Kailash Sacred Landscape Conservation Initiative
Feasibility Assessment Report - Nepal

2010

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Central Department of Botany
Tribhuvan University, Kirtipur, Nepal

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Foreword

MFSC

Preface

The MInistry of Forests and Soil Conservation (MFSC) and International Centre for Integrated Mountain Development (ICIMOD) signed a Letter of Agreement (LoA) for the implementation of Kailash Sacred Landscape Conservation Initiative (KSLCI) project with an aim of promoting an ecosystem approach for important transboundary landscape. The ICIMOD and UNEP have entered into an MOU to jointly work in the KSLCI.

The LoA signed by the MFSC and ICIMOD entrusted to the Central Department of Botany, Tribhuvan University (TU) as the lead partner for the KSLCI project implementation. The KSLCI project encourages cooperation to address the challenges of global climate and other environmental changes in the Kailash Sacred Landscape (KSL)-Nepal and the region, and promoting sustainable development.

The KSL-Nepal comprises four districts in Nepa – Baitadi, Darchula, Bajhang, and Humla, located in far-western and mid-western region in Nepal. The region, at present represents remotest part of the country from development indices, although houses rich biological and cultural diversity. Unfortunately, the region also lacks basic climatic, ecological, socio-economic and socio-cultural data, and the knowledge base required for long-tern effective cultural landscape conservation.

The Feasibility Assessment Report-Nepal part is the first outcome of the KSLCI project. It is prepared thorugh available literature search, field study, consultations with officials of the government departments, diverse stakeholders at national and district/village level, and with various experts. The extensive onsite field study and consultations with the communities and NGOs provided valuable information to identify the existing gaps, and the priorities for future plans.

We consider that the status report will provide strong basis for preparation of conservation strategy, comprehensive environmental monitoring plan for Nepal part, and they would lead to the process of developing Regional Cooperation Framework (RCF) for the KSL-region.

We acknowledge the MFSC, MoEn, and ICIMOD for their constant help and guidance to accomplish this work including financial support from UNEP through ICIMOD.

We sincerely thank all the experts for providing valuable information to prepare this report.

During the project, encouragements, inspirations, and guidance that we have received from the steering committee are thankfully acknowledged.

The work would not have been accompluished without genetrous help from local communities, social workers, officers working at government and non-government organizations who shared their valuable knowledge and information with us, and helped during the field work.

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Acronyms and Abbreviations

ANCA	Api Nampa Conservation Area
B.S.	Bikram Samvat
BOD	Biological Oxygen Demand
BOOT	Build, Operate and Ownership Transfer
BPP	Biodiversity Profile Project
BZMR	Buffer Zone Management Regulation
CABI	Center for Agricultural Bioscience International
CBD	Convention on Biological Diversity
CBO	Community Based Organization
CBS	Central Bureau of Statistics
CCN	Climate Change Network
CDM	Clean Development Mechanism
CFUG	Community Forest User Group
CITES	Convention on International Trade of Endangered Species of Fauna and Flora
COP	Conference of Parties
DCA	Detrended Correspondence Analysis
DDC	District Development Committee
DFO	District Forest Office
DHM	Department of Hydrology and Meteorology
DLSO	District Livestock Service Office
DNA	Designated National Authority
DNPWC	Department of National Parks and Wildlife Conservation
DO	Dissolved Oxygen
DoA	Department of Archaeology
EIA	Environmental Impact Assessment
EPA	Environmental Protection Act
FAO	Food and Agriculture Organization
FNCCI	Federation of Nepal Chamber of Commerce and Industry
GHG	Greenhouse Gas
GISP	Global Invasive Species Program
GLM	Generalized Linear Model
GLOF	Glacial lake Outburst Flood
ha	Hectare
HMG	His Majesty's Government
HHs	Households
IAS	Invasive Alien Species
IBA	Important Bird Area
ICIMOD	International Centre for Integrated Mountain Development
IEE	Initial Environmental Examination
IPA	Important Plant Area
ISRC	Intensive Study and Research Centre
IUCN	The World Conservation Union
kg	kilogram
KNP	Khaptad National Park
KP	Kyoto Protocol
KRTC	Khaptad Region Tourism Committee
KSLCI	Kailash Sacred Landscape Conservation Initiative
LSGA	Local Self Governance Act
LSMA	Land Survey and Measurement Act
m asl	meter above sea level
m ton	metric ton
MAP	Medicinal and Aromatic Plant
MEA	Multilateral Environmental Agreements
MFSC	Ministry of Forests and Soil Conservation
mm	millimetres
MoAC	Ministry of Agriculture and Cooperative
MoE	Ministry of Environment
MCCICC	Multi-stakeholder Climate Change Initiative Coordination Committee
NAPA	National Adaptation Program of Action
NARC	National Agricultural Research Council
NBCC	National Biodiversity Coordination Committee
NBS	Nepal Biodiversity Strategy
NBSIP	National Biodiversity Strategy Implementation Plan
NCSA	National Capacity Needs Self-Assessment

GoN	Government of Nepal
NGO	Non Government Organization
NHM	Natural History Museum
NIE	National Implementing Entity
NLCDC	National Lake Conservation Development Committee
NPWCA	National Parks and Wildlife Conservation Act
NTFP	Non Timber Forest Product
NRDB	National Red Data Book
PAs	Protected Areas
PDD	Project Design Document
PIN	Project Idea Note
PPCR	Pilot Program for Climate Resilience
PREGA	Promotion of Renewable Energy, Energy Efficiency and GHG Abatement
RCF	Regional Cooperation Framework
REDD	Reduction of Emissions from Deforestation and Degradation
RNP	Rara National Park
SAARC	South Asian Association for Regional Cooperation
SADAN	Sustainable Development Agenda for Nepal
SCOPE	Scientific Committee on Problems of Environment
NEA	Nepal Electricity Authority
SINA	Statistical Information on Nepalese Agriculture
spp.	Species
TOR	Terms of Reference
TU	Tribhuvan University
TAC	Technical Advisory Committee
TDS	Total Dissolved Solids
UNCED	UN Conference on Environment and Development
UNCCD	UN Convention to Combat Desertification
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
VDC	Village Development Committee
WCMC	World Conservation Monitoring Centre
WCN	Wildlife Conservation Nepal
WRA	Water Resource Act
WUA	Water User Association
WWF	World Wildlife Fund

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1. Introduction

1.1 Background

The Kailash Sacred Landscape (KSL)-Nepal complex is a proposed transboundary landscape covering larger region around Mt Kailash of 31,252 sq.km, of which about 13,289 sq.km (42.5% of the total area) falls in Nepal, 10,843 sq.km (34.7%) in China and, 7,120 sq.km (22.8%) in India. The northern and western boundary of KSL-Nepal coincides with international boundary with China and India, respectively.

Figure 1.1 Area under the Kailash Sacred Landscape, Nepal

The KSL-Nepal comprises four districts in Nepal, Baitadi, Darchula, Bajhang and Humla; located in far-, and mid- western region in Nepal (Figure 1.1). Also the area is understood within greater Karnali (including Karnali Zone) for the development of the Karnali region as a whole. The area, at present, is characterized by remote part of the country from development indices, and suffers from food deficits and shortage, disease, nutritional deficiency, and unfulfilled basic needs. The intense conflict between the government and the Maoist insurgents further compounded the food security problem in the region. In the past, Karnali was considered a prosperous region; it is still considered as a place with immense potentialities (Adhikari 2008).

The Government of Nepal has formulated a strategy to provide management of landscape in the country. The Nepal Biodiversity Strategy (NBS) has adopted the landscape planning approach to protect and manage biodiversity on a sustainable, long-term basis. The NBS has provision of landscape conservation strategy i(HMG/MFSC 2002), and this is now being promoted by the periodic plans of Nepal (GoN/NPC 2008). The Ministry of Forests and Soil Conservation through the departments has joined hands with several national, regional and international conservation and development partners for conservation including Western Tarai Landscape Complex project, and Sacred Himalayan landscape strategy.

As one of the strategies of the Interim Plan (2008-2010) is committed to follow scientific management system for conservation of biodiversity and genetic resources, it creates enabling policy environment for the Ministry of Forests and Soil Conservation (MFSC) [other relevant ministries as well] to promote transboundary landscape management which implies using an integrated approach in the management of extended landscapes, defined by ecosystems rather than boundaries, in which both the conservation and sustainable use of components of biodiversity and cultural diversity are considered. Therefore, the Interim Plan does support such transboundary landscape management.

The Three-Year Plan - Approach Paper (2010/11-2012/13) creates enabling policy environment for the Ministry of Forests and Soil Conservation [other relevant ministries as well] to promote landscape management, undertake sustainable forest management system, develop new national forestry strategy, and develop and implement adaptation and mitigation measures to combat climate change (GoN/NPC 2010). Further, the plan has given priority to link remote geographical areas including Humla and other districts in Karnali with road, and mainstream marginalized groups into socio-economic development. Therefore, the Interim Plan does support such transboundary landscape management (GoN/NPC 2010).

The Kailash Sacred Landscape Conservation Initiative (KSLCI), a collaborative effort of International Centre for Integrated Mountain Development (ICIMOD), the United Nations Environment Programme (UNEP), and partners in Nepal, China and India; the countries have launched transboundary landscape management of the Kailash region in 2009.

The trend of conservation paradigm in Nepal has been changing from species conservation to landscape management. Considering the importance of landscape approach in the context of long term sustainable management of biological resources with conservation, several programmes have been implemented to protect the areas of particular importance to biodiversity. However, the effectiveness has not been to the level of expectation (GoN/MFSC 2009).

1.2 Objective

The overall objective of the feasibility study has been to conduct both a preliminary feasibility assessment and a policy and enabling environment assessment as relevant to the implementation of the KSL Conservation Initiative, as a first stage document leading to the development of a RCF for the KSL Conservation Initiative.

The feasibility study also includes in raising awareness of the local people and the relevant stakeholders at the target districts regarding management provision of landscape approach to conservation of transboundary Kailash Sacred Landscape. The study also contributes in enhancing processes and procedures in conservation of biological and cultural diversity, rangeland management, improvement of livelihood pattern and sustainable use of resources, economic upliftment, reducing poverty, and conservation of ecosystem and cultural integrity of the region.

The specific objectives of the feasibility assessment include:

- delineation of target landscape of Kailash Sacred Landscape(KSL)-Nepal;
- preparation of status report on bio-physical, socio-cultural, environmental degradation and cultural identity of the target landscape;
- identification of priorities (biodiversity, socio-cultural, environmental) for the target landscape;
- analysis of community perception on biodiversity, cultural values, environmental issues,and climate change;
- assessement of enabling environment (review of existing policies); and
- assessment of need analysis for the KSL-Nepal to develop a Regional Cooperation Framework (RCF).

1.3 Scope and Coverage

The scope and coverage includes to:

- prepare feasibility study report in accordance with TOR;
- undertake wider consultations with the relevant line agencies and stakeholders in the district;
- conduct field study and interact with local communities, user groups, political parties, social leaders, school, health posts, business and enterprise group, local media, NGOs, and community based organizations;
- review available data/literatures;
- conduct baseline survey to assess status of biological and natural resource of the target landscape in Nepal; assess environmental degradation and cultural integrity;
- identify potential threats and vulnerabilities, and prioritize major issues;
- understand community's perception on biodiversity, and cultural values; and
- analyse policy enabling environment; and assess significant gaps in protecting and conserving the resources of the target area.

1.4 Methodology

The feasibility assessment report is based on secondary as well as primary data. Secondary information were generated mainly through literature review; whereas primary data was collected through consultations, interaction program, group discussion, individual household surveys, field surveys.

Questionnaire, checklists, datasheets and field survey were used to generate primary level of information. Local people were contacted and interviewed to solicit information. A few focus group discussions were organized at different settlements (both permanent and temporary), and Simikot, the district headquarters of Humla.

An interaction program at Simikot was held to obtain valuable opinion from stakeholders. Comprehensive discussion on issues, and wider consultations during the field level study was made with local communities, schools, health posts, clubs, user groups, VDCs, business and enterprise group, entrepreneurs in the district. Opinion of all major political parties in conservation of KSL-Nepal was also well conceived.

Consultations with relevant line agencies and government offices at the central level in Kathmandu and other stakeholders in the district were made to generate primary information, and to verify data collected from the field as well.

Literature review comprised of both published and unpublished reports of government, non-government and other local level stakeholders, and interpretation of maps and photographs. Past management plans and strategies for the area, sectoral management plans, master plan and draft operational plans of other conservation areas were reviewed. Existing policy, legislation and institutional arrangements were also reviewed.

Baseline survey in Humla District as a representative district was conducted jointly by a team of Tribhuvan University, MFSC, and District Forest Office and its local staff, Simikot. Masters students were also involved to generate baseline data for monitoring.

Field survey covered site visit, consultation, site inspection and observation, site specific or significant ecological features of the area, and discussion with local community and stakeholders.The study on biophysical and social aspects included land use, biological information (flora and fauna, birds, reptiles, etc), status of community forestry, forest types, NTFPs and wildlife habitats, distribution of protected and endangered species found in the area, and management system. This also included issues related to conservation of wild flora and fauna.

Local communities including VDCs, Community Forest User Groups (CFUGs), NGOs, and CBOs were consulted. Main issues raised and discussed in the focus group was conservation sensitivity, importance of biodiversity, present status, present problems or difficulties, and potential solutions of the proposed Kailash Sacred landscape.

Information collected from different sources was used to prepare a comprehensive database of the feasibility study of KSL-Nepal. The generated information from primary sources were analyzed, tabulated and prioritized to fulfill the main objectives of the study.

2. Delineation of Kailash Sacred Landscape-Nepal

The process of National Level KSL boundary delineation in Nepal was initiated through Ministry of Forests and Soil Conservation, nodal agency for Kailash Scared Landscape Conservation Initiative. An executive committee at the national level was formed to guide the project in Nepal.

Criteria for delineation were developed and then agreed upon through an iterative and consultative process in Nepal at national level stakeholders workshop held in Kathmandu on 12 March 2010. Expert opinion and technical help of ICIMOD was most important to delineate the landscape.

The primary criteria as agreed by the regional partner countries were followed and included three categories: (i) ecological, or abiotic and biotic, (ii) cultural, and (iii) planning and management.

The main points identified for consideration are the following:

- Trans-boundary ecosystem services and ecosystem contiguity
- Key biodiversity areas, including migratory habitats and potential biodiversity corridors
- Endemism (biodiversity and culture)
- Indicator/flagship, rare, endangered and threatened species (and their habitat ranges)
- Protected areas, wetland (particularly Ramsar Sites) and other conservation priority areas
- Cultural heritage sites, pilgrimage routes; and existing and potential ecotourism areas
- Vulnerabilities of the area (globalization, migration and other change processes)
- Urbanization and infrastructure development (current and planned)
- Watershed and river basin coverage for headwater areas of major rivers originating from the landscape; and
- Ecological zone

The process adopted for the delineation included a review of published literature and other secondary information, and expert and stakeholder consultation with meetings at national and local levels. The area delineation exercise developed three scenarios, with the final boundaries decided by the Executive Committee. Main criteria considered included transboundary linkages and ecosystem services, watershed and river basin boundaries, key biodiversity areas, endemism, indicator/flagship, and rare, endangered and threatened species, protected areas and Ramsar Sites, cultural heritage sites, and pilgrimage routes

The delineated target area for the KSL-Nepal is approximately 13,289 km^2 and comprised of four districts, namely Humla, Bajhang, Baitidi, and Darchula (Figure 2.1, 3.1). The altitudinal gradient ranges from 390m to 7,132masl. Average rainfall ranges from 25mm in parts of Humla, to 1,344mm in Bhajang. Major rivers in this region include the Mahakali, Humla Karnali, and Seti Rivers. This region also encompasses the major pilgrimage routes and several historical trade routes. In general, the area is remote; however there is an airfield at Simikot with connection to Surkhet and Nepalganj. The main crops include paddy, barley millet, maize, and wheat. Generally, this is a food deficit area, with families typically not growing enough food for the full year, as well as high variability from year to year, with several recent drought years.

Figure 2.1 Map of the KSL Target Area outline boundary, based on a merging of the delineation of their respective area by each of the three KSL countries

This area is particularly rich in biodiversity, and lies at the intersection of several major floristic regions, namely the Western Himalayan, Eastern Himalayan, and Central Asiatic. This area fall within the Himalaya Biodiversity Hotspot, and is comprised of five major ecoregions:

- Himalayan subtropical broad-leaved forest
- Himalayan subtropical pine forest
- Western Himalayan broad-leaved forest
- Western Himalayan subalpine conifer forest
- Western Himalayan alpine shrub and meadows

Within the KSL-Nepal area, there are reportedly approximately 83 species of mammals, 456 species of birds, 38 species of reptiles, and 119 species of fish. Of these, 22 mammals' species, 12 bird species, and one reptile species are on the IUCN Red List. Eight species of mammals, 7 species of birds, 22 species of reptiles and 8 species of fish are either endemic or have a restricted range. There are 35 species of mammals, and 73 species of birds, that are listed in various categories in CITES. Ten mammals, 4 species of birds and 1 species of reptile are listed as legally protected by Government of Nepal. In addition, there are three endemic species of fish (*Schizothorax nepalensis, S. macrophthalmus,* and *S. raraensis* - restricted-range) have been reported from adjoining Rara National Park in KSL-Nepal.

Agricultural biodiversity is very high, with globally significant genetic resources and locally important landraces maintained by farmers, as well as many wild relatives of economically important food crops found in this area. Over 200 species for NTFPs are reported used for food and/or medicine in Bajhang district, of which 38 species (or their products) are commonly traded. A total of 83 species for NTFPs are recorded from Darchula District, of which 73 species (products) are used as ethnomedicine.

Forest product-based industries (five year report on forest/DFO, 2009) include Nepali paper factories, furniture industries, fibre refining factories (allo-bhangro refineries), medicinal herb processing, fruit processing, rattan factory, honey bee refineries, honey farms. There is significant trade and revenue from collection of medicinal plants (and other medicinals). There are 14 forest types reported for this region. Most of this forest is government managed, however a significant portion is under community forest management, with many Community Forestry Users Groups (CFUGs) reported for this area.

Socio-economic, livelihood, poverty and gender dimensions

Total population for this area (CBS 2001) was approximately 564,035 persons, with close to half found in Baitadi District. Humla, although the largest district, has the fewest people and lowest populaton density. Gender balance shows significant outmigration by males. Main ethnic groups or castes include Chetri, Bahun Thakuri, Tamang, Bhote, Dalit, and Lama. The religion of these peoples is more than 90% Hindu, with Buddhist primarily comprising the remainder. Agriculture is the main occupation for over 70.5% of the population. Population density ranges from 7 persons per km^2 in Humla to 154 persons per km^2 in Baitadi District. Literacy rates are generally low throughout the four districts. Health indicators are also generally low reflecting the wide spread and deep poverty of this area, with very few doctors and very few health care facilities. Chronic malnutrition among children under five is high, and percentage of the population with access to safe drinking water relatively low. There are almost no roads in this area, though there are several under construction. Baitadi, Darchula and Bajhang Districts together have about 283 km of road (including 53 km blacktopped), while Humla has none (data from 2004).

3. Physical, Biological, and Socio-Cultural Characteristics

3.1 Physical Characteristics

The Kailash Sacred Landscape (KSL) complex extends from 29°22'N to 30°45'N latitudes, and 80°15'E to 82°10'E longitudes. Humla District alone accounts for 45% of the total area. Kailash Sacred landscape varies along with the elevation gradient. Altitude of the region varies from 390m (Baitadi District) to above 7,000m (Table 3.1). The mountains, Mt Saipal – 7,031m in Bajhang; Api Himal-7,132m in Darchula; and Mt. Nala Kankad-7,336m, in Humla fall in this region. Other mountains include Byans – 6,670m, Guransh - 6,644m, Lipu Lek - 5,000m and Nampa - 6,757m. Climatic regime ranges from tropical in Baitiadi District to alpine in higher reaches of Bajhang, Darchula and Humla Districts. Climate of the area is generally characterized by high rainfall and humidity; whereas a part of Humla region is drier. Altogether, there are 178 VDCs/municipality in the region (Annex 1a & 1b). Brahmin, Chhettri, Bhote, Kami, Damai/Sarki are dominant ethnic groups in the area. The region includes the recently declared Api Nampa Conservation Area; whereas a part of Khaptad National Park falls in southern part of Bajhang District. High biogeographic, climatic, geological altitudinal variations as well as topographic complexity contribute to high biodiversity over a relatively small area. The landscape, thus, forms a complex mosaic of ecosystems unique to the mountain system.

