
3 Land Scaping works @6% of A	@6%of A	Rs.304,704
4 Internal Water Supply & Sanitation	@12.5%of A	Rs.634,800
5 External Water Supply & Sanitation	@12.5%of A	Rs.634,800
6 Internal & External Electrification	@12.5%of A	Rs.634,800
7 Privision for furnishing and furniture	@15%of A	Rs.761,760
		Rs.8,557,104 :-(b)
8 Architectural consultancy fees @3%of (b)	@3% of (b)	Rs.0
9 Escalation	@21%of A	Rs.1,066,464
	TOTAL	Rs.9,623,568
	Rounded to	<u>Rs.9,624,000</u>

Annex 22 Detailed cost estimate by subcomponent and year

Table D3-1 Estimation for the construction of Ecolodge

ESTIMATE FOR THE CONSTRUCTION OF ECOFRIENDLY LODGE-MAIN BLOCK		
GENERAL ABSTRACT		
1 Construction of main building	A	Rs.18,880,700
2 Site Levelling & Protective Works	@10%of A	Rs.1,888,070
3 Land Scaping works @15% of A	@15%of A	Rs.2,832,105
4 Internal Water Supply & Sanitation	@17.5%of A	Rs.3,304,123
5 External Water Supply & Sanitation	@17.5%of A	Rs.3,304,123
6 Internal & External Electrification	@17.5%of A	Rs.3,304,123
7 Provision for furnishing and Furniture	@28% of A	Rs.5,286,596
		Rs.38,799,839 ;-(b)
8 Architectural consultancy fees @3%of (b)	@3% of (b)	Rs.0
9 Escalation on cost of stock and non-stock materials W.E.F.2006 @7% p.a.	@21% ofA	Rs.3,964,947
	GRAND TOTAL	Rs.42,764,800 ;-(x)
ESTIMATE FOR THE CONSTRUCTION OF ECO FRIENDLY DOUBLE UNIT COTTAGES FOR FIVE NUMBERS		
GENERAL ABSTRACT		
1 Construction of main building	A	Rs.2,836,400
2 Site Levelling & Protective Works	@15%of A	Rs.425,460
3 Land Scaping works @15% of A	@15%of A	Rs.425,460
4 Internal & External Water Supply & Sanitation	@17.5%of A	Rs.496,370
5 Internal & External Electrification	@17.5%of A	Rs.496,370
6 Provision for furnishing and Furniture	@20% of A	Rs.567,280
		Rs.5,247,340 ;-(b)
7 Architectural consultancy fees @3%of (d)	@3% of b	Rs.0
8 Escalation on cost of stock and non-stock materials W.E.F.2006 @7% p.a.	@21% of A	Rs.595,644
	TOTAL	Rs.5,842,984
9 Cost of construction for five numbers of cottages	5nos.	Rs.29,214,920 ;-(y)
ESTIMATE FOR THE CONSTRUCTION OF ECO FRIENDLY SINGLE UNIT COTTAGE FOR TEN NUMBERS.		
GENERAL ABSTRACT		
1 Construction of main building	A	Rs.1,236,300
2 Site Levelling & Protective Works	@15%of A	Rs.185,445
3 Land Scaping works @15% of A	@15%of A	Rs.185,445
4 Internal & External Water Supply & Sanitation	@17.5%of A	Rs.216,353
5 Internal & External Electrification	@17.5%of A	Rs.216,353
6 Provision for furnishing and Furniture	@20% of A	Rs.247,260
		Rs.2,287,156 ;-(e)
7 Architectural consultancy fees @3%of (e)	@3% of (e)	Rs.0
8 Escalation on cost of stock and non-stock materials W.E.F.2006 @7% p.a.	@21% of A	Rs.259,623
	TOTAL	Rs.2,546,779
9 Total cost of Ten numbers of single unit eco friendlycottages	10 nos	Rs.25,467,785 ;-(z)
Total Estimated cost of the Eco friendly Lodge project.		
:=(x) + (y) + (z)		
	Grand Total	Rs.97,447,505
	Rounded to:	<u>Rs.97,448,000</u>

Annex 22 Detailed cost estimate by subcomponent and year

Table D3-2 Cost estimation for instructor training

Cost items	Quantity		Unit cost d	Total e=c*d
	a	b		
A. Set of equipment per rock climbing instructor				
Rope climbing	1 Unit		1	8,000
Rope rapling	1 Unit		1	8,000
Harness	1 Unit		1	3,500
Helmet	1 Unit		1	3,500
Climbing shoes	1 Unit		1	4,000
Carabinier	2 Unit		2	700
Piton	20 Unit		20	250
Chocknuts	1 Set		1	6,000
Belay devices	1 Set		1	5,500
Jumar	1 Set		1	6,000
Nuts and hexes	1 Set		1	4,000
Piton hammer	1 Unit		1	3,500
Atrier	1 Unit		1	4,000
Quick draw	1 Unit		1	6,000
Chalk bag	1 Unit		1	1,000
B. Medical equipment				
Tent	1 Unit		1	17,500
Emergency medical equipment	1 Set		1	5,000
Stretchers	2 Unit		2	10,000
Oxygen cylinder	1 Unit		1	10,000
Blanket	1 Unit		1	1,000
C. Training of bird and butterfly watching guides: training				
Instructor	21 day		21	2,500
Lodging and food	21 day		21	2,000
Transport for instructor to and from area	6 trip		6	2,000
Daily transport for students within the area	21 day		21	2,000
Lodging and food for students	21 day		21	500
D. Training of bird and butterfly watching guides: purchase of equipment				
Binoculars: Nikon 8 x 42 Trailblazer ATB	1 unit		1	6,240
Pocket guide to the birds of the Indian subcontinent	1 unit		1	1,968

Table D3-3 Estimation for the construction of interpretation centre (large)

ESTIMATE FOR THE CONSTRUCTION OF NATURE INTERPRETATION CENTRE (BIG)

GENERAL ABSTRACT

1 Construction of main building	A	Rs.5,078,400
2 Site Levelling & Protective Works	@10%of A	Rs.507,840
3 Land Scaping works @6% of A	@6%of A	Rs.304,704
4 Internal Water Supply & Sanitation	@12.5%of A	Rs.634,800
5 External Water Supply & Sanitation	@12.5%of A	Rs.634,800
6 Internal & External Electrification	@12.5%of A	Rs.634,800
7 Prvision for furnishing and furniture	@15%of A	Rs.761,760
		Rs.8,557,104 :-(b)
8 Architectural consultancy fees @3%of (b)	@3% of (b)	Rs.0
9 Escalation	@21%of A	Rs.1,066,464
	TOTAL	Rs.9,623,568
	Rounded to	Rs.9,624,000

Annex 22 Detailed cost estimate by subcomponent and year

Table D3-4 Estimation for the construction of interpretation centre (small)

ESTIMATE FOR THE CONSTRUCTION OF NATURE INTERPRETATION CENTRE (SMALL)

GENERAL ABSTRACT

1 Construction of main building	A	Rs.2,083,500
2 Site Levelling & Protective Works	@10%of A	Rs.208,350
3 Land Scaping works @6% of A	@6%of A	Rs.125,010
4 Internal Water Supply & Sanitation	@12.5%of A	Rs.260,438
4 External Water Supply & Sanitation	@12.5%of A	Rs.260,438
5 Internal & External Electrification	@12.5%of A	Rs.260,438
		Rs.3,198,173 ;-(b)
7 Architectural consultancy fees @3%of (b)	@3% of (b)	Rs.0
8 Escalation	@21% of A	Rs.437,535
	TOTAL	Rs.3,635,708
	Rounded to:	<u>Rs.3,636,000</u>

Annex 22 Detailed cost estimate by subcomponent and year

Table D3-5 Estimation for the construction of Ecolodge

Cost items	Quantity			Unit cost	Total
	a	b	c=a*b	d	e=c*d
A. Per village survey cost					133,827
Cost of collection and analysis of baseline data and preparation of a report for 15 villages					2,007,400
1) Socio-Economic Household Survey (1200 Samples from Households & Commercial Establishments)					630,400
Professional Expenses for Study Team including Board, Lodging & Incidentals					
Research Coordinator	20	Day	20	4,000	80,000
Assistant Research Coordinator	30	Day	30	3,000	90,000
Logistic Coordinator	20	Day	20	3,000	60,000
Data Manager	20	Village	20	4,000	80,000
Local Field Supervisors (two)	30	Day	30	700	21,000
Local Field investigators	30	Village	30	500	15,000
Logistics					
Vehicle Hire Charge(within the districts) for Field Team	100	Car Day	100	2,000	200,000
Travel of Field Team to and from Sikkim	12	Round Trip	12	2,000	24,000
Inter district travel for Field Team (22 field investigators & 2 Team Leaders)	36	Car Day	36	400	14,400
Other Cost					
Printing of questionnaire, schedules etc.	1,200	Questionnaire	1,200	5	6,000
Cost towards communication, stationary, etc	1	set	1	10,000	10,000
Data Management	1	set	1	20,000	20,000
Analysis and Report Writing	1	set	1	10,000	10,000
2) Solid Waste Sample Collection, Analysis and Report Preparation (35 Samples)					900,000
Travel and Transportation	1	set	1	150,000	150,000
Collection of Samples, Analysis and Report Preparation	1	set	1	750,000	750,000
3) Preparation of Report					477,000
Professional Expenses					
Senior Consultant's Fee	45	Day	45	5,000	225,000
Junior Consultant's Fee	60	Day	60	3,000	180,000
Visit to Sikkim by Consultants					
Travel to Gangtok & Back	2	Flight	2	12,000	24,000
Travel to and from Bagdogra	2	Trip	2	4,000	8,000
Car Rental for Travel to Tourist Villages	5	Day	5	2,000	10,000
Food, Lodging & Incidentals During Travel	5	Day	5	2,000	10,000
Other Cost					
Printing (150 pages Report x 10 Copies)	10	Each Copy of Report	10	1,000	10,000
Communication, Stationary etc.	1	Lump Sum	1	10,000	10,000
B. Per village Training of local communities on waste segregation					109,433
15 village training of local communities on waste segregation					1,641,500
1) Operational Costs					1,582,500
Consultant Fee & Allowance	105	Day	105	7,000	735,000
Two Assistants Fee & Allowance	210	Day	210	2,000	420,000
Travel costs out of Gangtok and from one village to another	105	Day	105	2,000	210,000
Hiring audio-visual equipment	15	Village	15	4,000	60,000
Food Expenses (Tea & Snacks), for 25 pax	105	Day	105	1,500	157,500
2) Other Expenses					59,000
Tools and implements (Gloves, Masks, Shoe, Apron etc)	5	Lump Sum	5	3,000	15,000
Travel to Gangtok & back	3	Round Trip	3	12,000	36,000
Travel to and from Bagdogra	2	Trip	2	4,000	8,000

Annex 22 Detailed cost estimate by subcomponent and year

Table D3-6 Cost of trekking route, camping site, and mountain bike trail development

Cost items	Quantity		Unit cost		Total e=c*d	Note
	a	b	c=a*b	d		
A. Development of trekking routes (per 1km cost)					400,000	
Construction of trekking routes	1 km	1 unit	1	200,000	200,000	Protected Area Plans
Protection and restoration of land slide areas	25 m	1 unit	25	5,000	125,000	Protected Area Plans
Habitat improvement by gap plantation, weed removal, etc.	1 ha	1 unit	1	15,000	15,000	Protected Area Plans
Establishment of sings, temporary resting sheds, and amenities	1 unit	1 unit	1	60,000	60,000	Protected Area Plans
B. Development of camping site including ecological toilet (per 1 site cost)					1,000,000	
Survey and planning	1 unit	1 set	1	40,000	40,000	Protected Area Plans
Establishment of ecological toilet	1 unit	1 set	1	260,000	260,000	Protected Area Plans
Establishment of sings, temporary resting sheds, water points, etc.	1 unit	1 unit	1	500,000	500,000	Protected Area Plans
Habitat improvement by gap plantation, weed removal, etc.	5 ha	1 unit	5	15,000	75,000	Protected Area Plans
Protection and restoration of land slide areas around camping site	25 m	1 unit	25	5,000	125,000	Protected Area Plans
C. Development of mountain bike trail (per 1km cost)					600,000	
Construction of trail	1 km	1 unit	1	200,000	200,000	Protected Area Plans
Protective stone covered banks	1 km	1 unit	1	200,000	200,000	Protected Area Plans
Protection and restoration of land slide areas	25 m	1 unit	25	5,000	125,000	Protected Area Plans
Habitat improvement by gap plantation, weed removal, etc.	1 ha	1 unit	1	15,000	15,000	Protected Area Plans
Establishment of sings, temporary resting sheds, and amenities	1 unit	1 unit	1	60,000	60,000	Protected Area Plans

Table D4-1 Cost of technical translation (English to Nepali)

Language Combination	No. of Words	Unit cost	Unit	Translation Charge
English > Nepali	35,000	8	word	280,000

Source:

Our charges for translation, including proofreading/editing, will be US\$ 0.160 per English word.