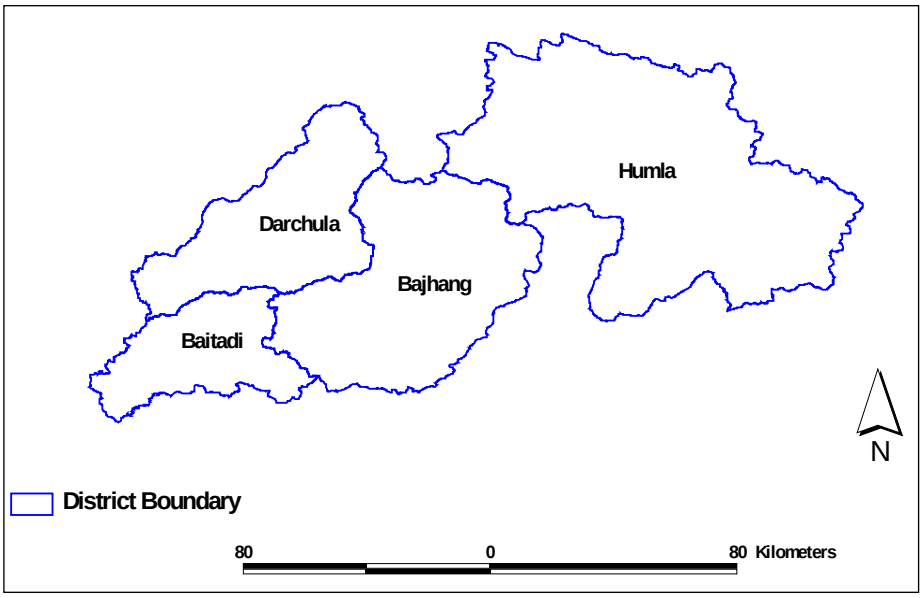


Figure 3.1 Kailash Sacred Landscape, Nepal

Baitadi District, Mahakali Zone, is a hilly district in Far Western Development Region of Nepal, bordered by Bajhang and Doti Districts in the east, Darchula District in the north, Uttaranchal Pradesh of India in the west, and Dadeldhura District in the south. Jhulaghat market of India is the nearest Indian market from district headquarters Dashrath Chand Municipality. It comprises 62 Village Development Committees (VDC) and one Municipality.

Darchula District, Mahakali Zone, is one of the mountainous districts in Far Western Development Region of Nepal, bordered by Bajhang district in the east, Tibet Autonomous Region of China (TAR-China) in the north, Uttaranchal of India in the west and Baitadi District in the south. Khalanga Darchula is the headquarters of the district and situated in close proximity to the Mahakali River. Dharchula is the nearest market in the Indian border lying just opposite to Darchula of Nepal. It comprises 41 VDCs.

Bajhang District in Seti Zone is also a the hilly district of Far Western Development Region of Nepal, bordered by Bajura and Humla Districts in the east; Darchula and Baitadi Districts in the west; Humla District and TAR-China in the North; and Doti and Baitadi Districts in the south. Chainpur is the headquarters of the district, which is located about 32km north from Khaptad National Park headquarters. The district is divided into 47 VDCs. Only 54.92 sq.km (8%) area of the district falls within Khaptad National Park Buffer Zone.

Table 3.1 Physical characteristics of KSL-Nepal

Parameters	Baitadi	Darchula	Bajhang	Humla
Area (sq.km.)	1491.42	2337.68	3455.91	6003.66
Latitude	29^o 22'-29^o 57'N	29^o 36'-30^o 15'N	29^o 29'-30^o9'N	29^o 25'-30^o57'N
Longitude	80^o 15'-80^o 45'E	80^o 22'- 81^o 9'E	80^o 46'-81^o 34'E	81^o 18-82^o 10' E
Altitude (m)	390- 2950	518-7132	915-7077	1220-7336
Annual mean temperature (ºC)	5-30	5.7-18.6	5.7- 18.6/-10	10^o-25^o/-10^o
Average annual rainfall (mm)	1513	1885	1343	25.4-146.9

Humla District in Karnali Zone is a mountainous district of Mid-Western Development Region of Nepal. The district is located in the northern corner of Karnali zone and bordered by TAR-China in the north and north-west, Mugu District in the south-east, Bajura in the south and Bajhang in the south-west. Simikot is the headquarters of the district. It is divided into 27 VDCs.

Land use and Soil

Land use categories in the study area comprise forest, cultivated land, non-cultivated land, pasture, and others (Table 3.2). The existing land use pattern were forest 24.3%, shrubland 8.6%, grazing land 17.1%, cultivated land 8.6%, and others 41.3% (GoN 1998/2001). The percentage of cultivated land is quite low varying from 1% in Humla and 21% in Baitadi, with less than only 12.5% of the total land being irrigated (7.8% in Humla and 15.3% in Darchula). Soils of the lower region are predominantly fine to coarse loam; and alluvial and coarse textured in irrigated field.

Overall, forest area has remained almost constant; whereas shrub area has greatly been increased from 1978/79 to 1998/2001. This is accompanied by decrease in grassland and cultivated land. However, the forest area in Humla and Darchula districts are found to be in increasing trend which may be attributed to handing over of forest areas to the communities, and insurgency during which many people migrated from the district. This data needs to be reconfirmed, because rampant deforestation has also been observed in the region. Except Humla district, agriculture land is found to be in decreasing trend (Table 3.2).

The comparison of the two available datasets is quite difficult. This is due to combined effect of different factors such as the primary objectives, materials and methods used and interest in mapping. The LRMP has used manual interpretation of aerial photographs with field verification whereas the Topo-sheet work was based on satellite image analysis with limited field verification. Even land use/land cover categories or legends used in these two studies are different.

Fine particles of stony soil exit in cracks of larger rocks in the High Himalayan region while shallow and stony soils are seen in the high mountains. Soils in the Middle Mountains are moderately to highly acidic, medium- to light-textured coarse grained sand and gravel. Soils of the lower region are predominantly fine to coarse loam; and alluvial and coarse textured in irrigated field. Soils in the middle mountains are moderately acidic, medium- to light- textured coarse grained sand and gravel. In the high mountains, fine particles of stony soils exist in cracks of larger rocks (ANCA 2008; DNPWC 2008, 2010). Soils of the lower region are predominantly fine to coarse loam and alluvial and coarse textured in irrigated paddy fields.

Table 3.2 Land use change (ha) in the KSL-Nepal

District	LRMP (1978/79)				Department of survey/GoN (1998/2001)				Change in ha and %			
	Forest	Shrub	Grassland	Cultivated land	Forest	Shrub	Grassland	Cult. land	Forest	Shrub	Grassland	Cult. land
Baitadi	60785	17920	19199	51624	61292	30573	10792	44480	507 (0.83%)	12653 (41.39%)	-8407 (-77.90%)	-7144 (-16.06%)
Darchula	72978	6555	61214	25012	75578	17988	52987	20115	2600 (3.44%)	11433 (63.56%)	-8227 (-15.53%)	-4897 (-24.34%)
Bajhang	102463	10655	52926	41657	97437	38500	63028	34651	-5026 (5.16%)	27845 (72.32%)	10102 (16.03%)	-7006 (-20.22%)
Humla	71985	3857	141446	9124	79607	24578	94277	12506	7622 (9.57%)	20721 (84.31%)	-47169 (-50.03%)	3382 (27.04%)
Total	308211	38987	274785	127417	313914	111639	221084	111752	5703 (1.82%)	72652 (65.08%)	-53701 (-24.29%)	-15665 (-14.02%)

Sources: LRMP (1978/79), and Department of Survey (1998-2001)

3.1.1 Geomorphology and Geology

Most geological formations in different physiographic zones run east to west. A small portion in the northern most part of the KSL, Nepal area is dominated by Tibetan sediment. The High Himalayan zone belongs to the Precambrian era and it consists of gneiss, schist, limestone and sediments. This zone also possesses granite and pegmatite. The Middle Mountain zone is mostly of late Precambrian to Devonian era and consists of phyllite, quartzite, gneiss, granite and schist. The area seems to have relatively less fertile land from the point of agriculture, but this area is rich for medicinal plants. Midlands in Bajhang are dominated by chlorite and dolomite (Forest Resources of Nepal, FAO 1999).

3.1.2 Climate

Due to variation in altitude and topography, the climate of the region varies widely from subtropical to alpine type. In north, most part is covered with snow and the climate is alpine. In the Southern part and valleys the climate is subtropical, and in middle hill region climate is a temperate type (Figure 3.2). The average maximum temperature is 18.6ºC and the minimum temperature is 7.7ºC, and average rainfall is 2,129mm, with nearly 80% of the total annual rainfall falling during the four months of monsoons from June to September. All areas experience very high rainfall intensities, ranging between estimates of 125-350 mm for a 24 hour period (ICIMOD 1997). Upper part of Humla is relatively much drier.

Within its elevation range of 1,000m to 2,000m there are limited subtropical valleys in the southern margin although most of the area is physiographically temperate or highland. A cold, generally dry climate exists in the high alpine valleys just north of the southern arm of the Himalaya that cuts across the bottom of Darchula and Humla. The region lies in the western Himalaya (Holarctic Biogeographic Zone). This location (distance from markets, inaccessibility, and the unusual confluence of geologic, climatic and biological factors), and the area's orographic isolation, create a region of high floral diversity, with distinctive vegetation, as well as a high degree of endemism, including many valuable MAPs.

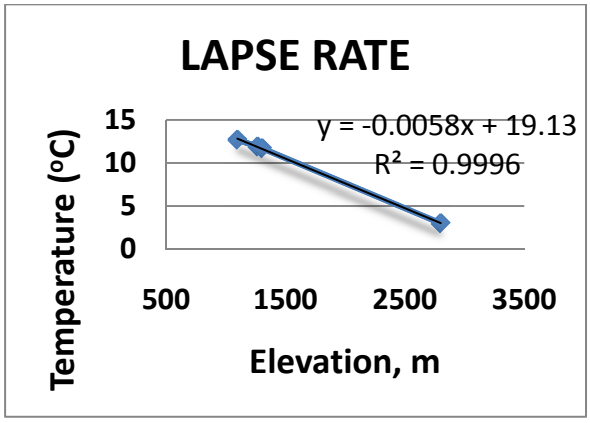


Figure 3.2a: Altitudinal variation of temperature in the project area.

Climate data for the entire region is not available. The average annual rainfall for Khaptad National Park is about 1,550mm based on records from Tribeni (3,050m) for 1978-1981. Most precipitation falls between May and September. About 1m of snow accumulates on the plateau during winter. Mean monthly maximum and minimum temperatures range from about 16°C and 8°C in January to 31°C and 21°C in June at Silgadi, Doti, which is 1,630m lower than Tribeni (Kattel 1981). Summary of precipitation and temperatures of selected places is given in Tables 3.3, 3.4 & 3.5 which show that between 1980 and 2006 average temperature change is increasing; whereas average precipitation is almost constant or slightly increasing (Figures 3.2b-3.2g).

Table 3.3 Monthly summary of precipitation (mm) recorded in the project area

Index	Period	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
0101	1956-06	41	45	56	47	100	260	457	397	220	54	7	18	1,701
0102	1973-06	45	58	59	54	127	198	320	276	160	42	8	29	1,375
0103	1956-06	41	40	47	47	101	197	344	301	159	37	9	21	1,344
0107	1974-06	51	64	68	59	121	298	686	641	316	53	9	29	2,396
0108	1956-06	45	56	65	65	124	218	402	385	202	37	10	28	1,637
0201	1956-06	54	53	60	62	117	315	585	555	305	61	11	25	2,202
0202	1956-06	56	62	63	47	60	179	372	385	208	47	9	25	1,512
0311	1978-06	30	56	69	35	49	78	141	148	110	35	14	18	784
0313	1979-06	38	48	65	59	72	109	333	294	149	44	18	28	1,256

Table 3.4 Monthly summary of temperature (^{o}C) recorded in the project area

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
			Index No. 103 Patan			Period 1981-2006						
Max	16.9	19.1	23.3	27.8	29.8	30.4	28.4	28.1	27.7	26.2	22.3	18.8
Min	4.2	6.1	9.8	13.4	16.3	19.2	19.9	19.8	18.0	13.5	8.4	5.1
Ave	10.5	12.6	16.6	20.6	23.0	24.8	24.2	23.9	22.9	19.9	15.4	11.9
			Index No..202 Chainpur			Period 1980-2006						
Max	18.0	20.2	24.0	28.2	30.8	31.1	29.4	29.1	28.6	26.7	23.0	19.5
Min	3.4	5.3	8.8	12.2	15.8	18.9	20.0	19.6	17.5	12.2	7.3	4.0
Ave	10.7	12.7	16.4	20.2	23.3	25.0	24.7	24.3	23.1	19.4	15.2	11.7
			Index No. 107: Darchula			Period 1990-2006						
Max	19.0	22.2	26.6	31.2	33.5	33.8	32.0	31.7	30.8	28.3	24.4	20.1
Min	4.4	6.1	9.8	14.2	18.6	20.8	21.5	21.3	19.5	14.0	8.8	5.3
Ave	11.7	14.2	18.2	22.7	26.0	27.3	26.7	26.5	25.1	21.2	16.6	12.7
			Index No. Simikot			Period 1989-2006						
Max	7.5	6.6	11.3	17.2	20.5	22.3	21.9	21.0	20.1	17.6	13.8	11.6
Min	-7.6	-7.9	-3.0	3.6	6.8	8.7	10.9	11.3	9.2	3.4	-0.6	-5.7
Ave	-0.1	-0.7	4.2	10.4	13.7	15.5	16.4	16.1	14.7	10.5	6.6	3.0

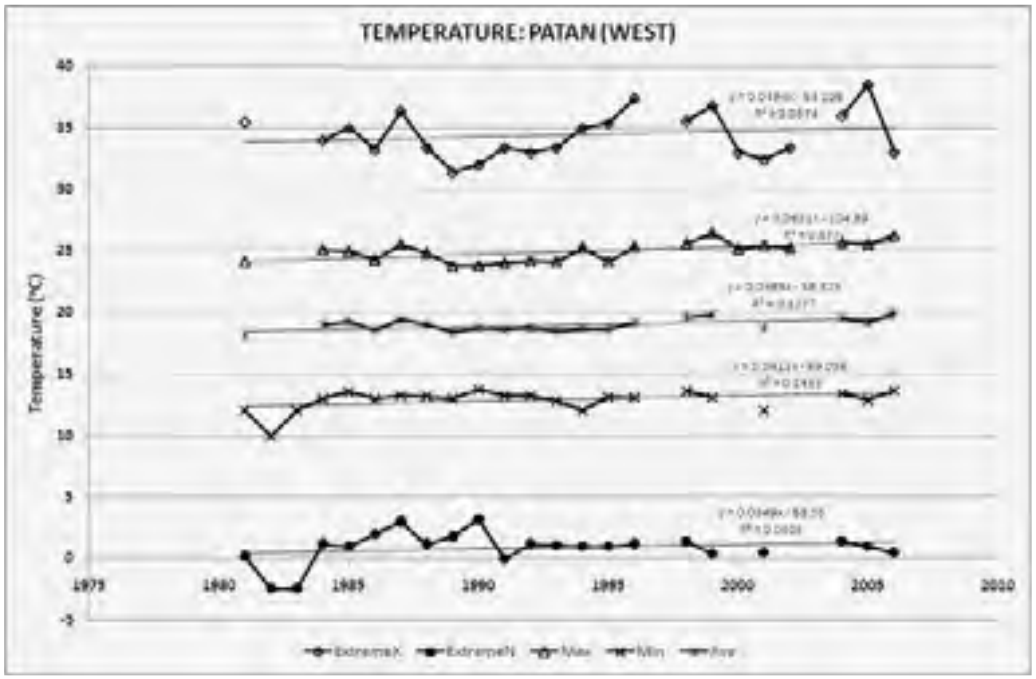


Figure 3.2b: Temperature trends recorded from Patan station.

Table 3.5 Climatic trends in the project area

Index	Station	Lat	Long	Elvtn	b	R2	N	Sig 95%	Sig	b	R2	N	Sig 95%	Sig
101	Kakerpakha	29.65	80.5	842	3	0.024	48	0.283	No					
103	Patan	29.47	80.53	1266	-1.5	0.008	46	0.289	No	0.039	0.328	20	0.438	No
201	Pipalkot	29.62	80.87	1456	3	0.015	49	0.28	No					
202	Chainpur	29.55	81.22	1304	3.1	0.034	49	0.28	No	0.045	0.543	25	0.392	Yes