IAFL Translation & Interpretation Services

HS-27, First Floor, Kailash Colony Market, New Delhi 110048 INDIA

Web: WWW.IAFLINDIA.COM

Tel: +91-11-2924 0035 / 2923 5313 / 2924 1036

<http://www.oanda.com/convert/classic>

1 US Dollar = 49.15364 Indian Rupee (15 September 2009)

Table D4-2 Cost of printing

	Quantity 1	unit	Quantity 2	unit	Total	Unit cost (INR) d	Total cost
	a		b		Quantity c=a*b*f		(INR) e=c*d
Printing (English version)	1,000	copy	100	page	100,000	7	700,000
Printing (Nepali version)	500	copy	100	page	50,000	7	350,000
Communication, Stationary etc	1	set	1		1	100,000	100,000 lump sum
							1,150,000

Table D4-3 Miscellaneous cost

	Quantity 1	unit	Quantity 2	unit	Total	Unit cost (INR) d	Total cost
	a		b		Quantity c=a*b*f		(INR) e=c*d
Printing of final report	50	copy	300	page	15,000	7	105,000
Communication, Stationary etc	1	set	1		1	100,000	100,000 lump sum
							205,000

Table D4-4 Estimation for the construction of Ecologde

item	one village	all the villages in one batch
water	Rs. 10 x 200 persons	= Rs. 2,000
snack	Rs. 50 x 200 persons	= Rs. 10,000
	Total	Rs. 12,000

Note: The average number of the households per village is approx. 200.

Source

water market rate

snack market rate

Table D4-5 Construction of a community hall

Construction of a community hall 1 unit	=	336 sqft		
	@	Rs.893.00 ./	sqft	Rs.300,048
			Rounded	Rs.300,000

Estimation – Technical specifications:

R.c.c frame structure with 1:2:4 c.c.

With required quantity of reinforcement.

Brick partition with cement plastering

Wooden doors and windows

Ready mixed paints to be provided

G.C.I roofing works in tubular roof truss

With M.S. rod brackets.

Electrification works.

Source: Building Space and Design

Table D4-6 Loan to three SHGs in one village

	Quantity 1	unit	Quantity 2	unit	Total Quantity	Unit cost (INR)	Total cost (INR)
	a		b		c=a*b*f	d	e=c*d
Loan	3	SHG	1	time	3	20,000	60,000
							60,000

Note:

For example, a SHG can purchase a milking cow to start a business. The price of a milking cow is INR 25,000. One SHG can borrow INR 20,000 from its JFMC, EDC or PSS. The rest of the expenditure can be covered by the contribution from the members, ie, if the SHG has ten members, each members can contribute INR 100 for 5 months.

Annex 22 Detailed cost estimate by subcomponent and year

Table D4-7 Training on management of JFMCs, EDCs and PSS's

Assumptions							
Number of villages in total	45						
Number of participants in total	5 ÷ 2 (45 villages X 5 members)						
Number of trainings per year	8						
Number of participants per training	30 (approx. 240 participants ÷ 8 trainings = 30 participants/training)						
Cost estimation							
	Q1	unit	Q2	unit	Total	Unit cost	Total cost
	b		a		Quantity	(INR)	(INR)
					c=a*b*f	d	e=c*d
Resource person (trainer)	2	trainer	1	training	2	1,500	3,000
Accommodation for resource person	2	trainer	2	night	4	400	1,600
Transportation cost for resource person (to and fro)	2	trainer	1	training	2	600	1,200
Per diem for participants	30	participant	3	day	90	200	18,000
Accommodation for participants	30	participant	2	night	60	300	18,000
Transportation cost for participants	30	participant	1	training	30	300	9,000
Training material	30	participant	1	training	30	150	4,500
Venue	1	venue	1	training	1	2,500	2,500
Food Expenses (Tea & Snacks)	30	participant	3	day	90	60	5,400
Total cost for one training							63,200
Note	one training is for 3 days 1st day: micro planning, leadership, organizational management 2nd and 3rd day: book-keeping, account management, documentation, etc						

Table D4-8 Training for business management

Assumptions							
Number of villages in total	45						
Number of participants in total	5 ÷ 2 (45 villages X 3 members X 3 SHG)						
Number of trainings per year	21						
Number of participants per training	approx. 20 (3 members X 3 SHGS X 2 villages)						
Cost estimation							
	Q1	unit	Q2	unit	Total	Unit cost	Total cost
	b		a		Quantity	(INR)	(INR)
					c=a*b*f	d	e=c*d
Operational Costs							
Resource person (trainer)	1	trainer	1	training	1	1,500	1,500
Accommodation for resource person	2	trainer	2	night	4	400	1,600
Transportation cost for resource person (to and fro)	2	trainer	1	training	2	600	1,200
Per diem for participants	20	participant	3	day	60	200	12,000
Accommodation for participants	20	participant	2	night	40	300	12,000
Transportation cost for participants	20	participant	1	training	20	300	6,000
Training material	20	participant	1	training	20	150	3,000
Venue	1	venue	1	training	1	2,500	2,500
Food Expenses (Tea & Snacks)	20	participant	3	day	60	60	3,600
Total cost for one training							43,400
Note:	One training for 3 days						

Annex 22 Detailed cost estimate by subcomponent and year

Table D4-9 Skill development training on IGAs

Assumptions							
Number of SHG in one village							3
Number of trainings per year per SHG							3
Estimated number of participants per training							10 (on an average 10 members from one SHG)
Training on floriculture for 3 SHGs in one village							
	Q 1	unit	Q 2	unit	Total Quantity c=a*b*f	Unit cost (INR) d	Total cost (INR) e=c*d
	a		b				
Resource person (trainer)	3	trainer	1	training	3	800	2,400
Transportation cost for resource person (to and fro)	3	trainer	1	training	3	380	1,140
Training material and accessories	10	member	3	SHG	30	380	11,400
Food Expenses (Tea & Snacks)	10	participant	3	SHG	30	60	1,800
Total cost for one village							16,740

Note:

one training is for 1 days.

The training is conducted at the village by inviting a resource person.

For the purpose of calculation, it is assumed here that all 3 SHGs in one village will take the training on floriculture.

One resource person is required per one SHG since each SHG is supposed to take up different IGA.

The cost for the venue is considered not necessary because the training is conducted at the village.

For each SHG, initial training will be conducted for 2 times in the initial year for the purpose of teaching basics. In the following year (one year after the last "initial training"), upgrading training will be conducted for one time for the purpose of improving the developed skills of the SHG members.

Table D4-10 Exposure visit

Assumptions							
Number of participants per village	6		3 memebtrs of Executive Committee and 3 members of SHGs				
Number of villages per visit	5						
Number of participants per visit	30		6 members X 5 villages				
Cost estimation							
	Q 1	unit	Q 2	unit	Total Quantity c=a*b*f	Unit cost (INR) d	Total cost (INR) e=c*d
	a		b				
Transportation cost	6	car	1	visit	6	2,000	12,000
Lunch on way	30	member	1	visit	30	200	6,000
Miscellaneous	1	set	1	set	1	30,000	30,000
Total cost for one village							48,000

Note:

The destination is Darjeeling in West Bengal.

No night halt is required.

Number of visits conducted per FY is 9 times (45 villages/batch ÷5 villages/visit)

The visit will conducted two years after the establishment of the Committee, eg, the committee established in FY 2 will be taken to the exposure visit in FY4.

Annex 22 Detailed cost estimate by subcomponent and year

Table D4-11 Standard per village cost of forest management for forest management and biodiversity conservation

	Quantity		Unit cost		Total	Note
	a	b	c=a*b	d	e=c*d	
Planting and first year maintenance					134,580	
Aided natural regeneration - advance work	1 unit	0.5 ha	1	8,100	4,050	
Aided natural regeneration - creation work	1 unit	0.5 ha	1	5,850	2,925	
Aided natural regeneration - 1st year maintenance	1 unit	0.5 ha	1	3,050	1,525	
Artificial regeneration - advance work	1 unit	3.0 ha	3	13,700	41,100	
Artificial regeneration - creation work	1 unit	3.0 ha	3	11,960	35,880	
Artificial regeneration - 1st year maintenance	1 unit	3.0 ha	3	3,200	9,600	
Bamboo plantation - advance work	1 unit	0.5 ha	1	7,450	3,725	
Bamboo plantation - creation work	1 unit	0.5 ha	1	6,500	3,250	
Bamboo plantation - 1st year maintenance	1 unit	0.5 ha	1	2,400	1,200	
Mixed plantation of trees having medicinal value - advance work	1 unit	0.5 ha	1	13,680	6,840	
Mixed plantation of trees having medicinal value - creation work	1 unit	0.5 ha	1	11,970	5,985	
Mixed plantation of trees having medicinal value - 1st year maintenance	1 unit	0.5 ha	1	3,200	1,600	
Regeneration of perennial herbs and shrubs - advance work	1 unit	0.5 ha	1	16,320	8,160	
Regeneration of perennial herbs and shrubs - creation work	1 unit	0.5 ha	1	14,280	7,140	
Regeneration of perennial herbs and shrubs - 1st year maintenance	1 unit	0.5 ha	1	3,200	1,600	
Second year maintenance					8,825	
Aided natural regeneration - 2nd year	1 unit	0.5 ha	1	1,400	700	
Artificial regeneration - 2nd year maintenance	1 unit	3.0 ha	3	1,800	5,400	
Bamboo plantation - 2nd year maintenance	1 unit	0.5 ha	1	1,650	825	
Mixed plantation of trees having medicinal value - 2nd year maintenance	1 unit	0.5 ha	1	1,800	900	
Regeneration of perennial herbs and shrubs - 2nd year maintenance	1 unit	0.5 ha	1	2,000	1,000	
Third year maintenance					5,850	
Aided natural regeneration - 3rd year maintenance	1 unit	0.5 ha	1	1,100	550	
Artificial regeneration - 3rd year maintenance	1 unit	3.0 ha	3	1,200	3,600	
Bamboo plantation - 3rd year maintenance	1 unit	0.5 ha	1	800	400	
Mixed plantation of trees having medicinal value - 3rd year maintenance	1 unit	0.5 ha	1	1,000	500	
Regeneration of perennial herbs and shrubs - 3rd year maintenance	1 unit	0.5 ha	1	1,600	800	
Nursery establishment and management						
Creation of nursery	1 ha	1.0 unit	1	365,078	365,078	Table D4-11-1
Annual maintenance cost of nursery	1 ha	1.0 unit	1	246,355	246,355	Table D4-11-2
Fire fighting equipment					105,700	
High Pressure Mobile Spray	1 unit	2 unit	2	20,700	41,400	
Fire Spray (manual)	1 unit	10 unit	10	1,950	19,500	
Khukri (local Nepali knife)	1 unit	10 unit	10	550	5,500	
Search light	1 unit	1 unit	1	9,800	9,800	
Pulaski, Fire Rack, Fire Resistant Cloth, Helmet, Gloves	1 unit	10 set	10	2,950	29,500	

Note: Cost items are listed for the purpose of deriving a standard cost per village only. Actual activities to be taken up by JFMC/EDC/PSS shall not be bound by the items listed above.

Note: One JFMC or EDC plant 5 ha of plantation annually. This required 5 ha x 1,400 = 7,000 seedlings. Forty five JFMC or EDC will require 7,000 x 45 = 315,000 seedlings. Since one ha nursery produces approximately 60,000 ~100,000 seedlings annually, 5ha nursery require to supply 45 JFMC or EDCs.

Source: High altitude, Schedule of rates, Revised 2008-09, FDA

Annex 22 Detailed cost estimate by subcomponent and year

Table D4-11-1 Schedule of rate for one hectare nursery creation

SCHEDULE OF RATES FOR FORESTRY ACTIVITIES						
EFFECTIVE DATE 01.04.2008						
SCHEDULE OF ITEMS FOR ONE HECTARE NURSERY CREATION						
ITEMS OF WORK	Work/ manday	Total mandays	Rate	Low Altitude	Rate	High Altitude
1 Survey, site clearance, removal of brushwood, stumps breaking and removing boulders wherever necessary, removing stones and pebbles, roots, herbs, control burning of debris and removing unburned debris away from the nursery site, cleaning the ground. 10000 sq.m.	80 sq.m.	125	100	12,500	150	18,750
2 Laying out of nursery beds of 1.20m width and length as land per formation ranging from 2m to 10m in 30% of the total area. Digging of earth upto 25 cm. for preparation of raised nursery beds in 30% of the total area including mixing of manure with pulverised soil in nursery beds. 10000 x 30%= 3000sq.m.	4.8 sq.m.	625	100	62,500	150	93,750
3 Collection of seeds from seed orchards/seed stand/plus trees, and treatment before sowing/dibbling. 100 Kgs.	5 Kg	20	100	2,000	150	3,000
4 Purchase of certified seeds 10 kg. @ Rs.200/Kg.	10 kg.	200		2,000		2,000
5 Purchase of pesticides & growth hormones	L.S.			1,500		1,500
6 Procurement of jungle manure 200 bags	4 bags	50	100	5,000	150	7,500
7 Cost of cowdung manure 400 bags @ Rs. 20/- per bag.				8,000		8,000
8 Erection of sheds with poles over the nursery beds in 3000 sq.m. area, collection of bamboo, pareng and preparation for the nursery beds.	5 sq.m	600	100	60,000	150	90,000
9 Cost of implements like polythene pipes, polythene bags, spades, shovels, crobars, pickaxe, sickles, axe, handfork, rose cans etc.	L.S.			20,000		20,000
10 Procurement of water syntex tank of 1000 litres capacity	L.S.			8,000		8,000
11 Stone wall fencing around the nursery in 0.4 Kilometres @ Rs. 462299/km. for				184,920		184,920
12 Providing entry iron gate with lock and keys.				4,000		4,000
				357,920		422,670
13 Contingencies including sign board, stationaries 1%				7,158		8,453
Total				365,078		431,123