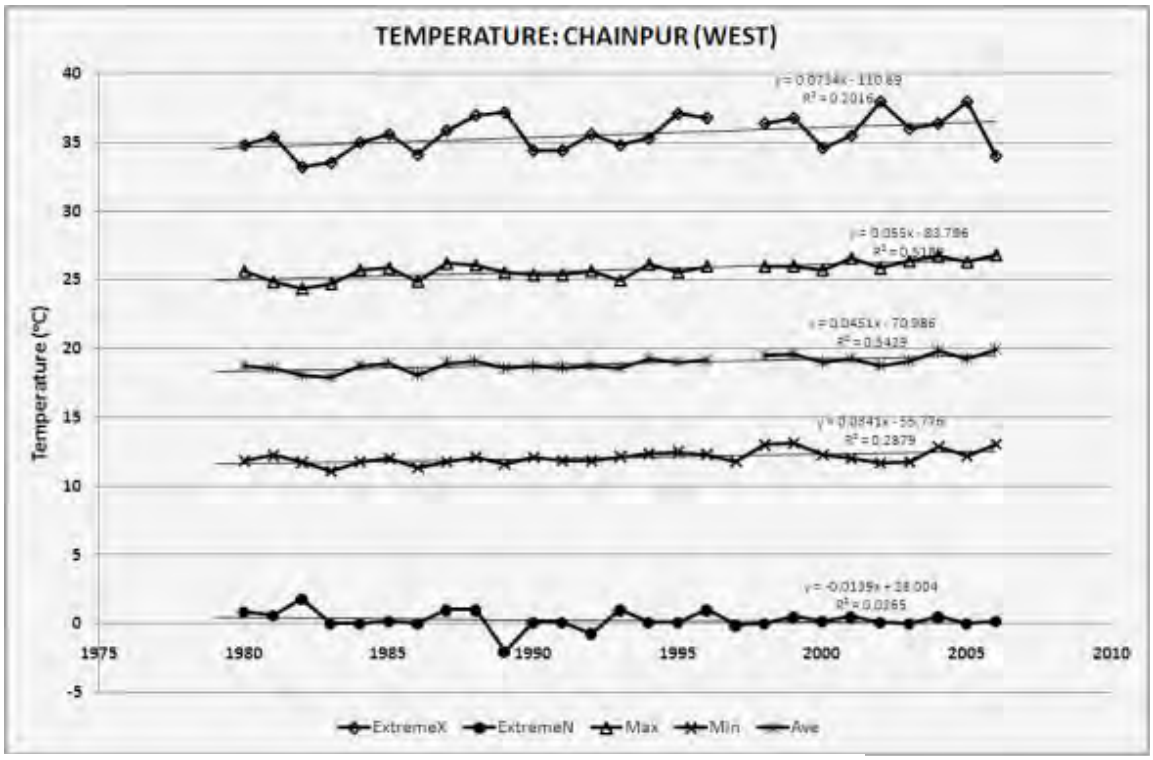


Figure 3.2c Temperature trends recorded from Chainpur Station

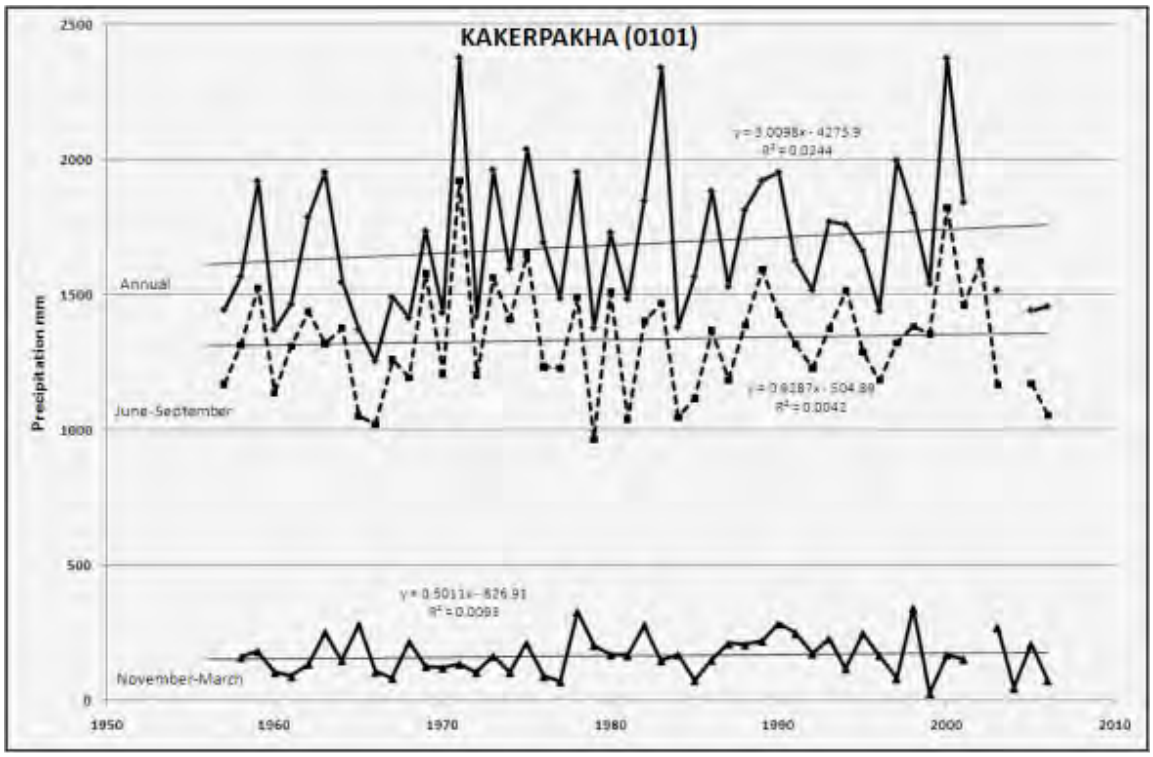


Figure 3.2d Precipitation trends recorded from Kekerpakha station

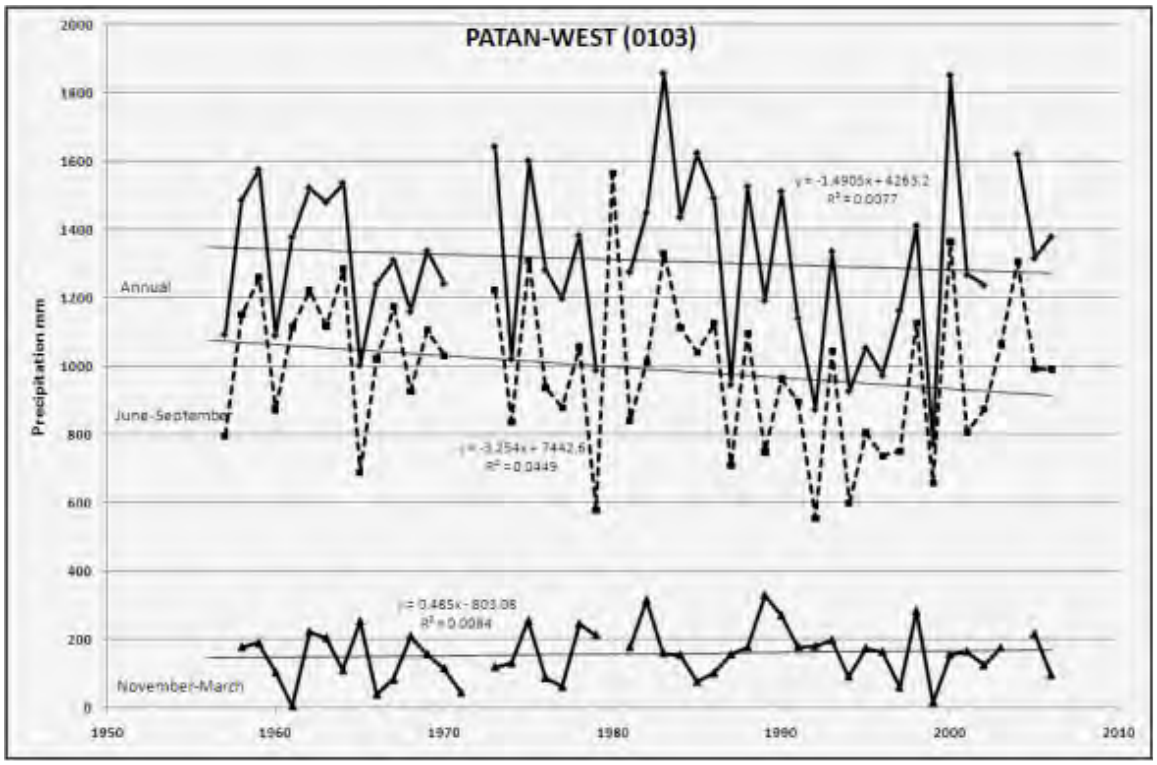


Figure 3.2e Precipitation trends recorded from Patan Station

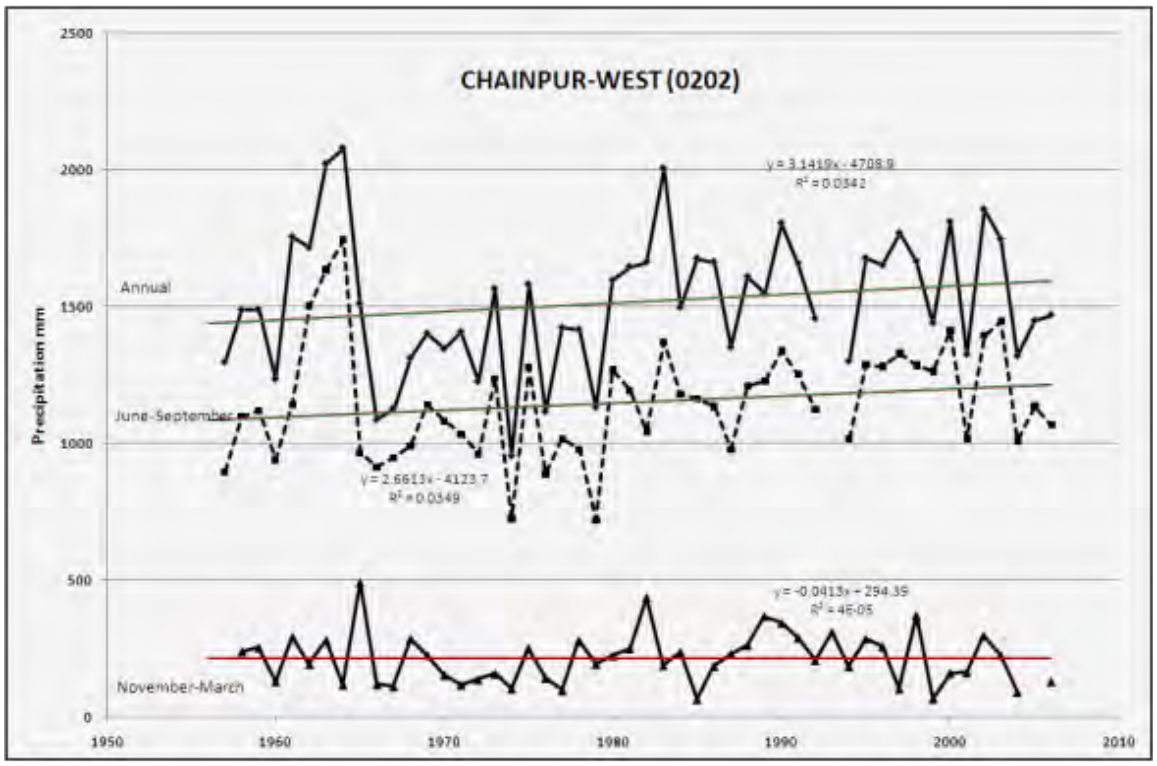


Figure 3.2f Precipitation trends recorded from Chainpur Station

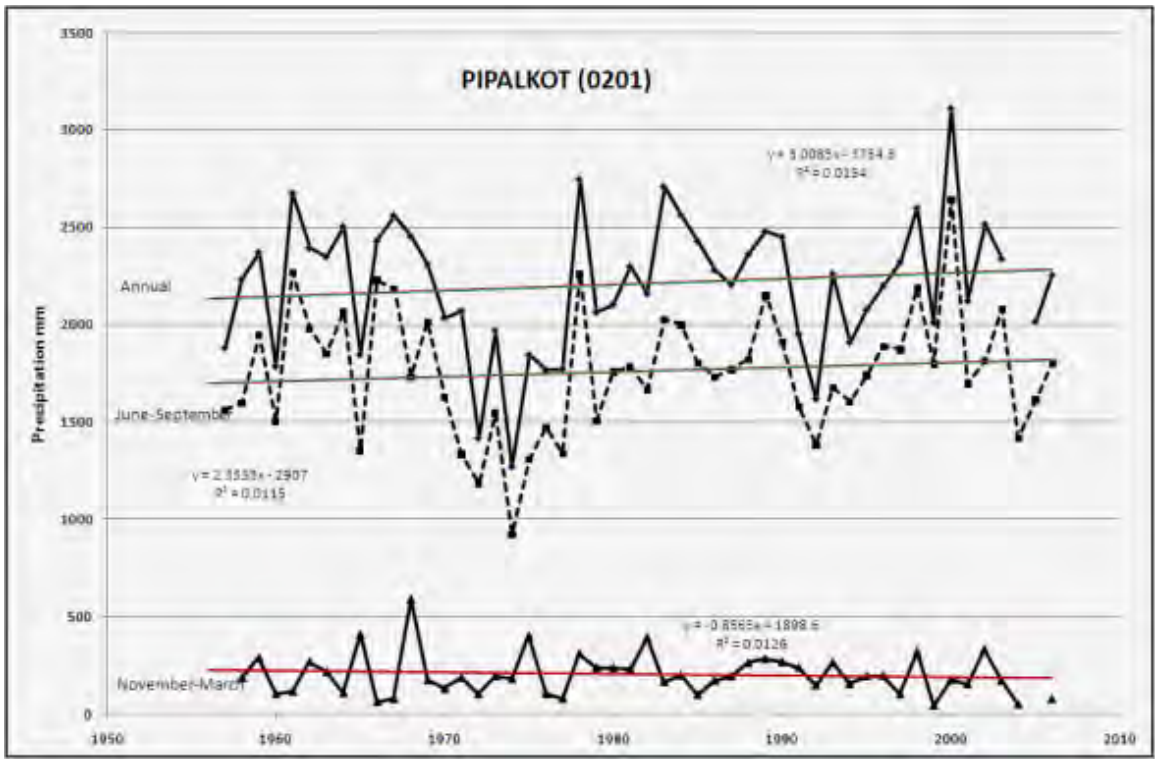


Figure 3.2g Precipitation trends recorded from Pipalkot Station

3.1.3 Hydrology, River Systems and Water Resources

Besides the catchment of Mansarovar, KSL-Nepal includes four districts in the northeast part of Nepal: Baitadi, Darchula, Bajhang, and Humla (Figures 3.3 & 3.4).

Figure 3.3 indicates that the northern part of the project area is significantly dry compared to the southern parts. Because of limited scope in agriculture and economic activities, very few settlements are located above 3,000m, although more than half of the project area lies above 3,000m.

River Basins

The Humla Karnali, the Mahakali and the Seti are the major river basins in the project area. River basins in KSL-Nepal are delineated in Figure 3.4. This also shows the basins of rivers considered in this study, but linked outside Nepal's political boundary. Humla Karnali originates in Kailash area in TAR-China. Major portion of the Mahakali lies in India, whereas the Seti River basin is confined to the Nepalese territory. Rivers and their major tributaries are depicted in figure 3.5.

Figure 3.3 GoogleEarth image of project area including Mansarovar (right) and Rakchas Tal (left) on top of the image

1. All basins (Nepal, China, and India): (i) Basin Area - 25,640 km^2; (ii) Average basin elevation – 3,520 m
2. Basins in Nepal (Nepal, and China): (i) Basin Area: 12,360 km^2; (ii) Average basin elevation: 3,740 m
3. Lowest Elevation of basins in Nepal: (i) Mahakali - 600 m; (ii) Seti - 980 m; (iii) Humla Karnali - 1,540 m
4. Highest elevation of basins in Nepal and China: (i) Mahakali-7,132 m (Api Himal); (ii) Seti – 7,031 m (Saipal); (iii) Humla Karnali – 7,728 m (Gurla Mandhata).

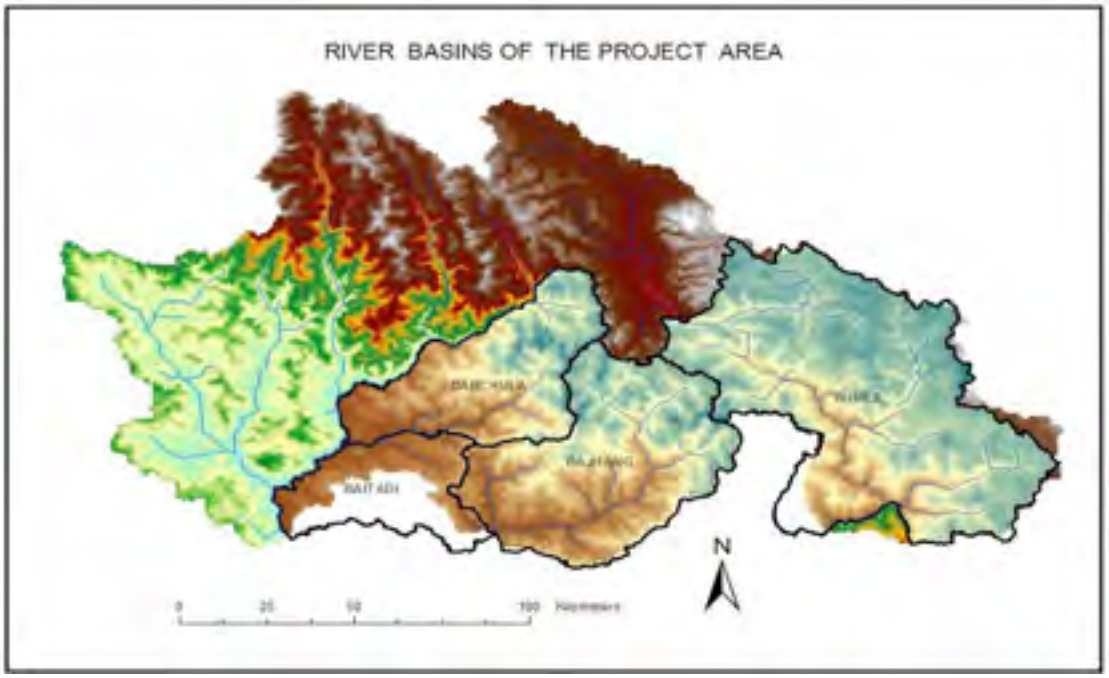


Figure 3.4 River basins of KSL

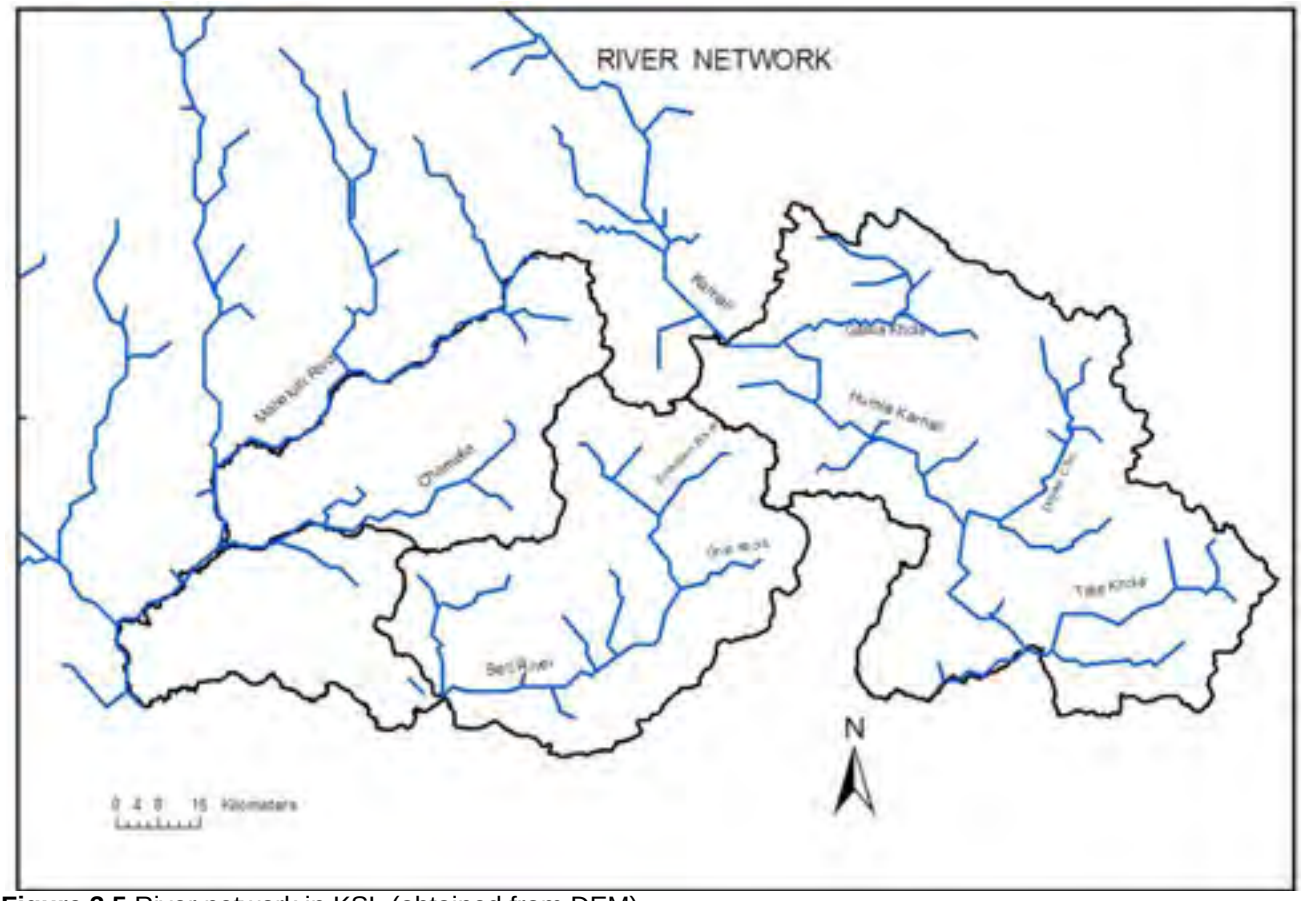


Figure 3.5 River network in KSL (obtained from DEM)

Figure 3.6 GoogleEarth image of Chhubhu Taal

Lakes

Lakes of small size occur in the project area. The largest lake with area less than one square kilometer is the Chhubhu Tal in Bajhang District (Figure 3.6). The lake is located above 4,000m and is influenced by snow and ice. The Surma Tal near Chhubhu Tal and Khaptad Tal in the southern part of Bajhang are two other lakes of smaller sizes.

Hydrometry

Because of poor accessibility, river basins in the project area are poorly gauged. Although more than half of the project area lies above 3,000m, no weather station exists in the region. A climate station located at Simikot (2,800m) in Humla District is the only high altitude station (Table 3.6). Location of stations and their description are given in Figure 3.7 and Table 3.6, respectively. Figure 3.7 shows that the network is relatively better in lower part of the basin.

Table 3.6 Meteorological stations in the project site

Index No.	Station	Lat (DD)	Long (DD)	Elevation (m)	Basin	Established Date	Station Type
101	Kakerpakha	29.65	80.50	842	Mahakali	05/01/1956	Precip
102	Baitadi	29.55	80.42	1635	Mahakali	05/01/1973	Precip
103	Patan	29.47	80.53	1266	Mahakali	05/01/1956	Climate
107	Darchula	29.85	80.57	1097	Mahakali	02/01/1974	Climate
108	Satbanjh	29.53	80.47	2370	Mahakali	06/01/1976	Precip
201	Pipalkot	29.62	80.87	1456	Karnali	06/01/1956	Precip
202	Chainpur	29.55	81.22	1304	Karnali	06/01/1956	Climate
311	**Simikot**	**29.97**	**81.83**	**2800**	**Karnali**	**05/01/1976**	**Climate**
313	Darma	29.73	82.10	1950	Karnali	09/01/1979	Precip

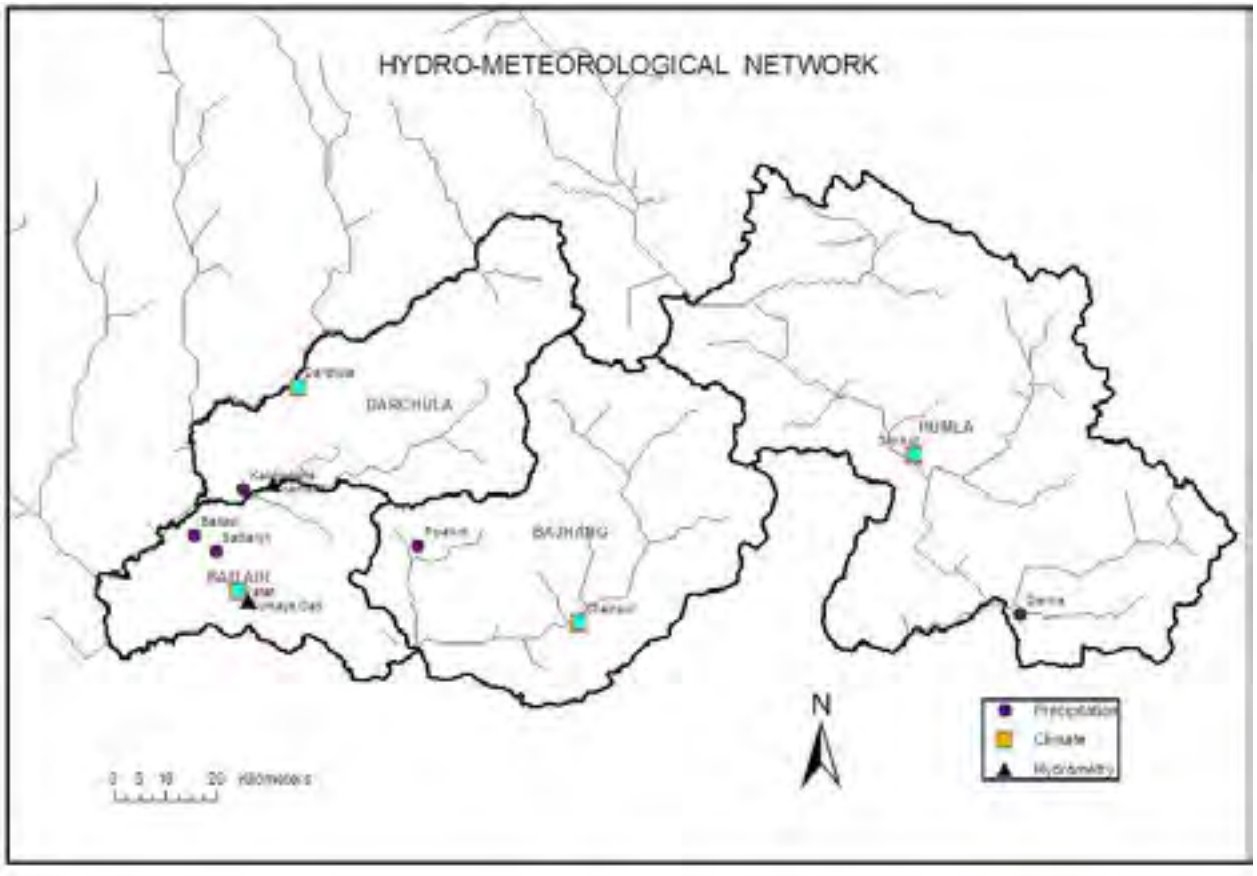


Figure 3.7 Hydrological and meteorological stations in the project area

Hydrology and River Systems

Out of the four major river basins, KSL-Nepal is drained by two river basins: Karnali and Mahakali. Karnali River originates from the south of Mansarovar and Rakchhes Tal in TAR-China. The main tributaries are Bheri, West Seti, Tila, Mugu Karnali, Humla Karnali, etc., and watershed area covers 19 districts including Humla and Bajhang of Nepal. Similarly, the Mahakali River originates in the high Himalayas from the Milan Glacier in India and Lipulekh (Api Himal) in Nepal. Chamelia River of Darchula District is one of the major tributaries of the river basin.

The National Lake Conservation Development Committee (NLCDC 2009) under the Ministry of Tourism made a desktop analysis of Nepal's lakes on the basis of Toposheets and identified 5,358 lakes/ponds in Nepal. NLCDC recorded largest number of lakes in Humla District (381) in Nepal. High Himalayan lakes are glacial in origin, whereas, in the middle mountain zone these are tectonic in origin. Out of the several wetlands in KSL-Nepal, only two (Khaptad and Rara) have comprehensive information.

Major lakes in Humla District include Chhungsa Daha (69 ha, 4,907m), Chhyungar Daha (20 ha, 4,679m), Chhaung Daha (18 ha, 5,054m), Lurupya (18 ha, 4,404m), Dudhya Daha (21 ha, 4,261m) and Jigilya Daha (17 ha, 4,359m). Some important lakes in the high mountain zone are Khaptad Daha and Surma Sarobar in Bajhang and Joge Tal in Darchula. Similarly, important lakes in middle mountain zone are Tima Daha, Nilla Hari kunda, Rakcchesh Daha in Bajhang, Bhrama Daha and Pasa Daha in Darchula, Jadya Daha, Selim lake, Nila lake in Humla and Rara Tal in Mugu, close to the Kailash region in Nepal.

Main river systems along the Nepal-India border are Mahakali and Chameliya (Chaulani) Rivers. All water sources originate from the Himalayan range of Darchula District. Water quality of three rivers shows that the physio-chemical characters such as pH is slightly higher than national standard; whereas TDS, DO and BOD are within the recommended range (Table 3.7).

Table 3.7 Water quality of major rivers (DHM 1998; CBS 2008)

Rivers	pH	TDS (mg/l)	DO (mg/l)	BOD (mg/l)
Mahakali at Pancheswar	8.8	110	5	2
Karnali at Chisapani	8.9	264	10.5	1.5
Seti at Ramghat	8.2	222	9.3	2

Water Bodies and Drainage Disruption along the Nepal-India Border

The Mahakali, a border river between Nepal and India, flows south forming the western international boundary between Nepal and India. In the upper region of the river, it flows in a deep gorge. Downwards, it joins with the Gori Ganga at Jauljibi, which in turn joins the Saryu River at Pancheshwar. The area around Pancheshwar is called 'Kali Kumaon'. Kalapani is situated on the Kailash-Lake Mansarovar trek, and it is said that at this place the Great Sage Vyasa meditated, thus the valley is called Vyasa Valley. The river is named after the Goddess Kali whose temple is situated in Kalapaani near the Lipu-Lekh pass at the border between India and China.

The Mahakali (Sarda in India) is shared with India, and has a total basin area of 14,871 km^2 up to Upper Sarda Barrage, about 34% of which lies in Nepal. The total catchments area is 17,818 km^2 up to Lower Sarda Barrage. The river also has a barrage to regulate water flow for irrigation and hydroelectric power. There are 87 glaciers in the area of 143.33 sq.km in the Mahakali River System and 10.06 km^3 ice reserves (Mool et al. 2001).

Figure 3.8a Wheat cultivation in Humla District

3.2 Biological characteristics

3.2.1 Agrobiodiversity

Diversity of Food Crops

Availability of cultivated land is low in Kailash area in Nepal; only 8.6% of the total land is cultivated varying from 1% in Humla District to 21% in Baitadi District.

Only a small part of the area is suitable to grow a single crop a year above 3,000 m (Figures 3.8a & 3.8b).

A great deal of agrodiversity has been found in KSL-Nepal. Farmers in these districts (Baitadi, Darchula, Bajhang and Humla) of the country grow diverse and unique/rare crops to fulfill their basic needs and to avert risk from adverse climatic conditions. Rice, maize, wheat, finger millet, proso millet, soybean, black gram, and phaseolus beans are major food crops. The agro-climatic variation is very high, from tropical to subalpine. People grow local cultivars of different crop species. Adoption of improved varieties is very nominal due to unique ecosystem and inaccessibility of new material and information. On the basis of germplasm collections maintained at National Agricultural Research Council (NARC), crop diversity of the area has been reflected (Table 3.8).

Figure 3.8b Field ploughing for crop sowing in Humla for summer

Table 3.8 Collections held in gene bank, NARC (Source: Gupta et al. 2000

Crops	Humla	Darchula	Baitadi	Bajhang
Amaranths	3	3	8	6
Barley	30	6	6	2
Bitter gourd	-	-	-	2
Blackgram	5	-	2	2
Broadbean	-	-	-	-
Buckwheat	8	3	1	4
Coriander	-	-	-	1
Cucumber	1	1	2	2
Common field bean	55	1	-	8
Cowpea	4	-	3	-
Finger millet	24	7	10	9
Foxtail millet	3	2	1	8
Garden cress	-	-	-	-
Horsegram	1	-	-	2
Lentil	-	-	17	1
Maize	11	-	2	1
Niger	-	-	-	1
Proso millet	3	-	-	1
Pumpkin	3	-	-	3
Peas	1	-	2	1
Perilla	-	-	-	1
Rape mustard	1	1	1	3
Radish	1	-	-	1
Rice	47	5	31	22
Ricebean	4	-	4	2
Sorghum	1	-	-	2
Sesame	5	-	-	1
Soybean	25	-	6	3
Sunflower	-	-	-	-
Spinach	-	-	-	-
Snake gourd	-	-	-	-
Wheat	-	4	13	5
Total	**236**	**33**	**115**	**94**

Humla is particularly rich in diversity of crop varieties. Eight different types of finger millet (*Eleusine coracana*) have been documented, *rato, kalo, agulya, taunya, dallya, jharuwa, rimalaya,* and *biyalnya* (Rokaya 2058 B.S.). Five different types of barley (*Hordeum vulgare*) are documented, *kalo jau, seto jau, murlaya jau, dhanbali jau,* and *bun jau* (which is medicinal value). Similarly, varieties of naked barley include *muralaya uwa, phul uwa*, and *dhanbale uwa*. Varieties of wheat include *hyasa, bhabri*, and *papi*. Local varieties of buckwheat are *gaslayo* (sweet), *dalya, fuche,* and *chakhau*. People make bread, porridge, *jadd* (alcohol) from millet and barley; whereas *lagar* (a kind of thick bread which gives strength for a long time and normally eaten with *choti*, a radish) is prepared from buckwheat. Proso millet i.e. 'chino' (*Panicum miliaceum*), and fox-tail millet i.e. 'kaguno' (*Setaria italica*) are other important crops. Varieties of proso millet include *rato chino, dudhya china*, and *bharbhurya chino*. Similarly, varieties of fox-tail millet are *rato, kalo* and *mal*. The region is also famous for beans, i.e. *simi* and the types found in Humla are *malya simi, chukkya simi, chakhurya simi, sukilo simi, rato simi, kalo simi, lahare simi*, etc. (Adhikari 2008).

Livestock

Livestock husbandry is one of the major occupations of the far-western (Darchula, Bajhang, Baitadi) and mid western (Humla) districts of Nepal. Cattle, buffalo, sheep, goats and yaks are major livestock species in the region (Table 3.9).

Table 3.9 Livestock population in project districts (Source: MoAC, 2008/9, DLSO Darchula)

Development Region/districts	Livestock species						Poultry
	Cattle	Buffalo	Chauri/Yak	Goats	Sheep	Pigs	Chicken
A. Mid western							
1. Humla	32,546	1,750	2,671 (1,000)	33,561	29,053	43	28,518
B. Far western							
1.Darchula	61,531	31,036	375(10)	48,836	27,266	280	91,009
2. Bajhang	98,743	47,890	42 (5)	51,228	28,664	793	61,829
3. Baitadi	94,276	63,774	-	100,335	238	87	44,340

Figures in (parenthesis) indicate number of yaks.

Cattle, sheep and goats are major livestock species in the west and far western mountain region of Nepal. Yak and chauri are also raised in these districts. Yaks occur in very small numbers compared with *chauri* (crossbreed between yak and cattle). Breeds and productivity of several animal species are given in Annex 2.

These mountain districts are feed deficit during the winter. People use pastures and rangelands for summer feeding. About 10 major fodder trees are available in these districts, which are *Grewia optiva* (Vimal), *Ficus semicordata* (Khanyu), *Litsea monopetala* (Kutmiro), *Ficus nemoralis* (Dudhilo), *Bauhinia variegate* (Koiralo), *Bauhinia purpurea* (Tanki), *Quercus semecarpifolia* (Kharsu), *Leucaena leucocephala* (Ipil ipil), *Quercus leuchotrichophora* (Banjh), *Populus* species (Populus) and *Salix balylonica* (Bains).

Major forage and pasture species in mid- and far-western region of Nepal are *Rosa sericea, Caragana* species, *Artemisia* species, *Medicago falcate, Poa* species, *Pennisetum* species, *Chamae jane, Flaccidum* species, *Hippophae tibetana,* and *Agrostis* species.

Fishery

Fish diversity of Bajhang, Humla, Darchula, and Baitadi Districts of far western development region is one of the most ignored, poorly studied and documented in Nepal. These four districts are enriched with several large international rivers and their tributaries. This implies that the area has potential for warm, as well as cold, water fisheries and aquaculture due to abundance of water. Besides, rich aquatic resources also indicate that these districts should indeed be rich in fish biodiversity resources.

There are only rudimentary studies on fish, fisheries and livelihoods of communities of these districts. However, fisheries could be an attractive area for future development. This is because the

rivers located in these districts are natural habitats of world famous game fishe species such as Mahseer (*Tor putitora*), Katle (*Neolissochielus hexagonolepis*), Asala (*Shizothorax* sp.), etc. Mahseer, also known as Himalayan golden mahseer, is one of the largest freshwater fishes in the Indian Sub-Continent. Large individuals can attain sizes of more than 100 kg body weight. Thus, rich fish biodiversity with several important game fishes suggest that large rivers and lakes could be utilized for promotion of recreational or tourism fisheries in the future (Gurung 2009).

Artificial impoundments, built as hydropower reservoirs, have also been reported in some districts. Recently, Nepal's largest reservoir has been envisaged for the Seti River which is habitat for 34 fish species. The proposed reservoir will cover approximately 2,070 hectares in six far-western districts. This reservoir will also extend to areas of Bajura and Bajhang.

Only a few farmers in some of the districts have initiated fishery activities, particularly pond fish farming. Traditional fisheries in the area are largely undocumented. Landholding pattern from fisheries perspective is not known.

3.2.2 Vegetation, Flora and Threatened Plant Species

Botanical Exploration

While botanical expeditions in Nepal began in the beginning of the 19th century i.e. (1802-03), plant collection in KSL-Nepal area and enroute started only in the 1960s. The botanical explorations carried out in west Nepal (Humla, Bajhang, Darchula and Baitadi districts) from 1952 to 2009 are given in Annex 3. The table shows that altogether 23 trips have been taken for plant explorations in these four districts by Nepalese as well as foreign scientists. However, the herbarium record shows that not many plants have been collected so far from these areas and much remains to be collected.

Ecoregions

The KSL-Nepal region comprises five major ecoregions that represent distinct habitat types.

- **Himalayan subtropical broadleaved forest**. The ecoregion represents the east-west-directed band of Himalayan subtropical broadleaf forests, lying between 500m and 1,000 m asl. Above 1,000 metres, the broadleaf forests yield to the Himalayan subtropical pine forests. These forest types in KSL-Nepal consist of subtropical broadleaf hill forests comprising sal (*Shorea robusta*) forest. *Alnus* species is an early-successional species that invades landslide areas and forms monospecific stands, along with *Albizia* species.
- **Himalayan subtropical pine forest**. The mountain range is made up of east-west-directed parallel zones, between 1,000m and 2,000m asl. The dominant species is Chir pine (*Pinus roxburghii*), which lacks a well-developed understory due to frequent fires.
- **Western Himalayan temperate/broadleaved forest**. This ecoregion represents the temperate broadleaf forests of the western Himalayas between 1,500 and 3,000m asl. Evergreen broad-leaved forests and deciduous broad-leaved forests mainly include *Quercus* species (Figure 3.9a).
- **Western Himalayan subalpine conifer forest**. The ecoregion represents the subalpine conifer forests between 3,000 and 3,500m asl, comprising extensive forests of blue pine (*Pinus wallichiana*), fir (*Abies spectabilis*, and *A. pindrow*), and spruce (*Picea smithiana*) mixed with oak-fir forest. These subalpine areas have a number of economically important species including a large number of medicinal plants.
- **Western Himalayan alpine shrub and meadows**. The ecoregion contains several localized hotspots of floral diversity and endemism such as Himalayan alpine meadows and shrublands between about 3,000 and 5,000m. The rich meadow flora is dominated by herbaceous plants, especially species of *Anaphalis, Aster, Cyananthus, Jurinea, Morina, Potentilla, Delphinium, Gentiana, Meconopsis, Pedicularis, Anemone, Aster, Polygonum, Primula,* and *Saussurea*. A steppe-type vegetation of *Caragana gerardiana, Lonicera spinosa, Juniperus indica, Hippophae tibetana, Myricaria rosea* and *Berberis* species is found in the northern extents of the ecoregion (Figure 3.9b). The ecoregion and the adjoining trans-Himalayas are the prime habitat for the snow leopard and its ungulate prey.

Figure 3.9a Western Himalayan temperate forest

Figure 3.9b Western Himalayan alpine shrub and meadows

Forest Type

At least 18 main forest types occur in the KSL-Nepal area out of total 35 forest types in Nepal as classified by Stainton (1972). They are: 1. Hill Sal (*Shorea robusta*), 2. Riverine (*Bombax ceiba, Toona ciliata, Albizia* species), 3. Chir pine (*Pinus roxburghii*), 4. Alder (*Alnus nepalensis*), 5. Oak (*Quercus* species), 6. Himalayan blue pine (*Pinus wallichiana*), 7. Lower temperate mixed broad-leaved (*Michelia kisopa, Castanopsis tribuloides, Alnus nepalensis*), 8. Upper temperate mixed-broad-leaved (*Aesculus indica, Juglans regia, Acer caesium*), 9. Hemlock (*Tsuga dumosa*), 10. Himalayan Cypress forest (*Cupressus torulosa*), 11. Fir (*Abies spectabilis*), 12. Himalayan spuruce (*Picea smithiana*), 13. Himalayan Cedar (*Cedrus deodara*), 14. Poplar (*Populus ciliata*), 15. Birch (*Betula utilis*), 16. Moist alpine shrub (*Hippophae- Caragana*), 17. Caragana steppe, and 18. Upper alpine meadows (Table 3.10, Figures 3.10a-f).