Annex 22 Detailed cost estimate by subcomponent and year

Table D4-11-2 Schedule of rate for one hectare nursery maintenance

MAINTENANCE OF ONE HECTARE NURSERY							
ITEMS OF WORK	Work/ manday	Total mandays	Rate/ manday	Low Altitude	Rate/ Manday	High Altitude	Note
1 Wages of supervisor		365	115	41,975	173	62,963	
2 Wages of labourers 4 labourers for 365 days		1,460	100	146,000	150	219,000	
3 Cost of polythene bags 200Kg.			164	32,880		32,880	
4 Procurement of nursery implements and inputs Alkathene pipes 2 coils, one crobar, two shovels, two spades, three rose cans, five hand fork, 2 sickles etc.			L.S.	2,000		2,000	
5 Cost of Agro-net/Chitras for providing shed to the nursery beds (in 50% beds)			L.S.	10,000		10,000	
5 Purchase of cowdung manure 100 doko/ bags @ Rs.20/-				2,000		3,000	
6 Collection, and carriage of jungle manure from forest and composting/vermicomposting in the nursery 120 headloads	4 headload	30	100	3,000	150	4,500	
8 Procurement of certified seeds				4,000		4,000	
9 Repair works (fencing, mali shed etc.)				4,000		4,000	
				245,855	300	342,343	
10 Contingencies including cost of stationaries, sign boards 2% excluding item No. 1 and 2				500		550	
Total				246,355		342,893	

Annex 22 Detailed cost estimate by subcomponent and year

Table D4-11-3 Schedule of rate for one hectare propagation nursery creation

SCHEDULE OF RATES FOR FORESTRY ACTIVITIES							
EFFECTIVE DATE 01.04.2008							
SCHEDULE OF ITEMS FOR ONE HECTARE NURSERY CREATION (modified by the study team)							
ITEMS OF WORK	Work/ manday	Total mandays	Rate	Low Altitude	Rate	High Altitude	Note
1 Survey, site clearance, removal of brushwood, stumps breaking and removing boulders wherever necessary, removing stones and pebbles, roots, herbs, control burning of debris and removing unburned debris away from the nursery site, cleaning the ground. 10000 sq.m.	80 sq.m.	125	100	12,500	150	18,750	
2 Laying out of nursery beds of 1.20m width and length as land per formation ranging from 2m to 10m in 30% of the total area. Digging of earth upto 25 cm. for preparation of raised nursery beds in 30% of the total area including mixing of manure with pulverised soil in nursery beds. 10000 x 30%= 3000sq.m.	4.8 sq.m.	625	100	62,500	150	93,750	
3 Collection of seeds from seed orchards/seed stand/plus trees, and treatment before sowing/dibbling. 120 Kgs.	2 Kg	30	100	3,000	150	4,500	
4 Purchase of certified/identified planting materials	10 kg.	300		3,000		3,000	
5 Purchase of pesticides & growth hormones	L.S.			1,500		1,500	
6 Procurement of jungle manure 200 bags	4 bags	50	100	5,000	150	7,500	
7 Cost of cowdung manure 400 bags @ Rs. 20/- per bag.				8,000		8,000	
8 Erection of sheds with poles over the nursery beds in 3000 sq.m. area, collection of bamboo, pareng and preparation for the nursery beds.	5 sq.m	600	100	60,000	150	90,000	
9 Cost of implements like polythene pipes, polythene bags, spades, shovels, crobars, pickaxe, sickles, axe, handfork, rose cans etc.	L.S.			20,000		20,000	
10 Procurement of water syntex tank of 1000 litres capacity (2 sets)	L.S.	2	units	16,000	2	units	16,000
11 Stone wall fencing around the nursery in 0.4 Kilometres @ Rs. 462299/km. for				184,920		184,920	
12 Providing entry iron gate with lock and keys.				4,000		4,000	
13 Galvanized steel framed and polyethern film covered green house with propagation benches (30m long, 10m wide, and 4.5m high)	INR 400,000	1	unit	400,000	2	units	800,000 Internet
14 Fan misting system	INR 100,000	2	units	200,000	1	unit	100,000 Internet
15 Heating system	INR 119,000				1	unit	119,000 Internet
Sub-total				980,420		1,470,920	
16 Miscellaneous items including sign board, stationeries, etc (2% of sub-total)				19,608		29,418	
Total				1,000,028		1,500,338	
Total (rounded)				1,000,000		1,500,000	

Annex 22 Detailed cost estimate by subcomponent and year

Table D4-11-4 Schedule of rate for one hectare floriculture nursery creation

SCHEDULE OF RATES FOR FORESTRY ACTIVITIES							
EFFECTIVE DATE 01.04.2008							
SCHEDULE OF ITEMS FOR ONE HECTARE NURSERY CREATION (modified by the study team)							
ITEMS OF WORK	Work/ manday	Total mandays	Rate	Low Altitude	Rate	High Altitude	Note
1 Survey, site clearance, removal of brushwood, stumps breaking and removing boulders wherever necessary, removing stones and pebbles, roots, herbs, control burning of debris and removing unburned debris away from the nursery site, cleaning the ground. 10000 sq.m.	80 sq.m.	125	100	12,500	150	18,750	
2 Laying out of nursery beds of 1.20m width and length as land per formation ranging from 2m to 10m in 30% of the total area. Digging of earth upto 25 cm. for preparation of raised nursery beds in 30% of the total area including mixing of manure with pulverised soil in nursery beds. 10000 x 30%= 3000sq.m.	4.8 sq.m.	625	100	62,500	150	93,750	
3 Collection of seeds from seed orchards/seed stand/plus trees, and treatment before sowing/dibbling. 120 Kgs.	2 Kg	30	100	3,000	150	4,500	
4 Purchase of certified/identified planting materials	L.S.			83,000		83,000	
5 Purchase of pesticides & growth hormones	L.S.			1,500		1,500	
6 Procurement of jungle manure 200 bags	4 bags	50	100	5,000	150	7,500	
7 Cost of cowdung manure 400 bags @ Rs. 20/- per bag.				8,000		8,000	
8 Erection of sheds with poles over the nursery beds in 3000 sq.m. area, collection of bamboo, pareng and preparation for the nursery beds.	5 sq.m	600	100	60,000	150	90,000	
9 Cost of implements like polythene pipes, polythene bags, spades, shovels, crobars, pickaxe, sickles, axe, handfork, rose cans etc.	L.S.			20,000		20,000	
10 Procurement of water syntex tank of 1000 litres capacity (2 sets)	L.S.		2 units	16,000	2 units	16,000	
11 Stone wall fencing around the nursery in 0.4 Kilometres @ Rs. 462299/km. for				184,920		184,920	
12 Providing entry iron gate with lock and keys.				4,000		4,000	
13 Galvanized steel framed and polyethern film covered green house with propagation benches (30m long, 10m wide, and 4.5m high)	INR 400,000		3 units	1,200,000	3 units	1,200,000	Internet
14 Fan misting system	INR 100,000		3 units	300,000	2 units	200,000	Internet
15 Heating system	INR 119,000				1 unit	119,000	Internet
Sub-total				1,960,420		2,050,920	
16 Miscellaneous items including sign board, stationeries, etc (2% of sub-total)				39,208		41,018	
Total				1,999,628		2,091,938	
Total (rounded)				2,000,000		2,092,000	

Annex 22 Detailed cost estimate by subcomponent and year

Table D4-11-5 Schedule of rate for one hectare propagation nursery maintenance

MAINTENANCE OF ONE HECTARE NURSERY							
ITEMS OF WORK	Work/ manday	Total mandays	Rate/ manday	Low Altitude	Rate/ Manday	High Altitude	Note
1 Wages of supervisor		365	115	41,975	173	62,963	
2 Wages of labourers: 10 labourers for 365 days		3,650	100	365,000	150	547,500	
3 Cost of polythene bags 200Kg.			164	32,880		32,880	
4 Procurement of nursery implements and inputs Alkathene pipes 2 coils, one crobar,two shovels, two spades,three rose cans, five hand fork, 2 sickles etc.			L.S.	2,000		2,000	
5 Cost of Agro-net/Chitras for providing shed to the nursery beds (in 50% beds)			L.S.	10,000		10,000	
5 Purchase of cowdung manure 100 doko/ bags @ Rs.20/-				2,000		3,000	
6 Collection, and carriage of jungle manure from forest and composting/vermicomposting in the nursery 120 headloads	4 headload	30	100	3,000	150	4,500	
8 Purchase of certified/identified planting materials				50,000		40,000	
9 Repair works and spare parts (fencing, greenhouse, shed, etc.)				81,000		61,000	
10 Fuel for heating system						20,000	
Sub-total				587,855		783,843	
11 Miscellaneous items including sign board, stationeries, etc (2% of sub-total)				11,757		15,677	
Total				599,612		799,520	
Total (rounded)				600,000		800,000	

Table D4-11-6 Schedule of rate for one hectare floriculture nursery maintenance

MAINTENANCE OF ONE HECTARE NURSERY							
ITEMS OF WORK	Work/ manday	Total mandays	Rate/ manday	Low Altitude	Rate/ Manday	High Altitude	Note
1 Wages of supervisor		365	115	41,975	173	62,963	
2 Wages of labourers: 15 labourers for 365 days		5,475	100	547,500	150	821,250	
3 Cost of polythene bags 200Kg.			164	32,880		32,880	
4 Procurement of nursery implements and inputs Alkathene pipes 2 coils, one crobar,two shovels, two spades,three rose cans, five hand fork, 2 sickles etc.			L.S.	50,000		50,000	
5 Cost of Agro-net/Chitras for providing shed to the nursery beds (in 50% beds)			L.S.	10,000		10,000	
5 Purchase of cowdung manure 100 doko/ bags @ Rs.20/-				2,000		3,000	
6 Collection, and carriage of jungle manure from forest and composting/vermicomposting in the nursery 120 headloads	4 headload	30	100	3,000	150	4,500	
8 Purchase of certified/identified planting materials				140,000		140,000	
9 Repair works and spare parts (fencing, greenhouse, shed, etc.)				153,000		153,000	
10 Fuel for heating system						40,000	
Sub-total				980,355		1,317,593	
11 Miscellaneous items including sign board, stationeries, etc (2% of sub-total)				19,607		26,352	
Total				999,962		1,343,945	
Total (rounded)				1,000,000		1,344,000	

Annex 22 Detailed cost estimate by subcomponent and year

Table D4-12 Standard per village cost of training for forest management and biodiversity conservation

	Q1	Unit	Q2	Unit	Unit Cost	Total Cost
Training year 1						
Organisational development resource person	5 day		10 Villages		2,500	125,000
Cooking resource person	10 day		10 Villages		2,500	250,000
Guiding resource person	15 day		10 Villages		2,500	375,000
Housekeeping resource person	3 day		10 Villages		2,500	75,000
Spoken English resource person	1 month		10 Villages		20,000	200,000
Cultural performance resource person	3 month		10 Villages		20,000	600,000
Class room materials	200 person		1 set		50	10,000
Training materials (cooking, English books)	200 person		1 set		300	60,000
LCD projector	2 unit		1 set		4,500	9,000
Screen	2 unit		1 set		48,000	96,000
Travel	12 day		10 Villages		2,000	240,000
Refreshments	200 day		1 set		150	30,000
NGO management cost	200 person		153 day		15	459,000
Total						2,529,000
Total per village						252,900
Training subsequent years						
Organisational development resource person	5 day		10 Villages		2,500	125,000
Cooking resource person	10 day		10 Villages		2,500	250,000
Guiding resource person	15 day		10 Villages		2,500	375,000
Housekeeping resource person	3 day		10 Villages		2,500	75,000
Spoken English resource person	1 month		10 Villages		20,000	200,000
Cultural performance resource person	7 day		10 Villages		2,500	175,000
Class room materials	200 person		1 set		50	10,000
Training materials (cooking, English books)	200 person		1 set		300	60,000
LCD projector	2 unit		1 set		4,500	9,000
Screen	2 unit		1 set		48,000	96,000
Travel	12 day		10 Villages		2,000	240,000
Refreshments	200 day		1 set		150	30,000
NGO management cost	200 person		70 day		15	210,000
Total						1,855,000
Total per village						185,500
Exposure trip - 10 people per trip repeated 5 times						
Transport	2 car		2 day		2,000	8,000
Accommodation, food and activities	11 person		1 set		2,000	22,000
Lunch on way	10 person		1 set		200	2,000
Resource person	1 person		2 day		2,500	5,000
Total						37,000

Note: One or several NGOs are appointed to deliver the training

Annex 22 Detailed cost estimate by subcomponent and year

Table D5-1 Cost of renovation and upgrading of offices and quarters

Cost items	Quantity			Unit cost	Total
	a	b	c=a*b	d	e=c*d
(a) Renovation and improvement of Headquarters					
Renovation and improvement of main offices	1	unit		1 120,000,000	120,000,000
Improvement of the Forest Colony (6 quarters and 1 community centre)	1	unit		1 40,000,000	40,000,000
Upgrading of existing facility in the Forest Colony	1	unit		1 20,000,000	20,000,000
(b) Renovation and improvement of Range offices and check posts					
Large office with four offices and one residential quarter	1	unit		1 2,693,500	2,693,500
Small office with two offices and one residential quarter	1	unit		1 1,729,000	1,729,000
Check posts with one residential quarter	1	unit		1 1,729,000	1,729,000