Table 3.10 Forest types in Kailash Sacred Landscape-Nepal

Forest Type Altitude (m asl)	**Forest Sub-type & (Associated species)**	Baitadi	Darchula	Bajhang	Humla	Remarks
1. Hill Sal forest (700-1000m)	*Shorea robusta* Forest (*Anogeissus latifolia, Terminalia tomentosa, Adina cordifolia, Bauhinia vahlii)*	+	-	-	-	
2. Riverine forest (700-1500m)	Riverine forest with *Toona, Acacia,* and *Albizia* (*Bombax malabaricum, Mallotus philippensis, Acacia catechu*)	+	-	-	-	Similar to that in some parts of KSL-India
3. Chir pine forest (1000-2700m)	*Pinus roxburghii* forest (*Olea cuspidata, Capparis spinosa, Woodfordia fructicosa, Indigofera heterantha*)	+	+	+	+	Similar to that in the KSL-India
4. Alder forest (500-2700m)	*Alnus nepalensis* forest & *A. nitida* forest (*Juglans regia, Quercus floribunda, Populus ciliata*)	+	+	+	+	Similar to that in the KSL-India
5. Oak Forest (2000-3100m)	Oak (*Q. floribunda*) forest (2100-2750m) (*Alnus nepalensis, Q. leuchotrichophora*)	+	+	+	+	
	Oak (*Quercus leucotrichophora, Q.lanata*)-chir pine (*Pinus roxburghii*) forest (2000-2450m)	+	+	+	+	Similar to that in the KSL-India
	Oak (*Q. semecarpifolia* - blue pine (*Pinus wallichiana*) forest (2450-3000m)	-	+	+	+	Similar to that in the KSL-India
	Oak forest (*Quercus semecarpifolia*) forest (2450-3100m) (*Abies spectabilis, Betula utilis, Rosa sericea*)	+	+	+	+	Similar to that in the KSL-India
6. Himalayan blue pine forest (2000-35000m)	Pine (*Pinus wallichiana*) forest (2000-3200m) (*Picea smithiana, Abies pindrow, Q. leuchotrichophora*)	-	-	+	+	Similar to that in the KSL-India
	Pinus-Picea-Abies forest (2800-3500m) (*Pinus wallichiana, Picea smithiana, Abies spectabilis, Q. semecarpifolia, Sorbus cuspidata, Juglans regia, Juniperus wallichiana*)	-	-	+	+	
7. Lower temperate mixed broad-leaved forest (2000-2500m)	Lower temperate mixed forest (*Michelia kisopa, Castanopsis tribuloides, Alnus nepalensis, Euonymous echinatus, Daphne papyracea,*)	-	-	+	-	Rare in KSL area
8. Upper temperate mixed-broad-leaved forest (2000-2900m)	*Aesculus- Juglans-Acer* (*Aesculus indica, Juglans regia, Acer caesium*) (*Betula alnoides, Alnus nepalensis, Quercus floribunda, Q. semecarpifolia, Prunus cornuta*)	+	-	-	+	Similar to that in the KSL-India

9. Hemlock forest (2100-3200m)	*Tsuga dumosa* forest (*Pinus wallichiana, Abies spectabilis, Sorbus cuspidate, Ilex dipyrena*)	-	+	+	+	
10.Himalayan Cypress forest 2100-2900m)	*Cupressus torulosa-Abies pindrow* (*Rosa macrophylla, Syringa emodi*)	-	+	-	+	
	Cupressus torulosa (Juniperus indica, Viburnum cotinifolium, Berberis species, Cotoneaster species)	-	+	+	+	
11. Himalayan Spruce forest (2150-3200m)	*Picea smithiana* (*Pinus wallichiana, Abies pindrow, Tsuga dumosa, Populus ciliate, Betula utilis*)	-	-	+	+	
12. Fir forest 2150-3500m)	*Abies pindrow* (2150-2900m)	-	+	+	+	Similar to that in the KSL-India
	Abies spectabilis (3050-3950m) (*Sorbus foliolosa, Taxus wallichiana, Rosa* sericea, *Cotoneaster acuminata, Ribes graciale*)	-	+	+	+	
	Abies spectabilis-Betula utilis forest (3000-4000m)	-	+	+	+	
	Abies spectabilis-Junipeus indicar forest (3000-3500m)	-	-	+	+	
13. Himalayan Cedar forest (2000-2600m)	*Cedrus deodara* (*Pinus wallichiana, Rosa sericea, Berberis aristata, Cotoneaster frigidusSpiraea canescens*)	+	+	+	+	
14. Poplar forest (2150-3200m)	*Populus ciliata* (*Picea smithiana, Pinus wallichiana, Hippophae salicifolia, Rosa sericea, Jasminus officinale*)	-	-	-	+	
15. Birch forest 2900-4000m)	*Betula utilis* forest (2900-3800m) (*Prunus rufa, Acer caesium, Sorbus microphylla, Lonicera myrtillus*)	-	+	+	+	
	Betula utilis-Rhododendron campanulatum (3500-4000m) (*Abies spectabilis, Prunus cornuta, Ribes graciale, Lonicera myrtillus*)	-	-	+	+	
16. Moist alpine shrub (3650-4400m)	Moist alpine shrub (*Juniperus wallichiana, Rhododendron lepidotum, R. anthopogon, Potentilla fruticosa, Lonicera obovata*)	-	+	+	+	Similar to that in the KSL-China
17. *Caragana* Steppe (4000-4500m)	*Caragana* Steppe (*Caragana gerardiana, C. brevifolia, Myricaria rosea*)	-	-	-	+	Similar to that in the KSL-China
18. Upper alpine meadows (4500-5000m)	Upper alpine meadows (*Festuca ovina, Kobresia seliculmus, Agrostis munroana, Allium carolinianum, Arenaria polytrichoides, Saxifraga stenophylla*)	-	-	-	+	Similar to that in the KSL-China
(Source: Stainton 1972; DFO reports 2008; Field Study 2010)						

Endemic Species

A total of 13 endemic plant species has been documented so far from KSL-Nepal region those are mainly distributed above 2500 m (Figure 3.11, Annex 4). It is worth to mention here that the north-west part of western Nepal (Kali-Karnali region), comprising eight districts of Nepal possess 101 species of endemic plants, and Dolpa district alone comprises 65 species. Therefore, it has been estimated that after thorough explorations, the number of endemic plants would be increased. Moreover, it is also essential to assess and monitor the distribution and frequency of occurrence of the endemic species.

Flora

As such, Eastern and Mediterranean floristic elements dominate, due to topographic, climatic, and altitudinal complexities. However, north-Indian elements occur in the lower altitudes in the south, and Tibetan flora in the northern Trans-Himalayan zone. Only a few botanical collections have been undertaken in the KSL-Nepal, hence the areas merit a systematic floristic study. We estimate that the KSL-Nepal region comprises about one third of the total 6,500 species (Press et al. 2000) of angiosperms in Nepal. Based on botanical collections made in Humla, the largest ten families is comprised of Asteraceae (18 genera/29species), Poaceae (16/18), Fabaceae (12/17), Brassicaceae (11/13), Liliaceae (10/15), Lamiaceae (10/10), Scrophulariaceae (9/10), Ranunculaceae (8/29), and Polygonaceae (7/16). Similarly, Largest genera of angiosperms include Anemone and Potentilla (8 species each), Lonicera (7 species), Berberis, Ficus, Rhododendron and Rubus (6 species each),

Acer, Androsace, Artemisia, Clematis, Prunus, Rosa, Salix (5 species each), Aconitum, Cotoneaster, Primula, Thalictrum (4 species each).

Flora of the KSL-Nepal region or even the checklist of flowering plants of the KSL-Nepal region is not available. A recent cursory survey in some parts of Humla district and screening of the specimens in National Herbarium revealed the presence of nearly 700 species (Annex 5). Therefore, a series of botanical explorations, and examination of herbarium specimens previously collected from that area, which are housed in national and international herbaria, may be instrumental to document the flowering plants as well as non-flowering plants of the KSL-Nepal region.

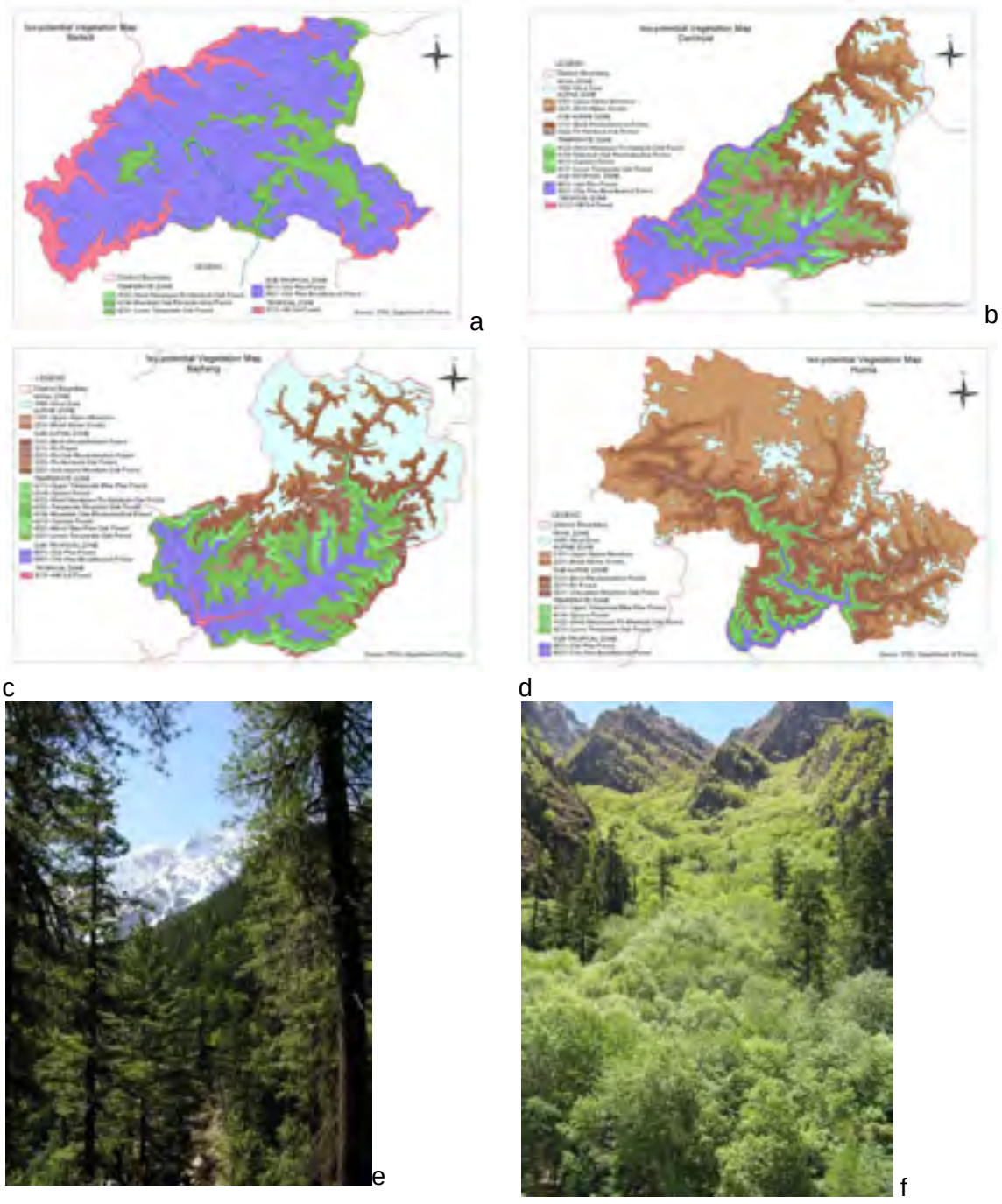


Figure 3.10a-f Vegetation/forest type: a-Baitadi; b-Darchula, c-Bajhang, d-Humla, e-Conifer (Bluepine) forest, f-Birch forest

3.2.3 Useful/NTFPs/Medicinal Plants: A case study in Humla District

Plant species are used for various purposes that include food, medicine, timber, fiber and trade. Only a few studies exist to document plant species into various categories such as NTFPs, medicinal, edible, ritual, fodder (Nepal and Sapkota 2005, Burlakoti and Kunwar 2009). Healers and different ethnic communities use plant species in traditional medicinal practice (Kunwar et al. 2008, Joshi 2009).

Figure 3.11 *Eskemukerjia megacarpum***,** an endemic species

Figure 3.12 *Morchella* species

We conducted a study to document useful plant species at Thehe (inhabited by Lama) and Chhipra VDC (inhabited by Chhettri, Thakuri and Dalits) in Humla District. A total of 167 species of vascular plants, 4 species of mushrooms (including *Morchella conica,* Figure 3.12) and 1 species of lichen have been recorded from Thehe and Chhipra VDCs as useful plant species. According to use, these species are grouped into nine use categories (Figure 3.13). Highest number of species was cited for medicine (92 species, 53% of total species) and food (78 species, 45%). Among food plants, highest proportion of species (45%) is consumed as cooked vegetables (Figure 3.14). Besides medicine and food, the other important use categories included social-religious (29 species, 17%), fuel/timber (26 species, 15%), and fodder (14 species, 8%) (Figure 3.13). Plant parts of about 20 species are traded from the two VDCs. About 79 species (46% of total) have multiple uses. Details of the useful species will be submitted as a Masters dissertation.

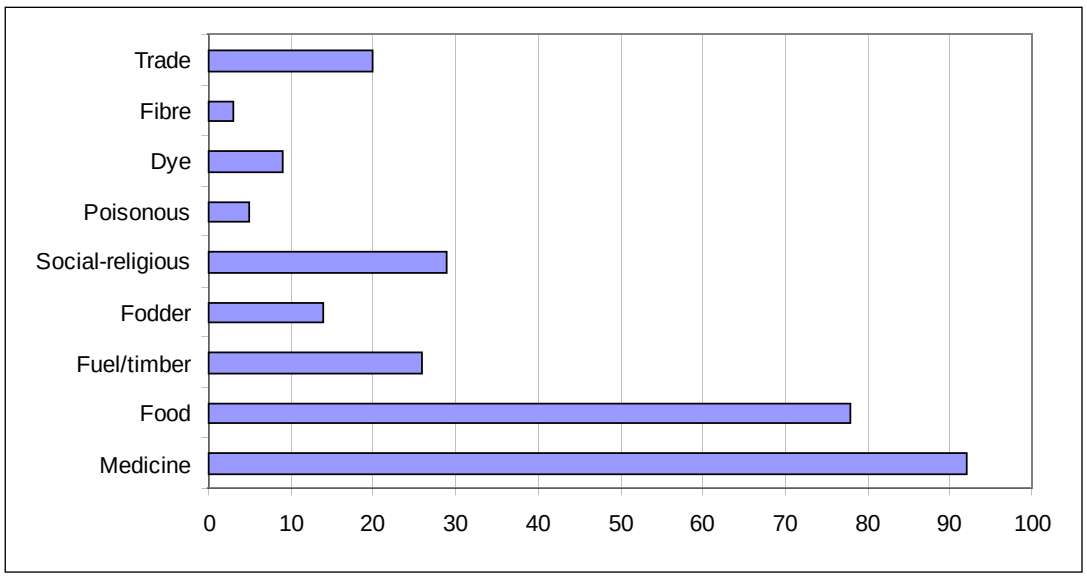


Figure 3.13 Useful plant species under different use categories recorded in Thehe and Chhipra VDCs

A list of selected species of plants from Thehe and Chhipra VDCs having medicinal, food and socio-cultural importance and information on local name, locality, distribution, parts used, use in brief is given in Annex 6.

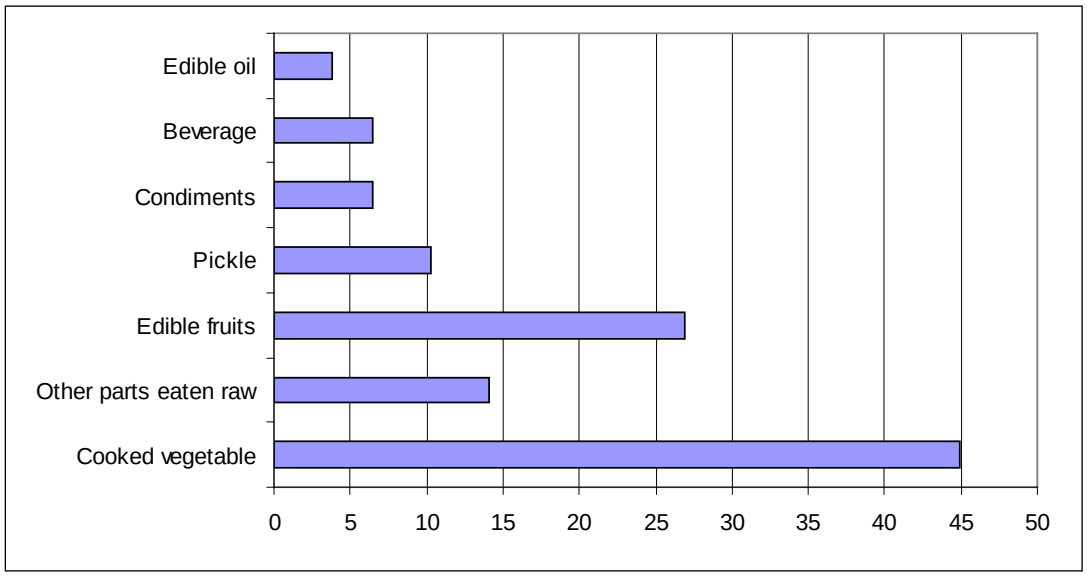


Figure 3.14 Food plant species (%) under different processing categories in Thehe and Chhipra VDCs

NTFPs/Medicinal. Important NTFPs/Medicinal plant species include *Aconitum bisma, Aconitum ferox, A. spicatum, Asparagus filicinus Berginea ciliata, Dactylorhiza hatagirea* (Figure 3.15b), *Delphinium himalayai, Fritillaria cirrhosa* (Figure 3.15a), *Juniperis indica, Morchella conica* (Figure 3.12), *Nardostachys grandiflora, Neopicrorhiza scrophulariiflora* (Figure 3.15c), *Paris polyphylla, Parnassia nubicola, Podophyllum hexandrum, Prinsepia utilis, Rheum australe, Rhododendron anthopogon, Taxus wallichiana, Thymus linearis, Valeriana wallichii.*

Figure 3.15a *Fritillaria cirrhosa*

Figure 3.15b *Dactylorhiza hatagirea*

Figure 3.15c *Neopicrorhiza scrophulariiflora*

Figure 3.15d *Juglans regia*

Figure 3.15e *Berberis asiatica*

Figure 3.15f Extracting oil from *Princepia utilis*

Edible plants. Some edible plant species from the KSL-Nepal region are *Aconogonum molle, Allium wallichii, Amaranthus caudatus, Arundinaria falcata, Asparagus racemosus, Berberis asiatica* (Figure 3.15e), *Cannabis sativa, Chenopodium album, Dendrocalamus hamiltonii, Diplazium stoliczae, Fragaria nubicola, Hippophae salicifolia, H. tibetana, Juglans regia* (Figure 3.15d), *Lindera neesiana, Morchella conica, Morus alba, Phytolaca acenosa, Polygonatum verticillatum, Prunus*

napaulensis, Pyrus pashia, Rosa sericea, Rubus ellipticus, Rumex species, Smilax aspera, Typhonium diversifolium, Urtica dioica, etc.

Plant species are used in various ways. A study conducted at Thehe and Chhipra VDC in Humla showed that edible plants also have trade value at local and international levels (Table 3.11).

Table 3.11 Edible Plants

Most potential species	Altitude (m)	Important distribution area (VDC)	Use(s)	Parts Used	Trade Value
Arisaema erubescens[1]	3100-3500	Jabkung, Seding (Thehe)	Vegetable	Tuber	low
Arisaema flavum[1]	2700-3100	Dojam, Japkung, (Thehe)	Vegetable	Whole Plant	low
Arisaema griffithii[1]	2800-3100	Japkung (Thehe)	vegetable	Leaves	low
Berberis aristata[1]	2100-2450	Hildum chhada, Simikot; (Thehe; Chipra)	eaten raw	Fruits	low
Dryopteris cochleata[1]	2000-2500	Chipra VDC	Vegetable	Young fronds	low
Juglans regia[1]	2100-3100	Chipra VDC; Dojam, Jabkung (Thehe)	edible oil extraction, edible kernels	Kernel	low
Megacarpea polyandra[2]	2800-3500	Tugling (Thehe); Upper Nalna (Chipra)	vegetable	Leaves	low
Morchella species[3]	3200-3800	Seding, Upper Japkung (Thehe)	Vegetable	Whole plant	High
Polygonatum verticillatum[1]	3100-3600	Japkung, Tugling, Seding, Polakyong (Thehe)	Vegetable	Tenders, leaves	low
Prinsepia utilis[1]	2200-2500	Nalna, Hildum khola, Chaupata (Chipra)	edible oil extraction	Cotyledons	low
Prunus sp[1]	2700-3000	They, Dojam (They VDC)	edible oil extraction	cotyledons	low
Rosa macrophylla[1]	2800-3200	Dojam, Jabkung (They VDC)	local tea	roots	low
Smilicina purpurea[1]	3200-3600	Japkung-Seding (Thehe)	Vegetable	Young leaves	low
Sorbus cuspidata[1]	2800-3500	Chipra VDC, Thehe, Dojam (Thehe)	ripe fruits edible	Fruits	low

1- All the edible plants are either traded locally or used for domestic consumption and therefore categorized as low trade value; 2- Higher price in the local markets; 3- Trade route to China via Limi. *Sorbus cuspidata*-Apple branches are grafted with the stem of *Sorbus cuspidata* to produce new variety of apple with stronger branches.

Cultural and Ritual plants. Culturally important plant species are utilized by the local communities as ritual during festivals, household goods, and some of them also hold trade value. They include *Abies pindrow, A. spectabilis, Acer caesium, A. cappadocicum* (Figure 3.16)*, Artemisia indica, Betula utilis, Buddleia asiatica, Juniperus indica, Nardostachys grandiflora, Valeriana hardwickii, V. jatamansii, Rhododendron anthopogon, R. Lepidotum,* etc. (Table 3.12).

Figure 3.16 *Acer cappadocicum*

Table 3.12 Culturally important plants

Most potential species	Altitude (m)	IPAs Place (VDC)	Use(s)	Parts used	Trade Value	Trade route & Remarks
Acer cappadocicum	3000-3300	Japkung (Thehe)	Knotty burs of trunk in the preparation of drinking cups (fura)	wood	Medium	To China, sometimes to India. Wood is exported to China to make fura (cup), and then sold in the markets of China or India
Betula utilis	2700-4200	Manal-Seding (Thehe)	Fuel, resin is used as substitute of tea, to make plough	wood	Low	
Nardostachys grandiflora	4300-4500	Chhudalung, upper selding (Thehe)	Rhizome in incense particularly during worships	rhizome	high	To China, sometimes to India
Taxus wallichiana	3000-3500	Japkung-Tukling (Thehe)	to make musli, handles of other agricultural equipments	wood	Medium	
Cedrus Deodara	2200	Chipra VDC	Holy plant, planted at temples	Whole live plant	low	

Invasive Alien Plant Species

Invasive alien species (IAS) is known to out-compete native species and cause habitat degradation and ecosystem degradation. There is no detailed study of IAS in KSL-Nepal. Common IAS at lower altitudes include *Ageratina adenophora (Eupatorium adenophorum), Chromolaena odorata, Parthenium hysterophorus, Eichhornia crassipes, Ipomoea carnea* ssp. *fistulaosa, Lantana camara, Ageratum conyzoides, Amaranthus spinosus, Bidens pilosa, Cassia tora, Cassia occidentalis, Xanthium strumarium*, etc (Tiwari *et al.* 2005).

Threatened Plant Species

There are, altogether 15 plant species threatened and protected under various categories by GoN. In the KSL-Nepal region 12 species (out of total 17 species in Nepal) protected by the Government of Nepal under various categoris are recorded (Table 3.13).

Table 3.13 Threatened and protected flora in KSL-Nepal

S.N	Scientific Name	Common Name	Family	Status Code		Legal Status
				IUCN	CITES	
Banned for collection and export						
1	*Dactylorhiza hatagirea*	Panch Aule	Orchidaceae	-	II	P
2	*Juglans regia* (bark)	Okhar ko bokra	Juglandaceae	-	-	P
3	*Neopicrorhiza scrophulariiflora*	Kutki	Scrophulariaceae	V	-	P
Banned for export without processing as specified						
4	*Nardostachys grandiflora*	Jatamansi	Valerianaceae	V	II	P
5	*Rauvolfia serpentina*	Sarpaganda	Apocynaceae	E	II	P
6	*Valeriana jatamansii*	Sugandabala	Valerianaceae	-	II	P
7	Lichens	Jhyau	-	-	-	P
8	*Abies spectabilis*	Talispatra	Pinaceae	-	II	P
9	*Taxus baccata* subsp. *wallichiana*	Himalayan Yew	Pinaceae	-	II	P
10	*Cordyceps sinensis*	Yarsagombu	Hypocreaceae	-	-	P
Banned for felling, transportation and export						
11	*Shorea robusta*	Sal	Dipterocarpaceae	-	-	P
12	*Bombax ceiba*	Simal	Bombacaceae	-	-	P
13	*Juglans regia* (Tree)	Okhar	Juglandaceae	-	-	P
13	*Aconitum heterophyllum*	Bikh	Ranunculaceae	R	-	-
14	*Meconopsis regia*	Himalayan Yellow Poppy	Papaveraceae	-	III	-
15	Orchidaceae	Sungava	Orchids	-	II	-
16	*Swertia chirayita*	Chirayato	Gentianaceae	V	-	-

P = Protected by NPWC Act 1973, CITES: Appendix II; Appendix III, IUCN: V-Vulnerable; E-Endangered; R-Rare

Other important plant species meriting conservation

The surveyed areas in Humla (Thehe and Chhipra VDC) are rich in threatened plant species which merit proper conservation. Plant species with local distribution, threat category (global, regional and national) and their local availability is given in Table 3.14.

Table 3.14 Rare and threatened plant species recorded in Thehe and Chhipra VDCs and their status

Botanical name	Family	Local	Local distribution		Threat category*				Protection and priority			Ende micity	Local Avail-ability	Local status
		name	Locality	Altitude	Global	Regional	National		CITES	GN	GN			
				m asl			1996	2001	Appendix	Protected	Prioritized			
Aconitum spicatum	Ranunculaceae	Duk	Tugling	3220-3400	-	-	CT	VU	-	-	+	$H_{im}E_{nd}$	C	NT
Bergenia ciliata	Saxifragaceae	-	Ghattekhola area	2900-3000	-	VU	CT	-	-	-	+	$H_{im}E_{nd}$	R	NT
Dactylorhiza hatagirea	Orchidaceae	Hattajadi	Tugling-Seding	3300-3700	-	EN-CR	-	EN	Ap. II	+	+	$H_{im}E_{nd}$	R	$T^{n,a}$
Delphinium himalayai	Ranunculaceae	Atis	Manal-Jabkung	2700-3300	-	-	-	VU	-	-	-	$N_{ep}E_{nd}$	C	T^{a}
Dioscorea deltoidea	Dioscoriaceae	Khankhani	Manal-Gyal dorje	2700-2950	-	EN-CR	CT	EN	Ap. II	-	+	wide	C	NT
Eskemukerjea meghacarpum	Polygonaceae	Kyunmanlang	Jabak-Jabkung	2840-3200	-	-	R	-	-	-	-	$N_{ep}E_{nd}$	F	NT
Fritillaria cirrhosa	Liliaceae	Podya	Ladegompa area	3400-4200	-	-	-	VU	-	-	-	$H_{im}E_{nd}$	C	T^{a}
Juglans regia var. *kumaonia*	Juglandaceae	Okhar	Baijubara-Jabkung	2500-3300	-	-	-	-	-	+	+	$H_{im}E_{nd}$	C	NT
Jurinea dolomiaea	Asteraceae	Dhupjadi	Above Seding	4200-4500	-	NT,VU-EN	-	NR	-			$N_{ar}E_{nd}$	C	$T^{n,a}$
Nardostachys grandiflora	Valerianaceae	Bhultya	Above Seding	4200-4500	-	VU,EN-CR	VU	VU	Ap. II	+	+	$H_{im}C_{hn}$	C	T^{a}
Neopicrorhiza scrophulariiflora	Scrophulariaceae	Katuki	Above Seding	3400-4500	-	VU	VU	VU	-	+	+	$H_{im}C_{hn}$	C	T^{a}
Podophyllum hexandrum	Berberidaceae	-	Jabkung-Seding	3100-4200	-	VU,EN-CR	VU	VU	Ap. II	-	+	wide	C	NT
Rheum australe	Polygonaceae	Arthakpa	Tugling-Seding	3300-3700	-	VU	-	VU	-	-	+	$H_{im}E_{nd}$	C	T^{a}
Rheum moorcroftianum	Polygonaceae	Padamchalno	Seding	3700-4200	-	NT-VU	-	NR	-	-	-	$N_{ar}E_{nd}$	R	$T^{n,a}$
Rubia manjith	Rubiaceae	Majitho	Ghattekhola area	2700-3050	-	-	-	VU	-	-	+	$N_{ar}E_{nd}$	C	NT
Schisandra grandiflora	Schisandraceae	-	Ghattekhola area	3050	-	-	-	-	-	-	-	$H_{im}E_{nd}$	R	T^{a}
Taxus wallichiana	Taxaceae	Sangasing	Jabkung-Tukling	3100-3400	-	EN-CR	-	EN	Ap. II	-	+	wide	F	T^{a}
Valeriana jatamansii	Valerianaceae	Samayo	Chhipra	2100-2400	-	VU-CR	-	VU	-	+	+	$H_{im}C_{hn}$	R	T^{a}
Ulmus wallichiana	Ulmaceae	Tyaktyak	Gyaldorje forest	2800-3000	VU	-	R	-	-	-	-	$H_{im}I_{nd}$	F	NT

3.2.4 Fauna

Faunal diversity is high in the KSL-Nepal region.

Mammals

A total of 83 species of mammals representing nine orders, 26 families and 61 genera are currently listed from the KSL-Nepal (B.P.P. 1995a, b; DNPWC/MFSC/GoN 2005; Bhuju *et al.* 2007; Siwakoti & Basnet 2007; Baral & Shah 2008). Among them, 55 species occur in the midhills (between 1,000 – 2,500 m asl), and 56 species in the highlands (above 2,600 m asl). In Kailash region, Snow Leopard (*Panthera uncia),* Tibetan Antelope (*Pantholops hodgsoni),* Asiatic Wild-dog/Dhole (*Cuon alpines*), Red Panda (*Ailurus fulgens*), Particoloured Flying Squirrel (*Hylopetes alboniger)* are under IUCN Endangered category (Annex 3). There are eight regionally confined mammalian species in the KSL-Nepal. They are Horsefield's Shrew (*Crossidura horsfieldi*), Pearson's Horseshoe Bat (*Rhinolophus pearsonii*), Rufous Horseshoe Bat (*Rhinolophus rouxi*), Bent Wing Bat (*Miniopterus schreibersii),* Little Tube-nosed Bat (*Murina aurata*), Hog Badger (*Arctonyx collaris*), Himalayan Field Mouse (*Apodemus gurkha*-Nepal endemic) and Tibetan Antelope (*Pantholops hodgsoni*). Hence, KSL-Nepal significantly contributes in conserving mammalian species at genetic level (Figure 3.17). A summary of local, national and globally threatened status of mammalian species is given in Table 3.17 and annotated checklist supplement in Annex 7.

Figure 3.17 Himalayan marmot (*Marmota bobak*)

Box 3.1. Mammal species observed in Humla

In the feasibility study carried out in May-June 2010, 26 species of mammals were verified from Humla district. Herds of Blue Sheep (*Pseudois nayaur*), more than 25 in numbers were observed near Tila village in Limi, and Changla Himal. At Limi village, some of the goats killed and injured by Snow Leopards were also encountered. Snow Leopard's were recorded from Manepeme, Limi valley and Tolung lake areas. Wild Yak (*Bos mutus*) was reported from Chinese border – Deu khola and Sajhe khola area. Similarly, Tibetan Wild ass or Kiang (*Equus kiang*) was reported form Takse Khola, Gyau Khola and Sakya Khola area, close to the border of China. Tibetan antelope (*Pantholops hodgsoni*), an endangered species was also reported from the area.

Source: Field study, May-June 2010

Birds

The area habours 455 bird species representing 17 orders, 50 families and 213 genera (Fleming *et al.* 1976; Inskipp 1989; B.P.P. 1995a, b; Grimmet *et al.* 1998, 2000; Baral & Inskipp 2004, 2005; DNPWC/MFSC/GoN 2005; Bhuju *et al.* 2007; Siwakoti & Basnet 2007). Over 65% of species are residential and remaining 35% are summer visitor or migratory. Midhills zone of the area habours 388 birds where as highlands support for 287 species. The species of birds that are under risk in trade (CITES appendix) are 73 species (NHM/TU & IUCN 2002 (2059-BS). Among them, three vulture species *viz.* White-rumped Vulture (*Gyps bengalensis)*, Slender-billed Vulture (*Gyps tenuirostris),* and Red-headed Vulture (*Sarcogyps calvus)* are the critically endangered (IUCN 2007). Four species of birds: Cheer Pheasant (*Catreus wallichii)*, Himalayan Monal (*Lophophorus impejanus*), Satyr Tragopan (*Tragopan satyra),* and Black Stork (*Ciconia nigra)* are under legal protection by the Government of Nepal (Annex 3).

The KSL-Nepal region offers habitat for at least six bird species which have regional restricted range of distribution in Nepal. They are Red-necked Phalarope (*Phalaropus lobatus)*, White-cheeked Tit (*Aegithalos leucogenys)*, Tytler's Leaf Warbler (*Phylloscopus tytleri)*, Black-chinned Yuhina (*Yuhina nigrimenta)*, Spectacled Finch (*Callacanthis burtoni)* and Yellowhammer (*Emberiza citronella)*. It also habours significant number of breeding bird species [see Table 3.17 and Annex 8].

Other potential important bird areas of the KSL-Nepal region are forest and grasslands of Baitadi district. The sites could be potential for carrying out surveying of the critically endangered Himalayan Quail (*Ophrysia superciliosa),* a species not yet recorded in Nepal.

Two species of vultures, Himalayan Griffon (*Gyps himalayensis)* and Lammergeier (*Gypaetus barbatus)*, were commonly observed in good numbers from Humla District, and another endangered species, Egyptian Vulture (*Neophron percnopterus)*, recorded only once or twice. On the basis of local informants, globally threatened Cheer pheasant were reported from grassland and slope of Chehate forest of Khagalgaun, Thehe and Chhipra VDCs in Humla District (Figure 3.18).

Table 3.15 Amphibian and reptilian species reported only from the KSL-Nepal region

SN	Common Name	*Scientific Name*
1	Nyingchi high altitude toad	*Scutiger nyingchiensis*
2	Sikkimese pelobatid toad	*Scutiger sikimmensis*
3	Bajang frog	*Paa ercepeae*
4	Small paa frog	*Paa minica*
5	Indian Borrowing frog	*Sphaerotheca breviceps*
6	Elongated Tortoise	*Indotestudo elongata*
7	Large mountain lizard	*Oriotiaris major*
8	Agaupani forest agama	*Oriotiaris dasi*
9	Kumaon mountain lizard	*Oriotiaris kumaonensis*
10	Theobald's Toad Agama	*Phrynocephalus theobaldi*
11	Nepalese rock gecko	*Cyrtopodion nepalense*
12	Himalayan ground skink	*Asymblepharus himalayanus*
13	Nepalese ground skink	*Asymblepharus nepalensis*
14	Red bellied Kukri Snake	*Oligodon erythrogaster*
15	Boulenger's Keelback	*Amphiesma parallelum*
16	Olive oriental slender snake	*Trachischium leave*

Sources: Shah 1995; Shah 2004; DNPWC/MFSC/GoN 2005; Bhuju *et a*l. 2007

Box 3.2. Bird species observed in Humla

Over 125 species of birds were verified from different habitats between 2,800m to 5,000m asl during the feasibility study (May, 2010) in Humla district. Two species of vultures Himalayan Griffon (*Gyps himalayensis)* and Lammergeier (*Gypaetus barbatus)* were commonly observed in Humla district, and another endangered species Egyptian vulture (*Neophron percnopterus)* was recorded only once or twice. On the basis of local informants, globally threatened Cheer Pheasant were reported from grassland and slope of Chehate forest of Khagalgaun, Thehe and Chuprak VDC in Humla district.

Source: Field study, May-June 2010

According to Baral & Inskipp (2005), five globally threatened species Satyr Tragopan (*Tragopan styra*), White-rumped Vulture (*Gyps bengalensis*), Cinereous Vulture (*Aegypius monachus)*, Red-headed Vulture (*Sarcogyps calvus*), Tytler's Leaf Warbler (*Phylloscopus tytleri)* and two Restricted range species Tytler's Leaf Warbler (*Phylloscopus tytleri*), and Spectacled Finch (*Callacantheis burtoni)* has been reported from this Important Bird Areas (IBA). Similarly, another endangered species Egyptian Vulture *Neophron percnopterus* also reported from this region. Some identifies potential Important Bird Area of the Kailas Sacred Landscape is the forest and grasslands of Baitadi district. This site could be a potential survey site for the critically endangered Himalayan Quail *Ophrysia superciliosa* a species not yet recorded in Nepal.

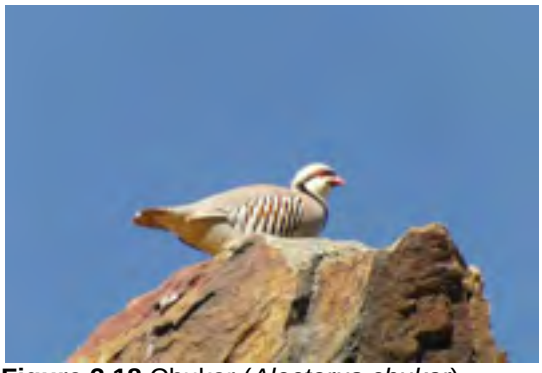


Figure 3.18 Chukar (*Alectorus chukar*)

Herpeto fauna

Toads, frogs, lizards and snakes have been reported from the KSL-Nepal region in Nepal. There are 38 species of amphibian and reptile found in the region, representing four orders, 10 families and 25 genera (Shah 1995; Shah 2004; DNPWC/MFSC/GoN 2005; Bhuju *et al.* 2007; Siwakoti & Basnet 2007). Fewer numbers of species occur in highland (11 species) than in Midhills (30 species). One species, Yellow monitor (*Varanus flavescens)* falls under the legal protection of the GoN. Four species of reptiles and amphibians are listed in the IUCN red list; among them one species of Elongated tortoise (*Indotestudo elongate)* is listed under Endangered categories. Similarly, five species fall under the CITES appendix (NHM/TU & IUCN 2059-BS). The KSL-Nepal region harbours three endemic amphibian species: Khaptad Pelobatid Toad (*Scutiger nepalensis)*, Bajang Frog (*Paa ercepeae)*, and Small Paa Frog (*Paa minica)* (Annex 2b). Similarly, it harbours Nepalese Rock Gecko (*Cyrtopodion nepalense),* and Nepalese Ground Skink (*Asymblepharus nepalensis),* an endemic reptiles. In a feasibility study, only two species of reptiles Theobal's toad agama (*Phrynocephalus theobaldi*) and Skink (*Asymblepharus* species) were

observed during May-June 2010 in Humla district. A significant number of toads, frogs, lizards and snakes have been reported only from KSL-Nepal, thus significantly contributing to the gene pool of Nepalese herpeto-diversity. At least 16 amphibia and reptiles which are restricted to KSL-Nepal are presented in Table 3.15 and Annex 9.

During the field survey in Humla District, only two species of reptiles, Theobal's toad agama (*Phrynocephalus theobaldi*) and Skink (*Asymblepharus* sp.) were observed.