Table D5-2 Salary of PMU staff members

Name of the post	Contract type	Pay scale (low/high) (INR)	No. of person	Person- Month	Monthly payment (INR)	Monthly benefits (INR)	Annual total (INR)
TOTAL			98	1,084	633,360	633,360	26,221,560
A. Project management unit at HQ			47	472	553,690	553,690	13,605,240
A-1. Executive office at state level			40	430	415,790	415,790	11,895,840
Project director	Deputation	67,000/79,000	1	12	79,000	79,000	1,896,000
Additional project director	Deputation	37,400/67,000	1	12	67,000	67,000	1,608,000
Planning and monitoring specialist	Deputation	15,600/39,100	1	12	39,100	39,100	938,400
Biodiversity conservation specialist	Deputation	15,600/39,100	1	12	39,100	39,100	938,400
Ecotourism specialist	Contractual	15,600/39,100	1	12	39,100	39,100	938,400
Divisional engineer (4 years)	Deputation	15,600/39,100	1	4.8	39,100	39,100	375,360
Assistant engineer (4 years)	Deputation/Contractual	9,300/34,800	2	9.6	34,800	34,800	668,160
Junior engineer (4 years)	Deputation/Contractual	9,300/34,800	4	19.2	34,800	34,800	1,336,320
Accountant	Contractual	4,300/6,800	1	12	6,800	6,800	163,200
Office superintendent	Contractual	5,500/9,000	1	12	9,000	9,000	216,000
Junior accountant	Contractual	4,000/6,000	2	24	6,000	6,000	288,000
Office assistant	Contractual	3,050/4,550	4	48	4,550	4,550	436,800
Computer operator	Contractual	3,050/4,550	2	24	4,550	4,550	218,400
Driver	Contractual	3,050/4,550	8	96	4,550	4,550	873,600
Cleaner	Contractual	2,850/4,170	2	24	4,170	4,170	200,160
Peon	Contractual	2,850/4,170	8	96	4,170	4,170	800,640
A-2. Ecotourism marketing cell at state level (last for 5 years)			7	42	137,900	137,900	1,709,400
Chief executive	Deputation/Contractual	37,400/67,000	1	6	67,000	67,000	804,000
Product, sales, and advertizing manager	Contractual	(no scale applied)	1	6	30,000	30,000	360,000
Mrketing, RP, events and festivals manager	Contractual	(no scale applied)	1	6	25,000	25,000	300,000
Accountant	Contractual	4,300/6,800	1	6	6,800	6,800	81,600
Office Assistant	Contractual	3,050/4,550	2	12	4,550	4,550	109,200
Administrative assistant	Contractual	3,050/4,550	1	6	4,550	4,550	54,600
B. District facilitation unit			24	288	70,670	70,670	6,784,320
Project coordinator	Deputation	15,600/39,100	4	48	39,100	39,100	3,753,600
Deputy project coordinator	Deputation	7,000/11,500	4	48	11,500	11,500	1,104,000
Accountant	Contractual	4,300/6,800	4	48	6,800	6,800	652,800
Data entry	Contractual	3,050/4,550	4	48	4,550	4,550	436,800
Driver	Contractual	3,050/4,550	4	48	4,550	4,550	436,800
Peon	Contractual	2,850/4,170	4	48	4,170	4,170	400,320
C. Range supporting unit			27	324	9,000	9,000	5,832,000
Community organiser	Contractual	4,000/9,000	27	324	9,000	9,000	5,832,000

Source: 1) Gazette of India, Extraordinary, Part II, Section 3, Sub-section (i), dated September 27, 2008. 2) Sikkim government service (revised pay) rule (1998).

Table D6-1 Cost of consultancy services

Consultants and support staff		FY01	FY02	FY03	FY04	FY05	FY06	FY07	FY08	FY09	FY10	Total
No.	INR/PM											
21		82	175	169	157	158	113	106	106	115	100	1,281
13		34	79	73	61	62	17	10	10	19	4	369
5		16	24	19	15	15	8	1	1	3	—	102
1.	Team Leader/Participatory Forest Management Specialist	1,351,759	8	8	6	6	2	2	2	2	4	34
2.	Biodiversity Management Specialist	1,351,759	3	4	3	3	3	3	3	3	3	21
3.	GIS and Forest Management Specialist	1,351,759	3	2	2	2	2	2	2	2	2	13
4.	Ecotourism Specialist (International Market)	1,351,759	3	3	3	3	2	2	2	2	2	21
5.	Impact Assessment and M&E Specialist	1,351,759	3	1	1	1	1	1	1	3	4	13
8		18	55	54	46	47	9	9	9	16	4	267
1.	Co-team Leader/Joint Forest Management Specialist	201,005	10	10	9	10	8	8	8	4	4	77
2.	Institutional Development Specialist	150,754	3	8	7	7	7	7	7	3	3	18
3.	Protected Area Management Specialist	150,754	3	7	7	7	7	7	7	3	3	34
4.	GIS and Information Technology Specialist	150,754	7	7	7	7	7	7	7	3	3	31
5.	Ecotourism Specialist (National Market)	150,754	7	7	7	7	7	7	7	3	3	34
6.	Design and Construction Quality Control Specialist	150,754	7	7	7	7	7	7	7	3	3	28
7.	Monitoring and Evaluation Specialist	150,754	3	2	2	2	2	2	2	3	3	17
8.	Training Coordinator	75,377	7	7	7	7	7	7	7	3	3	28
8		48	96	96	96	96	96	96	96	96	96	912
1.	Administrative Manager	15,075	12	12	12	12	12	12	12	12	12	114
2.	Accounts Manager	12,563	6	12	12	12	12	12	12	12	12	114
3.	Office Assistant/Photocopier Operator	7,538	18	36	36	36	36	36	36	36	36	342
4.	Driver	7,538	18	36	36	36	36	36	36	36	36	342
Consultants and support staff												
21		33,299,792	55,160,662	45,946,535	37,060,765	37,328,812	17,640,734	5,022,405	5,022,405	9,766,843	1,946,561	248,195,513
13		24,643,216	40,708,543	33,798,995	27,135,678	27,336,683	12,572,864	3,110,553	3,110,553	6,668,342	804,020	179,889,447
5		21,628,141	32,442,211	25,683,417	20,276,382	20,276,382	10,814,070	1,351,759	1,351,759	4,055,276	—	137,879,397
1.	Team Leader/Participatory Forest Management Specialist	5,407,035	10,814,070	10,814,070	8,110,553	8,110,553	2,703,518	2,703,518	2,703,518	4,055,276	—	45,959,799
2.	Biodiversity Management Specialist	1,351,759	8,110,553	5,407,035	4,055,276	4,055,276	2,703,518	2,703,518	2,703,518	4,055,276	—	28,386,935
3.	GIS and Forest Management Specialist	4,055,276	4,055,276	2,703,518	2,703,518	2,703,518	1,351,759	1,351,759	1,351,759	4,055,276	—	17,572,864
4.	Ecotourism Specialist (International Market)	4,055,276	8,110,553	5,407,035	4,055,276	4,055,276	2,703,518	2,703,518	2,703,518	4,055,276	—	28,386,935
5.	Impact Assessment and M&E Specialist	4,055,276	1,351,759	1,351,759	1,351,759	1,351,759	1,351,759	1,351,759	1,351,759	4,055,276	—	17,572,864
8		3,015,075	8,266,352	8,115,578	6,859,296	7,060,302	1,758,794	1,758,794	1,758,794	2,613,065	804,020	42,010,050
1.	Co-team Leader/Joint Forest Management Specialist	1,206,030	2,010,050	2,010,050	1,809,045	2,010,050	1,608,040	1,608,040	1,608,040	804,020	804,020	15,477,387
2.	Institutional Development Specialist	452,261	1,206,030	1,055,276	1,055,276	1,055,276	1,055,276	1,055,276	1,055,276	452,261	—	2,713,568
3.	Protected Area Management Specialist	452,261	1,055,276	1,055,276	1,055,276	1,055,276	1,055,276	1,055,276	1,055,276	452,261	—	5,125,628
4.	GIS and Information Technology Specialist	452,261	1,055,276	1,055,276	1,055,276	1,055,276	1,055,276	1,055,276	1,055,276	452,261	—	4,673,367
5.	Ecotourism Specialist (National Market)	452,261	1,055,276	1,055,276	1,055,276	1,055,276	1,055,276	1,055,276	1,055,276	452,261	—	5,125,628
6.	Design and Construction Quality Control Specialist	150,754	1,055,276	1,055,276	1,055,276	1,055,276	1,055,276	1,055,276	1,055,276	452,261	—	4,221,106
7.	Monitoring and Evaluation Specialist	150,754	301,508	301,508	301,508	301,508	150,754	150,754	150,754	452,261	—	2,562,814
8.	Training Coordinator	75,377	301,508	301,508	301,508	301,508	150,754	150,754	150,754	452,261	—	2,110,553
8		437,186	874,372	874,372	874,372	874,372	874,372	874,372	874,372	874,372	874,372	8,306,533
1.	Administrative Manager	90,452	180,905	180,905	180,905	180,905	180,905	180,905	180,905	180,905	180,905	1,718,593
2.	Accounts Manager	75,377	150,754	150,754	150,754	150,754	150,754	150,754	150,754	150,754	150,754	1,432,161
3.	Office Assistant/Photocopier Operator	135,678	271,357	271,357	271,357	271,357	271,357	271,357	271,357	271,357	271,357	2,577,889
4.	Driver	135,678	271,357	271,357	271,357	271,357	271,357	271,357	271,357	271,357	271,357	2,577,889
3		8,219,390	13,577,748	11,273,168	9,050,714	9,117,757	4,193,498	1,037,480	1,037,480	2,224,129	268,169	59,999,533
1.	Co-team Leader/Joint Forest Management Specialist	8,219,390	13,577,748	11,273,168	9,050,714	9,117,757	4,193,498	1,037,480	1,037,480	2,224,129	268,169	59,999,533
B Direct cost												

Annex 22 Detailed cost estimate by subcomponent and year

Table D6-2 Cost of consultancy services (direct costs)

Items	Unit cost		Quantity		Total Cost	
	INR	Yen	Value	Unit	INR	Yen
B. Direct cost total					59,999,533	119,399,070
I. Cost in foreign currency					20,144,724	40,088,000
1. International airfare (Professional A)					7,236,181	14,400,000
a) Team Leader/Participatory Forest Management Specialist	150,754	300,000 /trip	10	trips	1,507,538	3,000,000
b) Biodiversity Management Specialist	150,754	300,000 /trip	6	trips	904,523	1,800,000
c) GIS and Forest Management Specialist	150,754	300,000 /trip	6	trips	904,523	1,800,000
d) Ecotourism Specialist (International Market)	150,754	300,000 /trip	7	trips	1,055,276	2,100,000
e) Impact Assessment and M&E Specialist	150,754	300,000 /trip	9	trips	1,356,784	2,700,000
f) Ten PMU staff airfare	150,754	300,000 /trip	10	trips	1,507,538	3,000,000
4. Accomodation allowance (Professional A)					12,703,518	25,280,000
a) Team Leader/Participatory Forest Management Specialist	4,020	8,000 /day	1,020	days	4,100,503	8,160,000
b) Biodiversity Management Specialist	4,020	8,000 /day	630	days	2,532,663	5,040,000
c) GIS and Forest Management Specialist	4,020	8,000 /day	390	days	1,567,839	3,120,000
d) Ecotourism Specialist (International Market)	4,020	8,000 /day	630	days	2,532,663	5,040,000
e) Impact Assessment and M&E Specialist	4,020	8,000 /day	390	days	1,567,839	3,120,000
f) Ten PMU staff accomodation (10days x 10 staff)	4,020	8,000 /day	100	days	402,010	800,000
7. International communications					205,025	408,000
a) International communications	2,010	4,000 /month	102	months	205,025	408,000
II. Cost in local currency					39,854,809	79,311,070
2. Domestic airfare (Professional B)					1,755,000	3,492,450
a) Co-team Leader/Joint Forest Management Specialist	27,000	53,730 /round trip	17	trips	459,000	913,410
b) Institutional Development Specialist	27,000	53,730 /round trip	4	trips	108,000	214,920
c) Protected Area Management Specialist	27,000	53,730 /round trip	9	trips	243,000	483,570
d) GIS and Information Technology Specialist	27,000	53,730 /round trip	9	trips	243,000	483,570
e) Ecotourism Specialist (National Market)	27,000	53,730 /round trip	9	trips	243,000	483,570
f) Design and Construction Quality Control Specialist	27,000	53,730 /round trip	8	trips	216,000	429,840
g) Monitoring and Evaluation Specialist	27,000	53,730 /round trip	9	trips	243,000	483,570
h) Training Coordinator	27,000	53,730 /round trip	0	trips	0	0
3. Domestic travel					738,000	1,468,620
a) Professional A and B	2,000	3,980 /time	369	PM	738,000	1,468,620
4. Accomodation allowance (Professional B)					20,125,628	40,050,000
a) Co-team Leader/Joint Forest Management Specialist	2,513	5,000 /day	2,310	days	5,804,020	11,550,000
b) Institutional Development Specialist	2,513	5,000 /day	540	days	1,356,784	2,700,000
c) Protected Area Management Specialist	2,513	5,000 /day	1,020	days	2,562,814	5,100,000
d) GIS and Information Technology Specialist	2,513	5,000 /day	930	days	2,336,683	4,650,000
e) Ecotourism Specialist (National Market)	2,513	5,000 /day	1,020	days	2,562,814	5,100,000
f) Design and Construction Quality Control Specialist	2,513	5,000 /day	840	days	2,110,553	4,200,000
g) Monitoring and Evaluation Specialist	2,513	5,000 /day	510	days	1,281,407	2,550,000
h) Training Coordinator	2,513	5,000 /day	840	days	2,110,553	4,200,000
5. Vehicle rental					10,552,764	21,000,000
a) Sedan (fuel included)	50,251	100,000 /month	100	months	5,025,126	10,000,000
b) 4x4 (fuel included)	50,251	100,000 /month	100	months	5,025,126	10,000,000
c) Other land transportation (taxis, buses, boat, train, etc.)	5,025	10,000 /month	100	months	502,513	1,000,000
6. Office rental					3,600,000	7,164,000
a) Office rental in Gangtok including utilities	30,000	59,700 /month	120	months	3,600,000	7,164,000
8. Domestic communications					536,683	1,068,000
a) Domestic communications (internet, postage, phone, etc.)	2,010	4,000 /PM	267	PM	536,683	1,068,000
9. Office supply					536,683	1,068,000
a) Office supplies	2,010	4,000 /PM	267	PM	536,683	1,068,000
10. Office furniture and equipment					1,507,538	3,000,000
a) Office furniture	251,256	500,000 /set	1	set	251,256	500,000
b) Office equipment (computer, photocopier, etc.)	1,256,281	2,500,000 /set	1	set	1,256,281	2,500,000
11. Report production					502,513	1,000,000
a) Report production	50,251	100,000 /year	10	years	502,513	1,000,000

Annex 23 Benefit valuation

1. Method used for benefit valuation

Production activities were selected for economic analysis of the Project. This annex explains the details of the valuation method and assumptions applied in the analysis.

(1) Increase in tourist number

The tourist number is expected to rise as a result of the Project. This is because of the development of the information base and infrastructure related to ecotourism in Sikkim and the easing of current restrictions on tourist movement which hamper the promotion of tourism.

The increment of the tourist number is calculated based on the assumption that the growth rate of the tourist number in Sikkim will improve to the level equal to the average of India. The following table shows the assumptions used in the estimation.

Table 1 Assumptions about increase in tourist number

	Without project	With project
1. Growth rate-domestic tourist	11.3%	11.7%
2. Growth rate-international tourist	9.5%	10.1%
3. Average spending per stay - domestic		INR 1,500
4. Average spending per stay - international		INR 2,500

The estimations made by the Tourism Department indicate that the average spending per stay is INR 1,500 for a domestic tourist and INR 2,500 for an international tourist, with an assumption of average four days in each stay.

(2) JFM activities (income generation activities)

Detailed income generation activities of each SHG will be decided during the Project implementation. In this calculation SHGs are assumed to have the same conditions except conditions of location and natural environment. SHGs are expected to generate the following economic benefits from respective income generation activities.

1) Income Generation Activities Model 1 (North district)

i. Ginger production

The value of ginger production is calculated based on the following assumptions. These assumptions are based on information obtained from interviews with local NGOs.

Table 2 Assumptions about ginger production

Item	Quantity	Unit and remark
Net economic profit	34	INR/kg
Unit price - local	30	INR/kg
Unit price - international	64	INR/kg
Total production cost	76,580	INR/ha
Seeds (1,800kg, INR 2,000/100kg)	36,000	INR/per ha
Fertilizer	18,000	INR/per ha/year
Mulching materials	2,880	INR/per ha
Labour	19,700	INR/head/day
Land preparation	4,500	Person-days/year
Manuring	3,500	kg/200kg seed
Interculturing, weeding, etc.	6,200	INR/kg
Plant protection	3,000	100kg of sales/farmer
Harvesting, cleaning and transplantation	2,500	INR
Net profit	332,029	INR/ha
Unit production	10,800	kg/ha
Mother rhizome	1,350	kg/ha
Gross unit production	12,150	kg/ha
Gross sales per SHG	1,759,754	
Average landholding per farmer*	0.53	ha
Average production per farmer	6,440	kg
Number of farmers/SHGs	10	

Source: Government of Sikkim, Department of Horticulture and Cash Crops Development, Gangtok; * Horticulture Production in Sikkim, Annual Report, 2006-07

ii. Cardamom production

The value of cardamom production is calculated based on the following assumptions.

Table 3 Assumptions about cardamom production

Item	Quantity	Unit and remark
Unit price local	100	INR/kg
Unit price international	610	INR/kg
Net economic profit	510	INR/kg
Initial cost	42,370	INR
Planting material (4,440 nos@INR 2)	8,880	INR/ha
Manure	8,880	INR/ha
Plant protection (insecticide, sprayer, etc.)	4,610	INR/ha
Labour	15,000	INR/ha
Irrigation cost	5,000	INR/ha
Annual operation and maintenance cost	2,000	INR/per year
Average landholding per farmer	0.25	ha
Average production per farmer	242	kg/year
Total sales	123,376	INR
Net benefit	121,376	INR/ha
Number of farmers/SHG	10	
Net benefit/year/SHG	1,213,764	
Economic life/re-plantation		
Maturity	2	years
Re-plantation cycle	12	years
Number of nursery for re-plantation	4,440	per ha
Unit price per nursery	2	INR (1.5-2.5), other costs inclusive
Re-plantation cost	8,880	INR/ha
Re-plantation cost	88,880	INR/SHG

Source: Department of Horticulture and Cash Crops Development, Government of Sikkim; Spice Board of India, Ministry of Commerce

iii. Animal husbandry

The value of animal husbandry is calculated based on the following assumptions. These assumptions are based on information obtained from an interview with the Rural Management Development Department (RMDD).

Table 4 Assumptions about animal husbandry

Item	Quantity	Unit and remarks
Price of milk (Local price)	18	INR/litre
Price of milk (International price)	40	INR/litre
Initial cost	40,000	
Price of milk cow	20,000	INR/head
Cost of construction of a cowshed (10*10)	20,000	INR/initial investment
Total cost	29,655	INR/year
Land and fodder development	5,000	INR/2 acres
Cost of purchase of milk pail, chains, bucket, rope, etc	1,000	INR/initial investment
Cost of feed for one year (3kg/day, INR 9/kg)	9,855	INR/year
Cost of insurance 6%, with 5% service tax	2,200	INR/year
Cost of labour@INR 3,500/month	8,400	INR/year
Veterinary assistance and medicines	1,200	INR/year
Miscellaneous	2,000	INR/year
Profits		
Price of milk (Local price)	18	INR/litre
Price of milk (International price)	40	INR/ litre
Daily production	10	litre/day
Annual economic profits	80,300	INR/year
Number per SHG	1	
Net profit/SHG	50,645	INR/year
Other assumptions		
Milk cow economic life	10	years
Equipment replacement	10	years

Source: Department of Animal Husbandry, Government of Sikkim

2) Income Generation Activities Model 2 (other districts)

i. Ecotourism service providers (home stay providers)

Table 5 Assumptions about ecotourism service provider

	Item	Qty	Unit and remarks
1	Earnings per stay/per visitor	2,000	INR/stay (3 nights)
2	Expected number of visits per host (SHG)	400	per year
3	Number of SHGs	90	

Source: Study team

The above assumptions have been established through the following process:

- Based upon the result of the field survey and interviews, the current status of home stay providers is estimated. It reveals that the status varies a lot by village. Some host only 30 visitors per year, whereas others receive more than 100.
- The accommodation charges they ask also vary; ranging from INR 150 per overnight stay to INR 1,800 per visit (three overnight stay).
- The number of available rooms ranges from 6 to 12 rooms.

With this information, a successful scenario of this business sector after the Project which includes the improvement of infrastructure and information base, is drawn as follows:

INR 1,800 is used for charge for home stay tourist per stay (3 overnight stay). This may be improved up to INR 3,000, which some successful villagers receive now. Within charge of INR 1,800 approximately INR 500 goes to homestay owners, and the rest goes to other service providers such as guides, cultural performers, etc.

- 6-12 available rooms
- The number of visitors may increase to 300-500. Model case adopts 300 visitors.

ii. Handicraft (carpet) business

Table 6 Assumptions about handicraft business

Item	Quantity	Unit and remarks
Ram materials	128	INR/sq.ft
Labour charges	15	INR/sq.ft
Total production cost	143	INR/sq.ft
Unit price (carpet)	230	INR/sq.ft
Number of SHG members	5	Members
Unit production per member, per day	1	Sq.ft
Unit production per SHG, per day	5	Sq.ft
Expected sales per day	1,150	INR/ SHG
Annual working days	265	Days
Net profit	436	INR/SHG per day

Source: Directorate of Handicrafts and Handlooms, Gangtok

iii. Agricultural production (potato production)

Table 7 Assumptions about agricultural production

Item	Quantity	Unit and remarks
Price		
Unit price (Local)	1,000	INR/100kg
Unit price (International)	2,000	INR/ 100kg
Total production cost	61,750	
1.Raw materials	43,500	INR/ ha
Seed	22,500	
Organic manure	20,000	
Organic chemicals	1,000	
2.Labour	18,250	INR/ ha
Land cleaning	1,500	
Bullock labour	3,750	
Human labour	2,000	
Pulverization of soil	1,500	
Application of manures, etc.	1,000	
Planting of potato	1,500	
Earthing, weeding, etc.	2500	
Plant protection operation	1,500	
Harvesting, drying and storage, etc.	3,000	
Benefit	125,000	INR/ ha
Average yield	1,250	kg
Net profit	63,250	INR/ ha
Average landholding per household	0.81	ha
Number of SHG members	5	per SHG
Net profit per SHG	255,973	INR/ year

Source: Govt. of Sikkim, Department of Horticulture and Cash Crops Development, Gangtok

(3) Sale of timber products by JFMCs

The JFM activities include various measures for forest management and biodiversity conservation. This will create opportunities for commercial timber trade. In this analysis, we apply the following assumptions:

- Income generation activities by JFMCs: a total of 180 villages will be engaged in forest management.
- Each village will plant on 5 hectares of land every year for 4 years, ie, 20 hectares per village.
- All villages will establish a mixed plantation
- Stock table of Darjeeling Division of West Bengal is used to calculate timber growth
- The rates of thinning as indicated in the following table are applied in accordance with the plant maturity.
- The price of timber per cubic metre is INR 6,6951.

Table 8 Assumptions about timber production (rate of thinning)

Year	Rate of thinning (%)	Harvest per ha (in m ³)
Age 25	10%	4.25 m ³
Age 35	15%	16.46 m ³
Age 45	20%	42.47 m ³
Age 55	25%	53.09 m ³

¹ See Section 3.4.5

Other important assumptions are summarized in the next table.

Table 9 Assumptions about EIRR/NPV calculation

Economic benefit - assumptions

(1) Eco-tourism component

With project

1 Growth rate of domestic tourist	11.7%	per annum
2 Growth rate of international tourist	10.1%	per annum
(Without project)		
Growth rate of domestic tourist	11.3%	per annum
Growth rate of international tourist	9.5%	per annum
3 Average spending- Domestic tourist	1,500	INR per stay
4 Average spending- Foreign tourist	2,500	INR per stay

(2) JFM activities (Income generation activities)

Activity-wise breakdown

1) Targeted groups

Model name	village	SHGs	Total	
Model 1 (East, West and South district)	90		3	270
Model 2 (North district)	90		3	270
Total	180		6	540

2) IGAs Model 1

1 Cardamon production	90
2 Ginger production	90
3 Animal husbandry (dairy farming)	90

3) IGAs Model 2

1 Ecotourism service provider	90
2 Handicraft	90
3 Agricultural production (potato)	90
4) Number of members per SHG	10

(3) Forestry production

1 Batch 1	45	villages	
2 Batch 2	45	villages	
3 Batch 3	45	villages	
4 Batch 4	45	villages	
5 Annual plantation	5	ha/villages	
6 Plantation period	4	years	
7 1st thinning	10%	in age 25	4.2m2
8 2nd thinning	15%	in age 35	16.5m2
9 3rd thinning	20%	in age 45	42.5m2
10 4th thinning	20%	in age 55	53.1m2
11 Price of timber	6,695	INR per cubic metre	

(4) Other assumptions

Average landholding per hh	2	acres
1 acre=	4,047	m2
	0.81	ha

Annex 23 Benefit valuation

Based on the assumptions above, the cash flow is summarized as follows:

Table 10 Summary of cash flow

(Unit: Million INR)