Fish

Altogether 119 species of fish belonging to 10 orders, 26 families, and 62 genera have been reported from the Mahakali, Karnali and Seti Rivers that are the main watershed areas in Kailash, and its adjoining areas (Shrestha 1994, 1995; Bhuju *et al.* 2007; Bhattarai *et al.* 2062-BS). Among them Fageta *(Barilius barna)*, Kunar snow trout (*Schizotharaichthys labiatus)*, Spotted snow trout (*Schizothorax plagiostomus),* and Titari (*Psilorhynchus homaloptera)* are reported from high altitudes. These fishes require relatively clean, transparent cold and high oxygenated waters for feeding and spawning. Many remaining species are reported from the midhills or lower altitude. No fish species falls under the threat categories of IUCN and CITES Appendixes. Similarly, no species is under GoN legal protection; however some 19 species are listed in the 1995 National Red Data Book meriting legal protection. Among them, one species: Sahar (*Tor tor)* is Endangered, eight species are Vulnerable, and ten species are Susceptible (B.P.P. 1995c). One species Chuche Asala (*Schizotharaichthys annandalei)* is an endemic species reported from KSL-Nepal. Other two fish species are reported only from this region in Nepal, they are Rato machha (*Carassius carassius),* and Tengana (G*lyptosternum blythii)* [Table 3.16 and Annex 10].

Table 3.16 Summary of potential faunal taxa from the KSL-Nepal region and their local, national and globally threatened status

Threat Categories / Taxa	Mammals	Birds	Herpeto	Fish
Orders	9	17	4	10
Families	26	50	10	26
Genus	61	213	25	62
Species	**83**	**456**	**38**	**119**
Mid Hill	55	388	30	>18
High Land	57	287	11	4
GoN protected	**11**	**4**	**1**	**0**
CITES Appendix	**36**	**73**	**5**	**0**
I	16	4	0	0
II	9	56	2	0
III	11	13	3	0
IUCN Red list	**23**	**12**	**4**	**0**
CR	0	3	0	0
EN	5	1	1	0
VU	9	3	2	0
NT	9	5	1	0
NRDB list	**30**	**56**	**7**	**19**
C	2	2	0	0
E	3	3	0	1
V	10	10	0	8
S	15	41	7	10
Endemic spp.	**1**	**1**	**5**	**1**
Regional confinement spp.	**33**	**16**	**12**	**7**
HL WP	3	2	3	4
HL	14	12	1	0
MH WP	2	0	5	0
MH	14	2	3	3
Restricted Range spp.	**8**	**6**	**16**	**>2**

Sources: B.P.P. 1995a, b, c; DNPWC/MFSC/GoN 2005; Bhuju *et al.* 2007; Siwakoti & Basnet 2007; NHM/TU & IUCN 2059-BS, Fleming *et al.* 1976; Inskipp 1989; Suwal & Verheugt 1995; Grimmet *et al.* 1998, 2000; Baral & Inskipp 2004, 2005; Shah 1995; Shah 2004; Shrestha 1994, 1995 and Humla D.F.O. 2062/63-BS

Note: IUCN: CR – Critically Endangered, EN- Endangered, VU – Vulnerable, NT – Near Threatened; NRDB: C – Critically Endangered, E- Endangered, V – Vulnerable and S – Susceptible; HL – High land, WP – Western part, MH – Midhills

3.2.5 Threatened Animal Species

The KSL-Nepal region comprises a numbers of threatened and protected fauna. Altogether 17 species of mammals, ten species of birds and four species of herpeto fauna are threatened species reported from the region. A total of 11 mammal species (out of 26 species), four bird species (out of nine species), and one herpeto species (out of three species) are protected by the Government of Nepal. The endangered, threatened and protected species of animals reported in the KSL-Nepal region with their status of protection are listed in the Table 3.17.

Table 3.17 Some endangered, threatened and protected flora and fauna of the KSL-Nepal region

Taxa / Common Name	Scientific Name	GoN	IUCN Red list
Mammals			
Chinese Pangolin	*Manis pentadacyla*	P	
Assamese Macaque	*Macaca assamensis*	P	VU
Asiatic Wild-dog, Dhole	*Cuon alpinus*	-	EN
Grey Wolf	*Canis lupus*	P	
Brown Bear	*Ursus arctos*	P	
Himalayan Black Bear	*Ursus thibetanus*		VU
Red Panda	*Ailurus fulgens*	P	EN
Snow Leopard	*Panthera uncia*	P	EN
Clouded Leopard	*Pardofelis nebulosa*	P	VU
Leopard Cat	*Prionailurus bengalensis*	P	
Musk Deer	*Moschus chrysogaster*	P	
Wild Yak	*Bos mutus*	P	VU
Himalayan Thar	*Hemitragus jemlahicus*		VU
Mainland Serow	*Capricornis sumatraensis*		VU
Tibetan Antelope	*Pantholops hodgsoni*	P	EN
Irrawaddy Squirrel	*Callosciurus pygerythrus*		VU
Particoloured Flying Squirrel	*Hylopetes alboniger*		EN
Birds			
Cheer Pheasant	*Catreus wallichii*	P	VU
Himalayan Monal	*Lophophorus impejanus*	P	
Satyr Tragopan	*Tragopan satyra*	P	NT
White-rumped Vulture	*Gyps bengalensis*		CR
Slender-billed Vulture	*Gyps tenuirostris*		CR
Pallas's Fish Eagle	*Haliaeetus leucoryphus*		VU
Egyptian Vulture	*Neophron percnopterus*		EN
Red-headed Vulture	*Sarcogyps calvus*		CR
Black Stork	*Ciconia nigra*	P	
Grey-crown Priniya	*Prinia cinereocapilla*		VU
Herpeto			
Khaptad pelobatid toad	*Scutiger nepalensis*		VU
Small paa frog	*Paa minica*		VU
Elongated Tortoise	*Indotestudo elongata*		EN
Yellow Monitor	*Varanus flavescens*	P	

GoN: P = Protected by the Government of Nepal under the National Parks and Wildlife Conservation (NPWC) Act 1973
IUCN = IUCN Red List Category: CR = Critically Endangered; EN = Endangered; VU = Vulnerable; NT = Near Threatened

3.2.6 Important Habitats and Wildlife Corridors

The KSL-Nepal region supports several important habitats of plant and animal species. Important wildlife habitats in the area include forests, grasslands, agricultural lands, and wetlands (rivers, streams, lakes, and ponds). However, limited scientific study exists on important habitats for plant and animal species, and wildlife corridors due to remote location (Hamilton and Radford 2007; Baral and Inskipp 2005).

Forests and Pasturelands. Humla, Bajhang and Darchula Districts provide diversity of natural forests and large pasturelands. Mammals, including endangered animals such as snow leopard, wild yak, Tibetan antelope and Kiang mainly inhabit areas along the Nepal-China border in Humla District. Musk deer habitat is the dense conifer forest of Humla, Bajhang and Darchula Districts. Important bird areas include wetlands in the protected areas (Khaptad, Rara), and the Humla and Mahakali Rivers and their tributaries. Important bird areas and wildlife habitats in KSL-Nepal is presented in Figure 3.19.

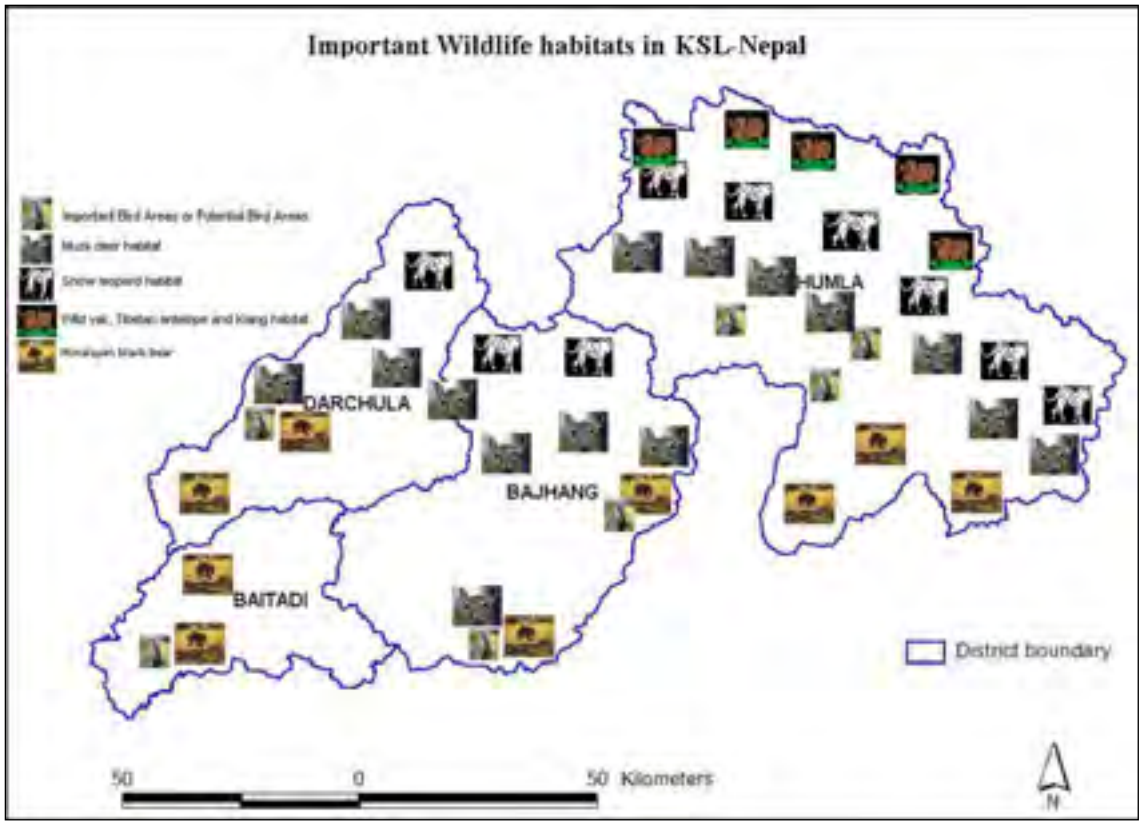


Figure 3.19 Important wildlife habitats in KSL-Nepal

Important habitats in Humla District include Thehe VDC (Ladekhola, Larchham forest, Parangdunga forest and Raling Himal area); Bar gaun VDC forests (Kermi areas – Nyalu lekh, Chula khola and its surrounding forests); Limi VDC (Takchi forest); Muchu VDC (Nara lekh, Tau Banand Sipali forests); Syada VDC (Bokhsi lekh); Darma VDC (near Mugu border – Rimi and Ruga - Changli lekh, Sarkideu, and Kalika VDCs (Munya lekh, Madana lekh and Gusao forest). Wetlands, that are mostly situated in the northern side of Humla District are also important habitats for birds and mammals, such as Thehe VDC (Lade daha, Raling daha, Dilu bali daha) and Lali VDC (Bagnepani daha dil, Nilpani daha, Dudhe daha in Kharpunath VDC.

In Bajhang District, Majhigaun, Pauwagadi, Kalukheti, Kada- tallokot, bungal areas are rich in wildlife. Main wildlife habitats include Ghodadaune patan and other large subalpine grasslands/ pasturelands situated in Khaptad National Park. Other important habitats include Seti River, Kali gaad khola, Kalganga River, Guela gaad, Taru gaad, Gadaae, Bahuli gaad, Suni gaad, Talkoti gaad, Surma Sarobar, Timadaha, Khaptad Taal, Lokunda Tal, Khapar daha, Nilsiri kunda, and Urilekh's Ramche daha.

In Darchula District, important habitats include Surma Sarobar taal (in Khandeshowri VDC), Mahakali River, Chaulani, Takar khola, Tusharpani khola, Kala gaad, Naugaad, Thali gaad, Lasku khola, Bartola, and Lipu lekh (at 5,000m)

In Baitadi District, border area of Darchula and Baitadi is famous for birds. Mahakali river, Seti river, Chaulani River, Dhikgaad, Surnaya River, Jamadi, Satgaad, Kansigaad, Ishori ganga, Garma, Koteni gaad, Nilgad gaad, Lichodi gaad are important wetlands.

Important Bird Areas (IBAs)

Khaptad National Park is an Important Bird Area in KSL-Nepal. Population of some bird species e.g. Chukar (*Alectoris chukar*), Kalij Pheasant (*Lophura leucomelanos*), Black Francolin (*Francolinus francolinus*), and Himalayan Monal (*Lophophorus impejanus*) are found to have increased in recent years (DNPWC/MFSC/GoN 2005). Khaptad National Park is particularly important for five bird species because they either have particularly restricted ranges or have been described as uncommon or rare in the Indian subcontinent (Inskipp 1989). These include Pied Ground Thrush (*Zoothera wardii*), Great Parrotbill (*Conostoma oemodium*), Hoary Barwing (*Actinodura nipalensis*), Rusty-flank Tree Creeper (*Certhia nipalensis*) and Spot-winged Rosefinch (*Carpodacus rodopeplus*).

Other potential IBAs recorded during field survey of Humla Districts are grassland and slope of Chehate forest of Khagal VDC and Kumuti area in Syuja VDC. Similarly, some forests and pasturelands of Thehe and Chipra VDCs are also important habitat for Cheer pheasant and Tytler's leaf warbler.

Important Plant Areas

KSL-Nepal hosts medicinal plant Important Plant Areas (IPAs). All four districts are identified as medicinal plants IPAs complex by Hamilton and Radford (2007) which are presented in Table 3.18.

Table 3.18 Medicinal IPAs in KSL-Nepal

Medicinal Plant IPA Complexes	No. of Sites per IPA Complex	Names of Sites	No. of IPAs per Complex
Karnali	5	Humla, Mugu, Jumla, Kalikot, Dolpa	36
Upper Mahakali-Seti	3	Darchula, Bajhang, Bajura	18
Lower Mahakali-Seti	4	Baitadi, Dadeldhura, Doti, Achham	14

We conducted both field study as well as literature search to identify medicinal plants IPAs in KSL-Nepal. At least 20 VDCs were found to have rich diversity of medicinal plants. These are distributed mainly in the subalpine and alpine zones in Humla, Bajhang and Darchula Districts. Moreover, subtropical and temperate zones in Baitadi and Bajhang Districts are also rich in medicinal plants. Figure 3.20 provides distribution of IPAs in KSL-Nepal.

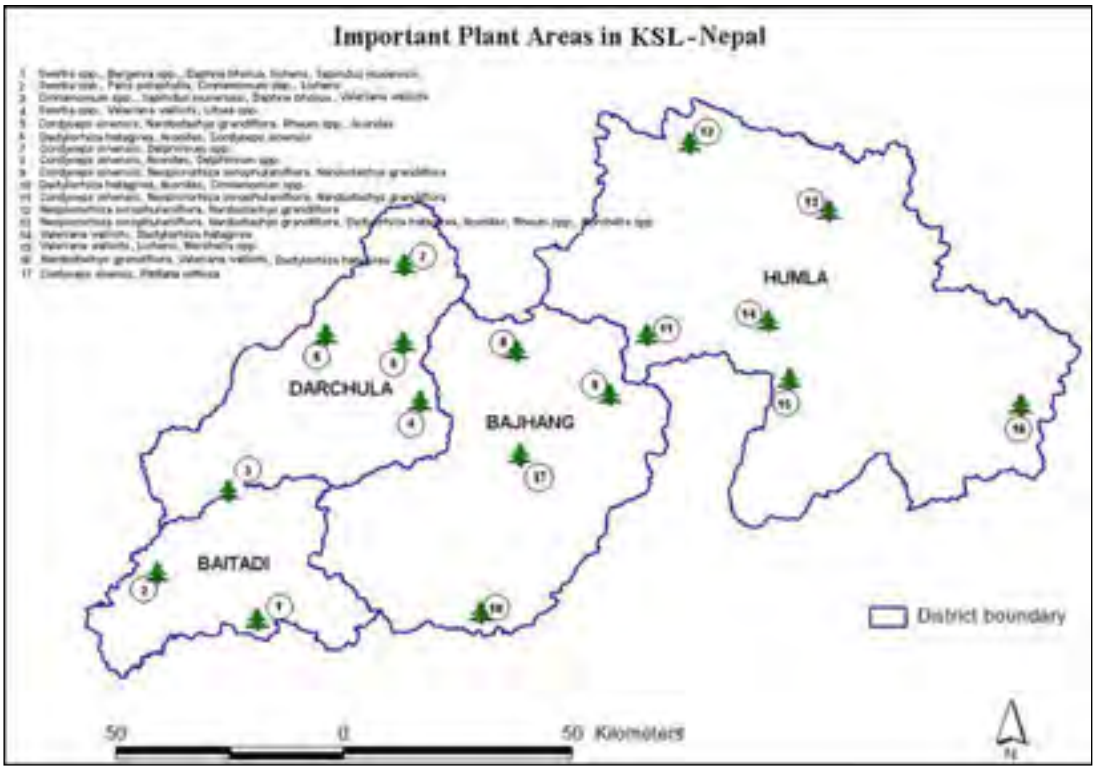


Figure 3.20 Important Plant Areas in KSL-Nepal

3.2.7 Protected Areas

The KSL-Nepal region includes three important Protected Areas (PAs) such as two (Khaptad NP and Api-Nampa CA) within the KSL boundary, and one (Rara NP) at the adjoining area (Table 3.19). The PAs comprise rich biological resource, and cultural and religious heritage. The PAs include important habitat for many threatened wildlife species including endangered, vulnerable, rare or threatened species, such as Snow leopard, Musk deer, Black bear and Red panda. The region is also important for several species of critically endangered and migratory birds and other wildlife. Currently these PAs are scattered as 'conservation islands'; however, with establishment of connectivity and corridors in between the PAs, viable population of many species could be demonstrated. The PAs would be important also for research in climate change adaptation in Nanda Devi (India)-Kailash region (Tibet).

Table 3.19 Protected areas in KSL-Nepal

Features	Khaptad NP	Api-Nampa CA	Rara NP
Establishment	1984	2010	1976
Location	Lat 29°17' N- 29°27' N Long 81°00' E - 81°13' E	Lat 29˚ 30' N-30˚ 15' N Long 80˚ 22' E- 81˚ 09' E	Lat 29^{o} 26' N-29^{o} 34' N Long 82^{o} 00' E-82^{o}10' E
Area (sq km) – Core & (BZ)	225 (216)	1,902	106 (198)
Altitude(m) & No. VDCs	1,296-3,276 (21)	518-7,132 (21)	2,754-4,097 (9)
Land use pattern	Forest (90%), Shrub & grassland (7%), Agricultural land (2%), Wetlands (1%)	Forest (29%), Grazing land (23%), Barren land (23%), Bush/Shrub (6), Cultivated land (5%), Water body (1%), Others (13%)	Forest (70%), Grassland (15)%, Shrubland (4%), Water body (10%), Other land (1%)
Forest types	11 with 22 meadows (patans)	16	4
Biodiversity	Flora (567 species, endemic 5 species), Fauna (23 mammals, 287 birds, 23 herpeto)	n/a	Flora (1070 species, endemic 30 species), Fauna (51 Mammals, 241 Birds, Endemic fish 3 species)
Rangelands	Medicinal & aromatic, and edible plant species	Medicinal & aromatic, and edible plant species	Medicinal & aromatic, and edible plant species
Wetlands	Khaptad daha-Flowering plant (87 species), Wetland dependent bird (20 species), mammals (9), Herpeto (2, one endemic); proposed for inclusion in Ramsar site	Chamelia river, Tinker gad, Lasku gad, Hopary gad, Lalikali gad, Thali gad; Godu tapobani, Brahmdev, pasa daha; Kotwalek Barhma Daha; Surmasarovar daha	Mugu-Karnali river, Rara lake (10.65 sq km), Gamgad, Kapra khola, Jhary khola, Himanadi, Lahagad, Khatyad khola
Population	33,272	54,358	11,685
Cultural and Religious sites	Khaptad baba asharam, Sahashra linga, Tribeni	Api Himal, Nampa Himal, Lipu kek, Godu Tapobani, Hunaenath temple, Siva Malikarjun temple, , Surmasarovar daha, Brahmdev, Pasa daha, Religious cave (Khandeshwari)	Rara Mahadev, Chapru Mahadev, Chhayanath, Harhara Mahadev and Thakurnath temples

1. Khaptad National Park (Figure 3.21)

Eleven species of mammals found in the park are protected by CITES. Two species of mammals and two bird species are protected under Appendix I of the National Parks and Wildlife Conservation Act 1973. The common mammal species include Common leopard (*Panthera pardus*), Himalayan black bear (*Selenarctos thibetanus*), Wild dog (*Cuon alpinus*), and Musk deer (*Moschus*

chrysogaster). Some important bird species of this park are Impeyan pheasant, Peregrine falcon, and White-rumped vulture.