		Economic cost				Economic benefit				Cash flow	
Year		Capital cost	O&M cost	Replacement cost	Economic cost total	Eco-tourism	JFM act	Timber product	Economic benefit total	Annual cash flow	Cumulative cash flow
1	2010	119.6	118.4		238.0	2.9	261.8	0.0	264.7	26.7	27
2	2011	386.0	118.4		504.4	6.5	374.6	0.0	381.1	-123.3	(97)
3	2012	603.6	118.4		722.1	10.9	374.6	0.0	385.5	-336.6	(433)
4	2013	685.0	118.4		803.5	16.1	374.6	0.0	390.7	-412.7	(846)
5	2014	634.4	118.4	52.1	805.0	22.4	374.6	0.0	397.1	-407.9	(1,254)
6	2015	366.9	118.4		485.4	30.0	374.5	0.0	404.5	-80.9	(1,335)
7	2016	230.9	118.4		349.3	38.9	374.6	0.0	413.5	64.2	(1,271)
8	2017	130.3	118.4		248.8	49.5	374.6	0.0	424.1	175.4	(1,095)
9	2018	133.7	118.4		252.2	62.0	374.6	0.0	436.6	184.5	(911)
10	2019	93.5	118.4	52.1	264.0	76.7	374.6	0.0	451.3	187.3	(723)
11	2020		118.4		118.4	93.9	372.7	0.0	466.7	348.2	(375)
12	2021		118.4		118.4	114.1	374.6	0.0	488.7	370.2	(5)
13	2022		118.4		118.4	137.6	257.4	0.0	395.0	276.5	272
14	2023		118.4		118.4	164.9	374.6	0.0	539.6	421.1	693
15	2024		118.4	52.1	170.6	196.7	374.5	0.0	571.3	400.7	1,093
16	2025		118.4		118.4	196.7	374.6	0.0	571.4	452.9	1,546
17	2026		118.4		118.4	196.7	374.6	0.0	571.4	452.9	1,999
18	2027		118.4		118.4	196.7	374.6	0.0	571.4	452.9	2,452
19	2028		118.4		118.4	196.7	374.6	0.0	571.4	452.9	2,905
20	2029		118.4	52.1	170.6	196.7	372.7	0.0	569.5	398.9	3,304
21	2030		118.4		118.4	196.7	374.6	0.0	571.4	452.9	3,757
22	2031		118.4		118.4	196.7	374.6	0.0	571.4	452.9	4,210
23	2032		118.4		118.4	196.7	374.6	0.0	571.4	452.9	4,663
24	2033		118.4		118.4	196.7	374.6	0.0	571.4	452.9	5,116
25	2034		118.4	52.1	170.6	196.7	257.3	0.0	454.0	283.5	5,399
26	2035		118.4		118.4	196.7	374.6	0.0	571.4	452.9	5,852
27	2036		118.4		118.4	196.7	374.6	6.4	577.8	459.3	6,311
28	2037		118.4		118.4	196.7	374.6	12.8	584.2	465.7	6,777
29	2038		118.4		118.4	196.7	374.6	19.2	590.6	472.1	7,249
30	2039		118.4	52.1	170.6	196.7	372.7	25.6	595.1	424.5	7,674
31	2040		118.4		118.4	196.7	374.6	19.2	590.6	472.1	8,146
32	2041		118.4		118.4	196.7	374.6	12.8	584.2	465.7	8,611
33	2042		118.4		118.4	196.7	374.6	6.4	577.8	459.3	9,071
34	2043		118.4		118.4	196.7	374.6	0.0	571.4	452.9	9,524
35	2044		118.4	52.1	170.6	196.7	374.5	0.0	571.3	400.7	9,924
36	2045		118.4		118.4	196.7	374.6	0.0	571.4	452.9	10,377
37	2046		118.4		118.4	196.7	257.4	24.8	478.9	360.5	10,738
38	2047		118.4		118.4	196.7	374.6	49.6	620.9	502.5	11,240
39	2048		118.4		118.4	196.7	374.6	74.4	645.7	527.3	11,768
40	2049		118.4	52.1	170.6	196.7	372.7	99.2	668.6	498.1	12,266
41	2050		118.4		118.4	196.7	374.6	74.4	645.7	527.3	12,793
42	2051		118.4		118.4	196.7	374.6	49.6	620.9	502.5	13,295
43	2052		118.4		118.4	196.7	374.6	24.8	596.2	477.7	13,773
44	2053		118.4		118.4	196.7	374.6	0.0	571.4	452.9	14,226
45	2054		118.4	52.1	170.6	196.7	374.5	0.0	571.3	400.7	14,627
46	2055		118.4		118.4	196.7	374.6	0.0	571.4	452.9	15,080
47	2056		118.4		118.4	196.7	374.6	64.0	635.3	516.9	15,597
48	2057		118.4		118.4	196.7	374.6	128.0	699.3	580.9	16,177
49	2058		118.4		118.4	196.7	257.4	191.9	646.1	527.6	16,705
50	2059		118.4	52.1	170.6	196.7	372.7	255.9	825.4	654.8	17,360

EIRR 15.89%

NPV INR 2,183.6 million

(Social discount rate:7%)

Figure 1 Annual cash flow

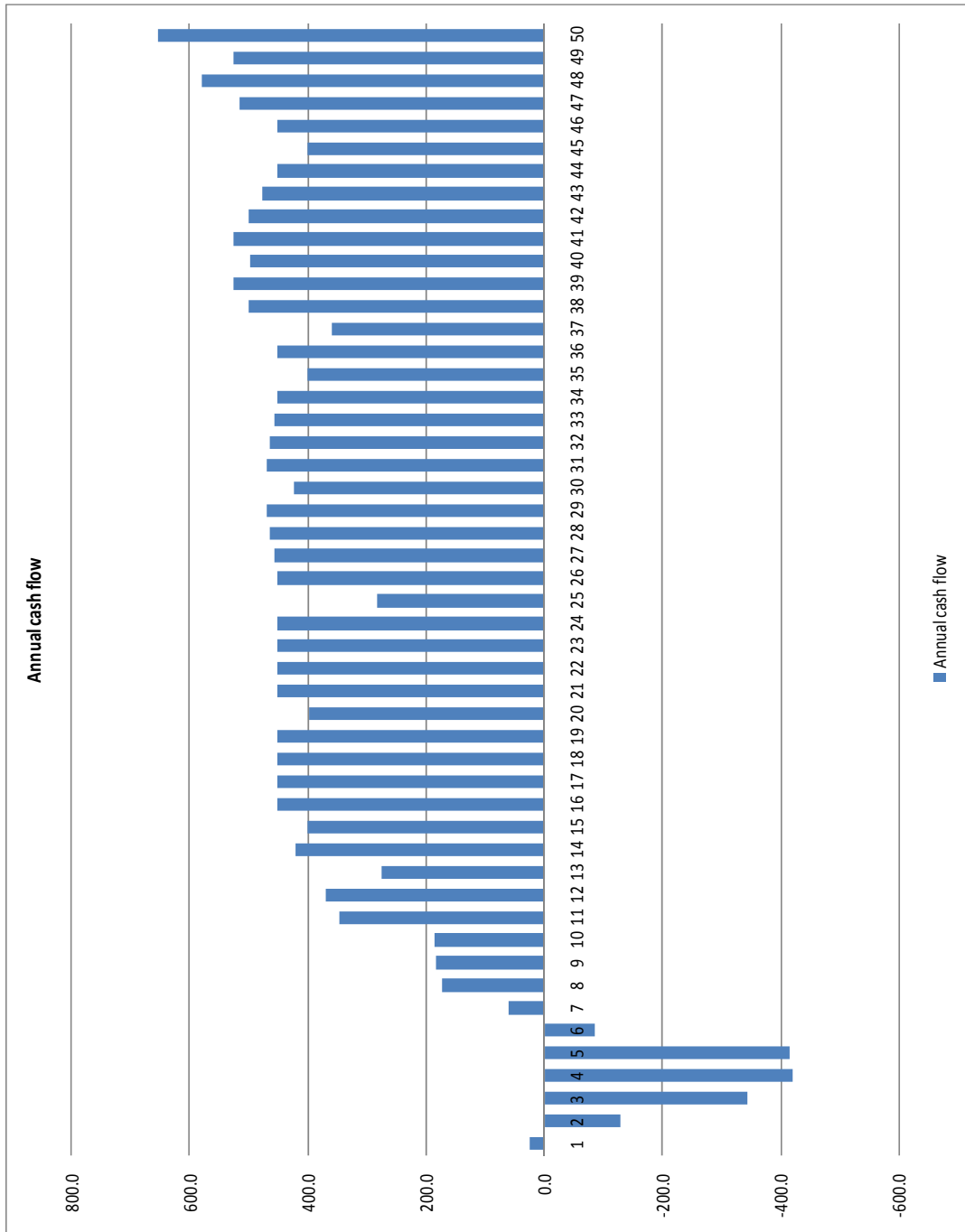


Table 11 Growth scenario of tourist volume

Growth scenario - without project			Growth scenario - with project			Net increment portion by the project			Gross spending (in million Rupees)			gross total		
	Domestic	International	Domestic	International	Domestic	International	Domestic	International	Domestic	International				
0	2008	460,564	19,154	460,564	19,154	0	2008	-	-	-	0	2008	-	-
1	2009	512,517	20,974	514,271	21,091	1	2009	1,753	117	2.6	1	2009	2.6	0.3
2	2010	570,331	22,966	574,240	23,223	2	2010	3,909	257	5.9	2	2010	5.9	0.6
3	2011	634,667	25,148	641,203	25,572	3	2011	6,536	424	9.8	3	2011	9.8	1.1
4	2012	706,259	27,537	715,974	28,157	4	2012	9,715	620	14.6	4	2012	14.6	1.6
5	2013	785,928	30,153	799,465	31,005	5	2013	13,537	852	20.3	5	2013	20.3	2.1
6	2014	874,584	33,018	892,691	34,140	6	2014	18,107	1,122	27.2	6	2014	27.2	2.8
7	2015	973,240	36,154	996,788	37,592	7	2015	23,549	1,437	35.3	7	2015	35.3	3.6
8	2016	1,083,025	39,589	1,113,025	41,393	8	2016	30,000	1,804	45.0	8	2016	45.0	4.5
9	2017	1,205,194	43,350	1,242,816	45,578	9	2017	37,622	2,228	56.4	9	2017	56.4	5.6
10	2018	1,341,144	47,468	1,387,742	50,187	10	2018	46,597	2,719	69.9	10	2018	69.9	6.8
11	2019	1,492,431	51,977	1,549,567	55,262	11	2019	57,137	3,284	85.7	11	2019	85.7	8.2
12	2020	1,660,782	56,915	1,730,264	60,849	12	2020	69,481	3,934	104.2	12	2020	104.2	9.8
13	2021	1,848,125	62,322	1,932,031	67,002	13	2021	83,907	4,680	125.9	13	2021	125.9	11.7
14	2022	2,056,600	68,243	2,157,327	73,777	14	2022	100,727	5,534	151.1	14	2022	151.1	13.8
15	2023	2,288,592	74,726	2,408,895	81,237	15	2023	120,303	6,511	180.5	15	2023	180.5	16.3
16	2024	2,288,592	74,726	2,408,895	81,237	16	2024	120,303	6,511	180.5	16	2024	180.5	16.3
17	2025	2,288,592	74,726	2,408,895	81,237	17	2025	120,303	6,511	180.5	17	2025	180.5	16.3
18	2026	2,288,592	74,726	2,408,895	81,237	18	2026	120,303	6,511	180.5	18	2026	180.5	16.3
19	2027	2,288,592	74,726	2,408,895	81,237	19	2027	120,303	6,511	180.5	19	2027	180.5	16.3
20	2028	2,288,592	74,726	2,408,895	81,237	20	2028	120,303	6,511	180.5	20	2028	180.5	16.3
21	2029	2,288,592	74,726	2,408,895	81,237	21	2029	120,303	6,511	180.5	21	2029	180.5	16.3
22	2030	2,288,592	74,726	2,408,895	81,237	22	2030	120,303	6,511	180.5	22	2030	180.5	16.3
23	2031	2,288,592	74,726	2,408,895	81,237	23	2031	120,303	6,511	180.5	23	2031	180.5	16.3
24	2032	2,288,592	74,726	2,408,895	81,237	24	2032	120,303	6,511	180.5	24	2032	180.5	16.3
25	2033	2,288,592	74,726	2,408,895	81,237	25	2033	120,303	6,511	180.5	25	2033	180.5	16.3
26	2034	2,288,592	74,726	2,408,895	81,237	26	2034	120,303	6,511	180.5	26	2034	180.5	16.3
27	2035	2,288,592	74,726	2,408,895	81,237	27	2035	120,303	6,511	180.5	27	2035	180.5	16.3
28	2036	2,288,592	74,726	2,408,895	81,237	28	2036	120,303	6,511	180.5	28	2036	180.5	16.3
29	2037	2,288,592	74,726	2,408,895	81,237	29	2037	120,303	6,511	180.5	29	2037	180.5	16.3
30	2038	2,288,592	74,726	2,408,895	81,237	30	2038	120,303	6,511	180.5	30	2038	180.5	16.3
31	2039	2,288,592	74,726	2,408,895	81,237	31	2039	120,303	6,511	180.5	31	2039	180.5	16.3
32	2040	2,288,592	74,726	2,408,895	81,237	32	2040	120,303	6,511	180.5	32	2040	180.5	16.3
33	2041	2,288,592	74,726	2,408,895	81,237	33	2041	120,303	6,511	180.5	33	2041	180.5	16.3
34	2042	2,288,592	74,726	2,408,895	81,237	34	2042	120,303	6,511	180.5	34	2042	180.5	16.3
35	2043	2,288,592	74,726	2,408,895	81,237	35	2043	120,303	6,511	180.5	35	2043	180.5	16.3
36	2044	2,288,592	74,726	2,408,895	81,237	36	2044	120,303	6,511	180.5	36	2044	180.5	16.3
37	2045	2,288,592	74,726	2,408,895	81,237	37	2045	120,303	6,511	180.5	37	2045	180.5	16.3
38	2046	2,288,592	74,726	2,408,895	81,237	38	2046	120,303	6,511	180.5	38	2046	180.5	16.3
39	2047	2,288,592	74,726	2,408,895	81,237	39	2047	120,303	6,511	180.5	39	2047	180.5	16.3
40	2048	2,288,592	74,726	2,408,895	81,237	40	2048	120,303	6,511	180.5	40	2048	180.5	16.3
41	2049	2,288,592	74,726	2,408,895	81,237	41	2049	120,303	6,511	180.5	41	2049	180.5	16.3
42	2050	2,288,592	74,726	2,408,895	81,237	42	2050	120,303	6,511	180.5	42	2050	180.5	16.3
43	2051	2,288,592	74,726	2,408,895	81,237	43	2051	120,303	6,511	180.5	43	2051	180.5	16.3
44	2052	2,288,592	74,726	2,408,895	81,237	44	2052	120,303	6,511	180.5	44	2052	180.5	16.3
45	2053	2,288,592	74,726	2,408,895	81,237	45	2053	120,303	6,511	180.5	45	2053	180.5	16.3
46	2054	2,288,592	74,726	2,408,895	81,237	46	2054	120,303	6,511	180.5	46	2054	180.5	16.3
47	2055	2,288,592	74,726	2,408,895	81,237	47	2055	120,303	6,511	180.5	47	2055	180.5	16.3
48	2056	2,288,592	74,726	2,408,895	81,237	48	2056	120,303	6,511	180.5	48	2056	180.5	16.3
49	2057	2,288,592	74,726	2,408,895	81,237	49	2057	120,303	6,511	180.5	49	2057	180.5	16.3
50	2058	2,288,592	74,726	2,408,895	81,237	50	2058	120,303	6,511	180.5	50	2058	180.5	16.3

Table 12 Cash flow from JFM income generation activities

		Model 1				Model 2				Total
Year		Cardamon	Ginger	Animal husbandry	M1 Total	Eco-tourism	Handicraft	Agiculture	M2 Total	M1+M2
0	2008				0				0	0
1	2009	-	158.38	0.96	159.34	72	20.8	9.7	102.5	261.8
2	2010	109.2	158.38	4.56	272.17	72	20.8	9.7	102.5	374.6
3	2011	109.2	158.38	4.56	272.17	72	20.8	9.7	102.5	374.6
4	2012	109.2	158.38	4.56	272.17	72	20.8	9.7	102.5	374.6
5	2013	109.2	158.38	4.56	272.17	72	20.8	9.7	102.5	374.6
6	2014	109.2	158.38	4.47	272.08	72	20.8	9.7	102.5	374.5
7	2015	109.2	158.38	4.56	272.17	72	20.8	9.7	102.5	374.6
8	2016	109.2	158.38	4.56	272.17	72	20.8	9.7	102.5	374.6
9	2017	109.2	158.38	4.56	272.17	72	20.8	9.7	102.5	374.6
10	2018	109.2	158.38	4.56	272.17	72	20.8	9.7	102.5	374.6
11	2019	109.2	158.38	2.67	270.28	72	20.8	9.7	102.5	372.7
12	2020	109.2	158.38	4.56	272.17	72	20.8	9.7	102.5	374.6
13	2021	(8.0)	158.38	4.56	154.94	72	20.8	9.7	102.5	257.4
14	2022	109.2	158.38	4.56	272.17	72	20.8	9.7	102.5	374.6
15	2023	109.2	158.38	4.47	272.08	72	20.8	9.7	102.5	374.5
16	2024	109.2	158.38	4.56	272.17	72	20.8	9.7	102.5	374.6
17	2025	109.2	158.38	4.56	272.17	72	20.8	9.7	102.5	374.6
18	2026	109.2	158.38	4.56	272.17	72	20.8	9.7	102.5	374.6
19	2027	109.2	158.38	4.56	272.17	72	20.8	9.7	102.5	374.6
20	2028	109.2	158.38	2.67	270.28	72	20.8	9.7	102.5	372.7
21	2029	109.2	158.38	4.56	272.17	72	20.8	9.7	102.5	374.6
22	2030	109.2	158.38	4.56	272.17	72	20.8	9.7	102.5	374.6
23	2031	109.2	158.38	4.56	272.17	72	20.8	9.7	102.5	374.6
24	2032	109.2	158.38	4.56	272.17	72	20.8	9.7	102.5	374.6
25	2033	(8.0)	158.38	4.47	154.85	72	20.8	9.7	102.5	257.3
26	2034	109.2	158.38	4.56	272.17	72	20.8	9.7	102.5	374.6
27	2035	109.2	158.38	4.56	272.17	72	20.8	9.7	102.5	374.6
28	2036	109.2	158.38	4.56	272.17	72	20.8	9.7	102.5	374.6
29	2037	109.2	158.38	4.56	272.17	72	20.8	9.7	102.5	374.6
30	2038	109.2	158.38	2.67	270.28	72	20.8	9.7	102.5	372.7
31	2039	109.2	158.38	4.56	272.17	72	20.8	9.7	102.5	374.6
32	2040	109.2	158.38	4.56	272.17	72	20.8	9.7	102.5	374.6
33	2041	109.2	158.38	4.56	272.17	72	20.8	9.7	102.5	374.6
34	2042	109.2	158.38	4.56	272.17	72	20.8	9.7	102.5	374.6
35	2043	109.2	158.38	4.47	272.08	72	20.8	9.7	102.5	374.5
36	2044	109.2	158.38	4.56	272.17	72	20.8	9.7	102.5	374.6
37	2045	(8.0)	158.38	4.56	154.94	72	20.8	9.7	102.5	257.4
38	2046	109.2	158.38	4.56	272.17	72	20.8	9.7	102.5	374.6
39	2047	109.2	158.38	4.56	272.17	72	20.8	9.7	102.5	374.6
40	2048	109.2	158.38	2.67	270.28	72	20.8	9.7	102.5	372.7
41	2049	109.2	158.38	4.56	272.17	72	20.8	9.7	102.5	374.6
42	2050	109.2	158.38	4.56	272.17	72	20.8	9.7	102.5	374.6
43	2051	109.2	158.38	4.56	272.17	72	20.8	9.7	102.5	374.6
44	2052	109.2	158.38	4.56	272.17	72	20.8	9.7	102.5	374.6
45	2053	109.2	158.38	4.47	272.08	72	20.8	9.7	102.5	374.5
46	2054	109.2	158.38	4.56	272.17	72	20.8	9.7	102.5	374.6
47	2055	109.2	158.38	4.56	272.17	72	20.8	9.7	102.5	374.6
48	2056	109.2	158.38	4.56	272.17	72	20.8	9.7	102.5	374.6
49	2057	(8.0)	158.38	4.56	154.94	72	20.8	9.7	102.5	257.4
50	2058	109.2	158.38	2.67	270.28	72	20.8	9.7	102.5	372.7

Table 13 Schedule of planting and thinning, and estimated sales of timber

	Batch 1	Batch 2	Batch 3	Batch 4	Total area	Total size of thinning (m ³)	Annual revenue (INR)
Year 1					0		0
Year 2					0		0
Year 3	225				225		0
Year 4	225	225			450		0
Year 5	225	225	225		675		0
Year 6	225	225	225	225	900		0
Year 7		225	225	225	675		0
Year 8			225	225	450		0
Year 9				225	225		0
Year 10					0		0
Year 11					0		0
Year 12					0		0
Year 13					0		0
Year 14					0		0
Year 15					0		0
Year 16					0		0
Year 17					0		0
Year 18					0		0
Year 19					0		0
Year 20					0		0
Year 21					0		0
Year 22					0		0
Year 23					0		0
Year 24					0		0
Year 25					0		0
Year 26					0		0
Year 27	225				225	956	6,397,575
Year 28	225	225			450	1,911	12,795,149
Year 29	225	225	225		675	2,867	19,192,724
Year 30	225	225	225	225	900	3,822	25,590,299
Year 31		225	225	225	675	2,867	19,192,724
Year 32			225	225	450	1,911	12,795,149
Year 33				225	225	956	6,397,575
Year 34					0		-
Year 35					0		-
Year 36					0		-
Year 37	225				225	3,703	24,791,920
Year 38	225	225			450	7,406	49,583,840
Year 39	225	225	225		675	11,109	74,375,759
Year 40	225	225	225	225	900	14,812	99,167,679
Year 41		225	225	225	675	11,109	74,375,759
Year 42			225	225	450	7,406	49,583,840
Year 43				225	225	3,703	24,791,920
Year 44					0	-	-
Year 45					0		-
Year 46					0		-
Year 47	225				225	9,557	63,981,772
Year 48	225	225			450	19,113	127,963,544
Year 49	225	225	225		675	28,670	191,945,315
Year 50	225	225	225	225	900	38,227	255,927,087

Annex 24

Terms of reference of specialists for Components 2, 3, and 4

Relevant cost table: **Table C2-1-2 Inventory and monitoring of biodiversity**

Position: ***Biodiversity inventory specialist***

No. of specialists: 4 in Year 2

Service duration: 12 months/person/year

Fee level: INR 89,000/month

Technical level: National junior consultant/researcher

- (1) Education, qualifications, and required technical and language skills
 - a) Minimum of 5 years of work or research experience in the field of ecology, taxonomy, animal science, botany, biology, or forestry
 - b) At least a bachelor's degree in one of the above fields
 - c) Good knowledge of biodiversity management policies, laws, and regulations of Sikkim
 - d) Good knowledge of flora and fauna in Sikkim
 - e) Excellent communication skills in English
 - f) Good mountaineering knowledge and experience
- (2) Terms of reference
 - a) Work under the supervision of a regional or international biodiversity specialist
 - b) Identify and visit 1,000 randomly-selected locations throughout Sikkim for biodiversity inventory using GPS
 - c) Identify and enumerate selected animal and plant species at the selected locations
 - d) Collect plant and animal specimens for their identification
 - e) Record and assemble field-collected data to integrate them into the GIS bio-database established in the Forest Department

Relevant cost table: **Table C2-1-3 Study of impacts of climate change and grazing in the Himalayan ecosystem**

Position: ***Alpine climate expert***

No. of specialists: 1 in Year 3

Service duration: 1 month/person/year

Fee level: INR 300,000/month

Technical level: National senior consultant/researcher

- (1) Education, qualifications, and required technical and language skills
 - a) Minimum of 15 years of work or research experience in the field of alpine climate and ecosystems, human and ecosystem interactions in alpine areas, and glaciology
 - b) At least a master's degree in the above fields
 - c) Good knowledge of climate change and its impacts in Himalayan alpine areas
 - d) Good knowledge of alpine climate and ecosystems in Sikkim
 - e) Excellent English writing and communication skills
- (2) Terms of reference
 - a) Evaluate the past and current status of the alpine climate in Sikkim
 - b) Develop a research plan for monitoring climate change impacts in alpine areas
 - c) Establish research and monitoring sites to capture the impacts of climate change on the alpine ecosystem and on socioeconomic conditions
 - d) Train Forest Department officials and graduate students for data collection, analyses, and reporting

Position: *In-state expert*

No. of specialists: 1 in Year 3

Service duration: 1 month/person/year

Fee level: INR 80,000/month

Technical level: National junior researcher

(1) Education, qualifications, and required technical and language skills

- a) Minimum of 10 years of teaching and research experience at well-known universities in India in the field of alpine climate, ecosystem, economics, sociology, and environmental policy, or other fields relevant to the objectives of this Project
- b) At least a master's degree in the above fields
- c) Good knowledge of alpine climate and ecosystems in Sikkim
- d) Excellent teaching and training skills
- e) Excellent English writing and communication skills

(2) Terms of reference

- a) Assist the Supervisor to conduct research on grazing impacts
- b) Evaluate the past and current status of interactions between the Himalayan ecosystem and grazing in Sikkim
- c) Develop a research plan for monitoring the ecosystem and grazing impacts
- d) Establish research and monitoring sites to capture the impacts of grazing on the alpine ecosystem and on socioeconomic conditions
- e) Train Forest Department officials and graduate students for data collection, analysis, and reporting

Position: *Supervisor*

No. of specialists: 1 in Year 3

Service duration: 1 month/person/year

Fee level: INR 100,000/month

Technical level: National senior researcher

(1) Education, qualifications, and required technical and language skills

- a) Minimum of 15 years of teaching and research experience at well-known universities in India in the field of alpine climate, ecosystem, economics, sociology, and environmental policy, or other fields relevant to the objectives of this Project
- b) At least a master's degree in the above fields
- c) Good knowledge of the alpine climate and ecosystems in Sikkim
- d) Excellent teaching and training skills
- e) Excellent English writing and communication skills

(2) Terms of reference

- a) Evaluate the past and current status of interactions between the Himalayan ecosystem and grazing in Sikkim
- b) Develop a research plan for monitoring the ecosystem and grazing impacts
- c) Establish research and monitoring sites to capture the impacts of grazing on the alpine ecosystem and on socioeconomic conditions
- d) Train Forest Department officials and graduate students for data collection, analysis, and reporting

Relevant cost table: Table C2-2-2 Management and conservation of flagship species habitats

Position: *Flagship species surveyor*

No. of specialists: 8 each in Years 2, 3, 6, and 7

Service duration: 12 months/person/year total in Years 2 and 3; 8 months/person/year total in Years 6 and 7

Fee level: INR 40,000/month

Technical level: National and junior consultant/researcher

- (1) Education, qualifications, and required technical and language skills
 - a) Minimum of 1 to 3 years of work experience in the field of animal science, biology, ecology, taxonomy, botany, or forestry
 - b) At least a bachelor's degree in the above fields
 - c) Good knowledge of flora and fauna in Sikkim
 - d) Good communication skill in English
 - e) Good mountaineering knowledge and experience
- (2) Terms of reference
 - a) Work under the supervision of a regional or international animal science specialist
 - b) Conduct the identification, observation, and enumeration of selected flagship species at the selected research areas
 - c) Assist the animal science specialist to assemble and analyse field-collected data and to integrate them into the GIS bio-database established in the Forest Department
 - d) Collect plant and animal photographs and specimens for their identification

Relevant cost table: Table C2-3-1 Facilitation of inscription process of Khangchendzonga Biosphere Reserve on the World Heritage List

Position: *National expert*

No. of specialists: 2 in Year 2

Service duration: 3 months/person/year

Fee level: INR 300,000/month

Technical level: National and senior consultant/researcher

- (1) Education, qualifications, and required technical and language skills
 - a) Minimum of 20 years of work or research experience in the field of protected area management, natural resources management, or biodiversity conservation
 - b) At least a master's degree or preferably a Ph. D. in the field of natural resources management, economics, sociology, anthropology, ecology, or biology
 - c) Good knowledge of natural and socioeconomic conditions of Khangchendzonga Biosphere Reserve (KBR) and the process of inscription on World Heritage List
 - d) Experience working with UNESCO-related projects in India or elsewhere
 - e) Excellent English writing and communication skills
- (2) Terms of reference
 - a) Support Forest Department officials in the inscription of the KBR on the World Heritage List
 - b) Evaluate the past and current status of natural and socioeconomic conditions in the KBR and its vicinity in Sikkim, and identify significance of KBR for the inscription
 - c) Follow up on the inscription process and identify and address obstacles and issues
 - d) Conduct supplementary or additional studies required to facilitate the inscription process

Relevant cost table: Table C2-4-2 Knowledge generation and dissemination of biodiversity and best practice information

Position: *Limnology expert*

No. of specialists: 1

Service duration: 4 months/person/year

Fee level: INR 100,000/month

Technical level: National researcher

- (1) Education, qualifications, and required technical and language skills
 - a) Minimum of 15 years of teaching and research experience at well-known universities in India in the field of limnology
 - b) At least a master's degree in limnology, preferably a Ph. D. in the same or related fields
 - c) Good knowledge of the establishment of water analysis laboratories, equipment, and their maintenance
 - d) Excellent teaching and training skills
 - e) Excellent English writing and communication skills
- (2) Terms of reference
 - a) Undertake the improvement of the water analysis laboratory, the procurement and installation of laboratory equipment, and the training of laboratory staff members for the operation and maintenance of the equipment
 - b) Study the physical, chemical, meteorological, and biological conditions in fresh waters in Sikkim, especially of ponds and lakes, to evaluate pollution levels
 - c) Establish monitoring sites to evaluate the dynamics of pollution and its impacts on environment
 - d) Train Forest Department officials and graduate students for conduct data collection, analysis, and reporting

Relevant cost table: Table C3-3-1 Development of high-end ecolodges

Position: *Consultant*

No. of specialists: 1 each in Years 2 and 3

Service duration: 2 months/person/year in Year 2; 1 month/person/year in Year 3

Fee level: INR 600,000/month

Technical level: Regional senior consultant

- (1) Education, qualifications, and required technical and language skills
 - a) Minimum of 15 years of work or research experience in the field of hotel management, marketing/advertisement, and corporate law
 - b) Work experience as senior manager or similar position of a private, profit-based hotel
 - c) At least a master's degree in the above fields
 - d) Good knowledge of profit-making hotel management, marketing/advertisement, and related law and regulations of Sikkim
 - e) Excellent communication skills in English
- (2) Terms of reference
 - a) Lead the detailed design of ecolodges including their conceptual design, layout plans, and marketing/advertisement policies
 - b) Develop the management policies and management boards of ecolodges
 - c) Coordinate related legal processes necessary for ecolodge operation such as registration, and the acquisition of permits
 - d) Develop staff employment plans and internal training policies and systems

Relevant cost table: Table C3-3-2 Development of trekking routes

Position: Consultant

No. of specialists: 2 in Year 3

Service duration: 2 months/person/year

Fee level: INR 210,000/month

Technical level: National senior consultant

- (1) Education, qualifications, and required technical and language skills
 - a) Minimum of 15 years of work or research experience in the field of ecotourism,.
 - b) Work experience as trekking guide and/or in other types of nature excursions
 - c) At least degree bachelor's degree in the above fields
 - d) Good mountaineering knowledge and experience
 - e) Excellent communication skills in English
- (2) Terms of reference
 - a) Lead the detailed design of trekking routes, including layout plans and technical specifications
 - b) Develop a business plan and management policies, including a security guideline
 - c) Coordinate related legal processes necessary for ecolodge operation such as registration, and the acquisition of permits
 - d) Develop staff employment plans and internal training policies and systems

Relevant cost table: Table C3-3-3 Development of mountain bike trails

Position: Consultant

No. of specialists: 1 in Year 3

Service duration: 0.33 months/person/year

Fee level: INR 210,000/month

Technical level: National senior consultant

- (1) Education, qualifications, and required technical and language skills
 - a) Minimum of 15 years of work or research experience in the field of ecotourism and/or other types of adventure sports.
 - b) Work experience as developer of adventure sports and/or other types of nature excursions.
 - c) At least a bachelor's degree in the above fields
 - d) Good mountaineering knowledge and experience
 - e) Excellent communication skills in English
- (2) Terms of reference
 - a) Lead the detailed design of mountain bike trails, including layout plans and technical specifications
 - b) Develop a business plan and management policies, including a security guideline
 - c) Coordinate related legal processes necessary for ecolodge operation such as registration, and the acquisition of permits
 - d) Develop staff employment plans and internal training policies and systems

Relevant cost table: Table C3-3-4 Development of rock climbing areas

Position: Consultant

No. of specialists: 1 in Year 4

Service duration: 0.33 months/person/year

Fee level: INR 210,000/month

Technical level: National senior consultant

- (1) Education, qualifications, and required technical and language skills
 - a) Minimum of 15 years of work experience in the field of adventure sports.
 - b) Work experience as developer of adventure sports and/or other types of nature excursions.
 - c) At least a bachelor's degree in the above fields
 - d) Good mountaineering knowledge and experience
 - e) Excellent communication skills in English
- (2) Terms of reference
 - a) Lead the detailed design of rock climbing areas, including layout plans and technical specifications
 - b) Develop a business plan and management policies, including a security guideline
 - c) Coordinate related legal processes necessary for ecolodge operation such as registration, and the acquisition of permits
 - d) Develop staff employment plans and internal training policies and systems

Relevant cost table: Table C3-3-5 Development of wildlife-watching areas

Position: Winter surveyor

No. of specialists: 4 in Year 3

Service duration: 2 months/person/year

Fee level: INR 10,000/month

Technical level: National assistant consultant/researcher

- (1) Education, qualifications, and required technical and language skills
 - a) At least university undergraduate or graduate student studying animal science, biology, ecology, taxonomy, botany, or forestry
 - c) Good knowledge of flora and fauna in Sikkim
 - d) Good communication skills in English
 - e) Good mountaineering knowledge and experience
- (2) Terms of reference
 - a) Work under supervision of the national wildlife specialist
 - b) Conduct the identification, observation, and enumeration of selected wildlife species at the selected wildlife-watching areas to evaluate probability of their citing
 - c) Assist selection and establishment of wildlife watching areas
 - d) Assist the wildlife specialist to assemble and analyse field collected data and to integrate them into the GIS bio-database established in the Forest Department
 - e) Collect plant and animal photographs and specimens for their identification

Position: Breeding season surveyor

No. of specialists: 4 in Year 4

Service duration: 3 months/person/year

Fee level: INR 10,000/month

Technical level: National assistant consultant/researcher

Annex 24 Terms of reference of specialists for Components 2, 3, and 4

- (1) Education, qualifications, and required technical and language skills
 - a) At least university undergraduate or graduate student studying animal science, biology, ecology, taxonomy, botany, or forestry
 - c) Good knowledge of flora and fauna in Sikkim
 - d) Good communication skills in English
 - e) Good mountaineering knowledge and experience
- (2) Terms of reference
 - a) Work under supervision of the national wildlife specialist
 - b) Conduct the identification, observation, and enumeration of selected wildlife species during their breeding seasons at the selected wildlife-watching areas to evaluate their sighting probability and their breeding behaviours
 - c) Assist the selection and establishment of wildlife watching areas
 - d) Assist the wildlife specialist to assemble and analyse field collected data and to integrate them in the GIS bio-database established in the Forest Department
 - e) Collect plant and animal photographs and specimens for their identification

Relevant cost table: Table C4-1-1 Preparation of JFMC/EDC/PSS management manual

Position: Forest management specialist

No. of specialists: 1 person in Year 2

Service duration: 1.5 months/person/year

Fee level: INR 210,000/month

Technical level: National senior consultant

- (1) Education, qualifications, and required technical and language skills
 - a) Minimum of 15 years of consulting experience in the area of forest management
 - b) Good knowledge of forest management policies, laws, and regulations of Sikkim
 - c) Good knowledge of joint forest management practices in Sikkim
 - d) Excellent English writing and communication skills
 - e) Capacity to establish good relations with the Department of Forest, Environment and Wildlife Management of Sikkim
- (2) Terms of reference
 - a) Prepare JFMC/EDC/PPS management manual in English in consultation with Forest Department and PMU staff
 - b) Translate the manual into Nepali and other local languages as necessary
 - c) Train Forest Department personnel to explain and apply and use the JFMC/EDC/PPS management manual

Position: Community development specialist

No. of specialists: 1 in Year 2

Service duration: 1.5 months/person/year

Fee level: INR 210,000/month

Technical level: National senior consultant

- (1) Education, qualifications, and required technical and language skills
 - a) Minimum of 15 years of consulting experience in the area of rural development
 - b) Good knowledge of community development policies, laws, and regulations of Sikkim
 - c) Good knowledge of socio-economic environment in rural areas of Sikkim
 - d) Excellent English writing and communication skills
 - e) Capacity to establish good relations with the Department of Forest of Sikkim, JFM/EDC/PPS members, and other related stakeholders

(2) Terms of reference

- a) Prepare JFMC/EDC/PPS management manual in English in consultation with Forest Department and PMU staff
- b) Translate the manual into Nepali and other local languages as necessary
- c) Train JFM/EDC/PPS members to apply and use the JFMC/EDC/PPS management manual

Relevant cost table: Table C4-1-2 Marketing study

Position: Marketing specialist

No. of specialists: 1 in Year 2

Service duration: 4 months/person/year

Fee level: INR 210,000/month

Technical level: National senior consultant

(1) Education, qualifications, and required technical and language skills

- a) Minimum of 15 years of consulting experience in the area of marketing/advertisement policy
- b) Work experience as marketing planner in the field of rural business and tourism
- c) Good knowledge of the socioeconomic environment in the rural areas of Sikkim
- d) Good knowledge of policies, laws, and regulations of Sikkim
- e) Excellent English writing and communication skills

(2) Terms of reference

- a) Study and review the current ecotourism marketing practices in rural areas of Sikkim and develop ecotourism marketing strategies and plans
- b) Study the legal processes necessary for the implementation of the tourism marketing policy
- c) Train Forest Department officials to apply the tourism marketing strategies

Position: Handicraft marketing specialist

No. of specialists: 1 person in the second year

Service duration: 2 months/person/year

Fee level: INR 210,000/month

Technical level: National senior consultant

(1) Education, qualifications, and required technical and language skills

- a) Minimum of 15 years of experience in the design, production, and sales of handicrafts
- b) Practical knowledge of quality standards and business regulations of Sikkim
- c) Excellent communication skills in the local language(s)

(2) Terms of reference

- a) Study and review current marketing policy of handicrafts in Sikkim and develop or improve the handicraft marketing policy
- b) Study the legal processes necessary for implementation of the handicraft marketing policy
- c) Train Forest Department officials to apply the marketing policy

Relevant cost table: Table C4-5-6 Training on ecotourism

Position: Instructor

No. of specialists: 2 each in Years 4, 6, 7; 1 in Year 5

Service duration: 0.33 months/person/year

Fee level: INR 75,000/month

Technical level: National junior consultant

Annex 24 Terms of reference of specialists for Components 2, 3, and 4

- (1) Education, qualifications, and required technical and language skills
 - a) At least 5 years of work experience as ecotourism guide
 - b) At least a bachelor's degree in the above or related field
 - c) Good knowledge of flora and fauna in Sikkim
 - d) Good communication skills in English
 - e) Good mountaineering knowledge and experience
- (2) Terms of reference
 - a) Work under supervision of a marketing specialist
 - b) Train JFM/EDC/PSS members to work as ecotourism service providers