Culture: The renowned Khaptad Baba Ashram, a religious site where Hindu pilgrims come to worship Shiva on the full moon of July-August each year, is located near the Park headquarters. Many pilgrims also visit the Park during the Ganga Dashahara festival on Jestha Purnima (the full moon of mid-June or July). Sahashra Linga, another religious site is situated at the highest point (3,200m) of the Park.

Rangelands: The upper elevations between 2,800m to 3,300m represent shrub and grassland. These landscapes are primarily used for livestock grazing, and collection of fodder, wild foods, and medicinal and aromatic plants. Livestock dung is collected from pasturelands and grasslands for organic manure and fuel.

Wetlands: A wide variety of colorful butterflies, moths and insects is also an important feature of the park ecosystem. The wetland areas of Khaptad support over 20 species of wetland-dependent birds and 9 species of mammals. In a recent study, above 50 species of birds, two species of mammals (*Ochotona roylei* and *Semnopithecus entellus*), 2 species of herpetofauna (Bajang frog, *Paa ercepeae* and Himalayan ground skink, *Asymblepharus himalayanus*) were observed. Among the avian species, four species of birds were added in the checklist including Short-eared owl (*Asio flammeus*), Black drongo (*Dicrurus macrocercus*), Black-faced laughing thrush (*Garrulax affinis*) and Rufous-vented yuhina (*Yuhina occipitalis*). Khaptad Daha and Tribeni wetland complex is also a proposed Ramsar Site.

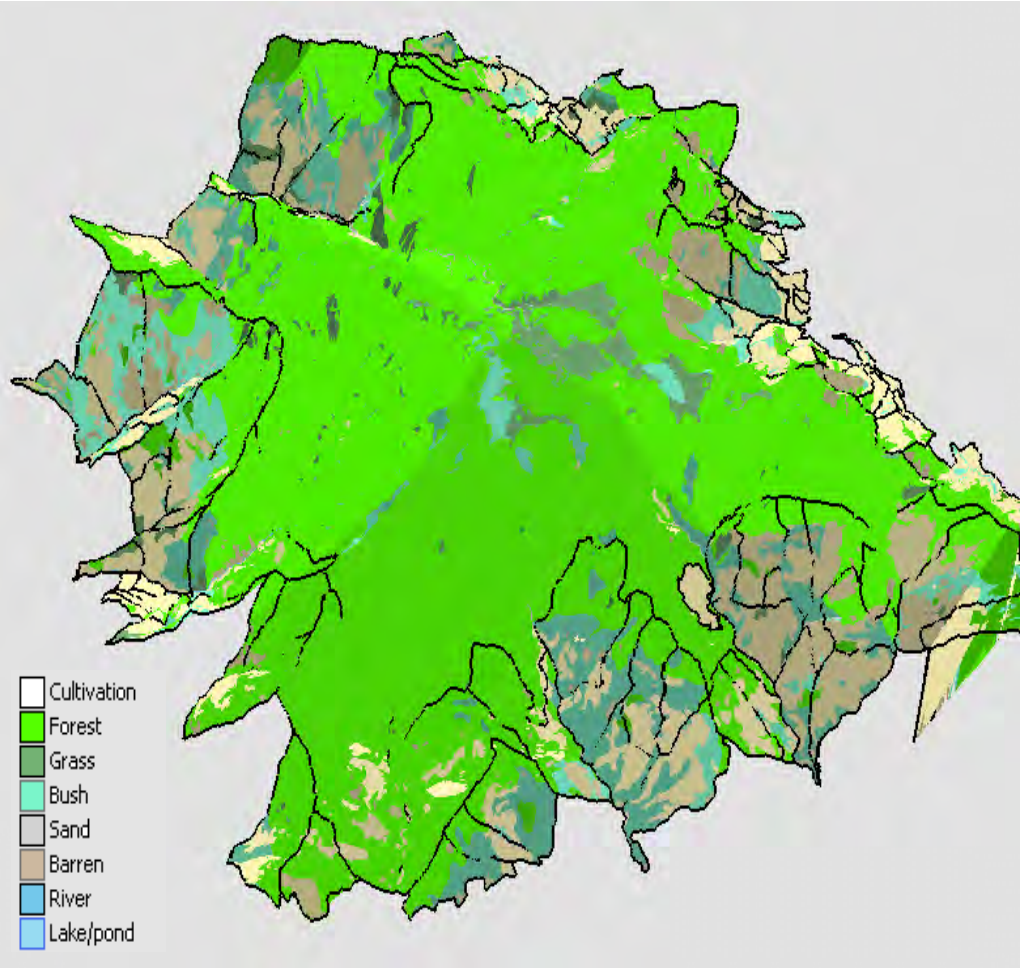


Figure 3.21 Physical features and landuse, Khaptad National Park and Buffer Zone (not to scale). *Source*: HMG Survey Department 1992.

The Khaptad Daha supports over 20 species of wetland dependent birds and 9 species of mammals including an endemic frog, Bajhang frog (*Paa ercepeae*). Similarly, over 87 species of flowering plants are reported in and around the Daha including *Dactylorhiza hatagirea, Valeriana jatamansii, Taxus wallichiana* and *Abies spectabilis.* These are threatened and government protected species under the Forest Act 1993 (Siwakoti & Basnet 2007).

2. Api-Nampa Conservation Area

The source of Kali River is on the northern slope of Mt Api. Mount Kailash (6,714m) is located about 100 km to the north of this trijunction. The central core area of the ANCA is a rolling plateau of grasslands intermixed with oak, coniferous forests and riverine deciduous temperate forest. Its peripheral areas are steep slopes covered with a variety of vegetation types ranging from subtropical forests in the lower altitudes to temperate forests around the area up to Byans, and alpine meadow above this belt (Figure 3.22).

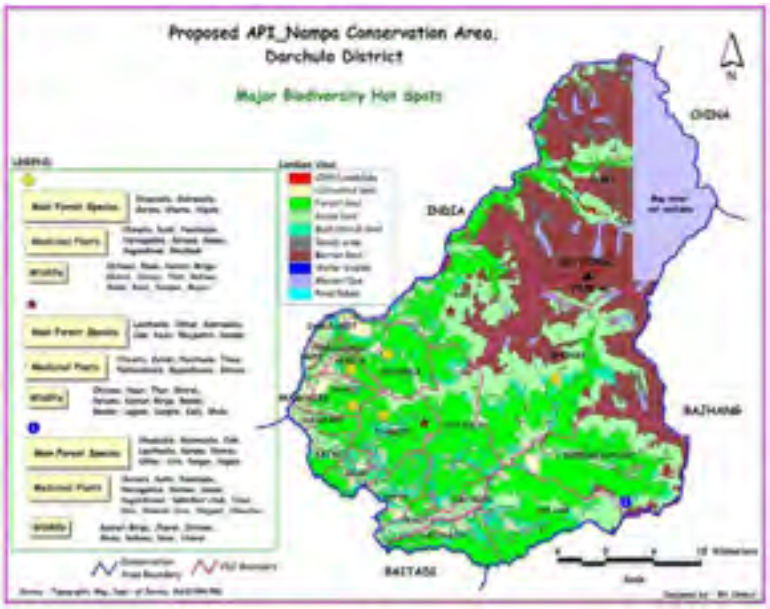


Figure 3.22 Api-Nampa Conservation Area

Diverse climatic condition and altitudinal variation have provided habitats for many wildlife species including the endangered snow leopard, musk deer and clouded leopard Birds include the national bird of Nepal, danphe or Himalayan monal (*Lophophorus impejanus*), as well as Satyr tragopan *(Tragopan satyra)*. Biodiversity hotspots are presented in Table 3.20.

Table 3.20 Biodiversity Hotspot areas of Api-Nampa Conservation Area

Major Sites	Main Forest Species	Medicinal Plants	Wildlife
Sunsera, Hikela, Dhari, Ghusa, Iearkot VDCs	Dhupisalla, Gobresalla, Gurans, Kharsu, Nigalo	Chiraito, Kutki, Panchaaule, Yarsagumba, Satuwa, Ganao, Sugandhawla, Bhutkesh	Common Leopard, Himalayan Black Bear, Musk Deer, Himalayan Goral, Himalayan Thar, Barking Deer, Wild boar, Kalij, Himalayan monal etc.
Siddanath CF Daphne CF and Basdhara CF of Iearkot VDC-6	Lauthsalla, Okhar, Gobresalla, Oak, Kaulo	Chiraito, Kutuki, Panchaule, Timur, Pakhanved, Sugandhawla	Common Leopard, Blue sheep, Musk Deer, Himalayan Goral, Himalayan Thar, Barking Deer, Wild boar, Rhesus Macaque, Kalij, Himalayan monal
Malikarjun VDC	Okhar, Panger, Utis, Oak, Timur	Dalchini, Chiraito, Pakhanved, Sugandhawla, Satuwa	Himalayan Goral, Barking Deer, Black bear
Rani Kothha Rapla VDC	Lauthsalla, Bhojpatra, Deodar		Common Leopard, Himalayan Black Bear, Musk deer, Barking deer
Dharmdhar Biodiversity area Khandeshori VDC (border of Bajhang district)	Dhupisalla, Gobresalla, Lauthsalla, Oak, Gurans, Kharsu, Okhar, Utis, Pangar, Nigalo	Chiraito, Kutki, Panchaaule, Yarsagumba, Satuwa, Ganao, Sugandhawla, Sekhdhar chuk, Timur, Dolu, Dhumini jara, Silajeet, Olaechan	Musk deer, Blue sheep, Common leopard, Black bear, Barking deer, Naur, Himalayan ghoral

Source: Api-Nampa Conservation area Management Plan, DNPWC 2009

Wetlands and River System: The Mahakali River is the main water body of the area. It originates from the greater Himalayas of Nepal at Kalapaani at an altitude of 3,600m, and it flows south forming the western international boundary between Nepal and India. Kalapani is situated along the trek of Mt. Kailash and Mansarovar Lake. In Pithoragarh District of Uttarakhand (India), it joins with the Gori Ganga at Jauljibi, and the Saryu River at Pancheshwar. (The area around Pancheshwar is called 'Kali Kumaon'). The river has three major tributaries: Chamelia, Surnayagad and Rongun

Khola (Sharma 1997). The river also has a barrage to regulate the flow of water for irrigation and hydroelectric power. The Mahakali, after it descends into the plains into India is known as Sarda, which meets the Ghaghara (Karnali in Nepal) in Indian Territory (DNPWC 2008). There are 87 glaciers in the area of 143.33 sq.km in the Mahakali River System and 10.06 km^3 ice reserves (Mool et al. 2001).

Wildlife

Vegetation and forests of ANCA encompasses suitable habitat for several rare, endangered and vulnerable species of mammals (Annex 11). The area hosts a number of wild fauna including protected and endangered species such as snow leopard (*Uncia uncia*), clouded leopard (*Neofelis nebulosa*), musk deer (*Moschus moschiferous*), wolf (*Canis lupus*), leopard cat (*Felis bengalensis*), wild yak (*Bos mutus*) and red panda (*Ailurus fulgens)*. Himalayan tahr and musk deer are dominant. Other large mammals include Hanuman langur (*Semnopithecus entellus)*, jackal (*Canis aureus)*, a small number of grey wolf (*Canis lupus),* Himalayan black bear (*Selenarctos thibetanus).* Danphe (*Lophopherus impejanus*), Satyr pheasant (*Tragopan satyra*), snow cock (*Tetraogallus tibetanus*), blood pheasant (*Ithaginis cruentus*), red billed chough (*Pyrrhocorax pyrrhocorax*) and yellow-billed chough (*Pyrrhocorax graculus*) can be seen in higher Himalayan range. A total of 69 fish species are recorded from the Mahakali River, out of a total of 130 species of fishes occurring in the snow-fed rivers and mountain lakes (Shrestha 1990). Fish species meriting protection is given in Table 3.21.

Table 3.21 List of fish species recommended for legal protection in Mahakali River

Scientific name	Common name	NRDB code	Distribution
Acrossocheilus hexagonolepis	Katle	V	Koshi, Gandaki, Karnali,
Chagunius chagunio	Rewa	V	Koshi, Gandaki, Karnali, Mahakali
Tor tor	Sahar	E	Gandaki, Mahakali
Schizothorax plagiostomus	Buchhe asla	V	Koshi, Bheri, Gandaki, Karnali, Mahakali, Phewa, Lake, Gandaki

Source: Shrestha 1990

Medicinal plants: The district is very rich in medicinal and aromatic plants. Main species found here are Yarsagumba, Panchaule, Jhyau, Bhojpatra, Bhyakur, Dalchini, Timur, Pakhanved, Padamchal, Daruhaldi, Titepati, Lauthsalla, Guchhichyau, Kumkum, Sikakai, Satuwa, Setak chini, Katuki, Kaphal bokra, Okhar, Dhupi, Tejpat, Ritha, etc. More than 59 species of medicinal plants are found in the ANCA (DNPWC 2008). Among them Yarsagumba, Dalchini, Kurilo, Pakhanbed, Bojho, Timur, Chirita, Lauth salla are commercially traded in India and Tibet.

Tourism in ANCA

ANCA is a potential site for tourism promotion due to scenic beauty of trans-Himalayan range. It is rich in flora and fauna. The Mahakali river system, en route to Kailash/Mansarovar, is considered a religious and cultural site. The intangible local cultural heritage such as traditional *Deuda, Gaura* and Byansi festivals are equally significant for tourism development.

3. Rara National Park - an adjoining park (Figure 3.23)

From regional development perspective, this area is placed under Midwestern Development Region in Karnali Zone. A larger part of RNP lies in Mugu District while a southern tip of the Park lies in Jumla District. The Park covers an area of 106 sq.km. out of which 10.8 sq.km. is occupied by Rara Daha, Nepal's largest lake that lends its name to the park. RNP is the smallest of the country's national parks, established in 1976 with the main objective of conserving the natural beauty of Rara Lake.

There are over 50 species of mammals reported from RNP, many of which are listed under CITES Appendices. The park is rich in bird species, over 200 species, of which many fall under CITES Appendices. There are three snow trout (fish) species unique to Rara Lake (Annex 12a, 12b & 12c).

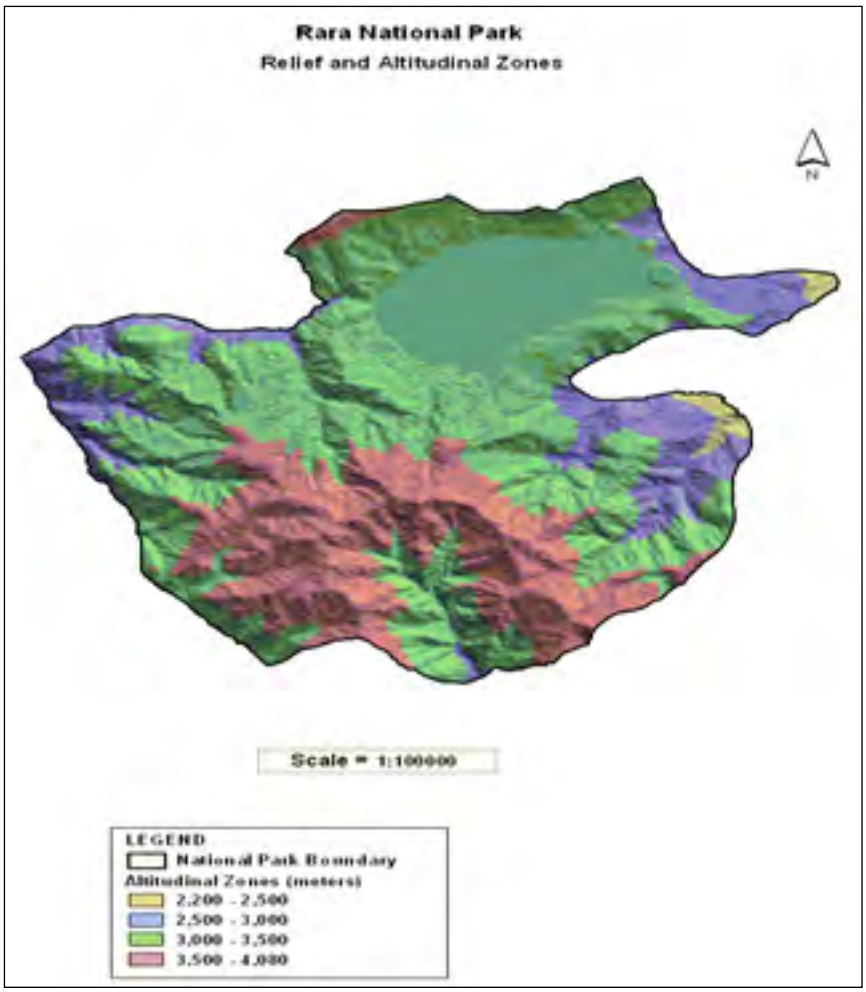


Figure 3.23 Rara National Park

3.2.8 Forest Utilization and Management

Forest resources are utilized in various ways in the KSL-Nepal region. Broadly, the utilization can be grouped as follows.

Fuelwood. About 98% of the local people depend on fuel wood as a primary source of energy in the KSL-Nepal. Fuelwood is a major source of fuel energy, followed by cattle-dung, and kerosene. Fuelwood is required for cooking, heating, lighting (to a certain degree), and dairy processing. It is estimated that each HH used 10 average loads i.e. 'bhari' (1bhari equals approx 30 kg) firewood in dry season and 20-30 'bhari' in winter season per month, particularly at higher altitudes. When forests are within a convenient distance, trees are harvested for fuelwood; but at high altitudes above the tree-line, the major source of fuelwood is the low-growing woody shrub. It is estimated that annual fuelwood demand in Bajhang and Humla districts is higher than supply (Figure 3.26a & b). Majority of households living around the headquarters of the districts sale fulewood for subsistence income.

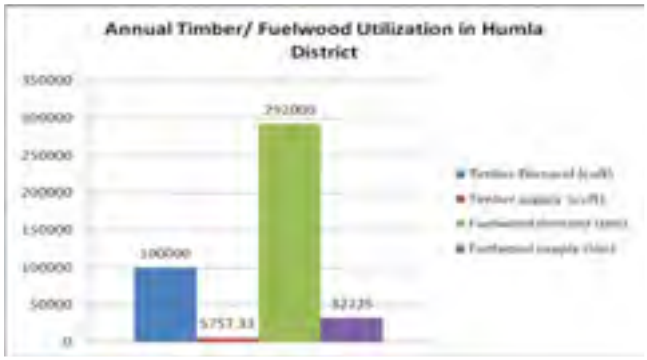
Timber. Timber is extracted from the forest by the local communities for their own use or sale across the border in India and China. Most of the western parts of Darchula district is bordered with India along the Mahakali River. The Indian part is almost depending on timber products from opposite forests of Nepal. With and without permit, large quantities of fuelwood and timber were found to be supplied to India. Timber is extracted and supplied to Taklakot (Tibet) *via* Tinker from Darchula district (DNPWC 2008); and *via* Hilsa from Humla district (Figure 3.24, 3.25).

It is estimated that timber demand in Humla is about 100,000 cft; whereas timber legally fulfilled is about 5,757 cft (4,757 cft from the government forests and 1,000 cft from the community forests). In Bajhang district, timber demand is 556,741 cft, whereas, the supply is 296,925 cft from all sources (Figure 3.26). Timber supply from Government forest in Baitadi and Darchula districts are 20,127

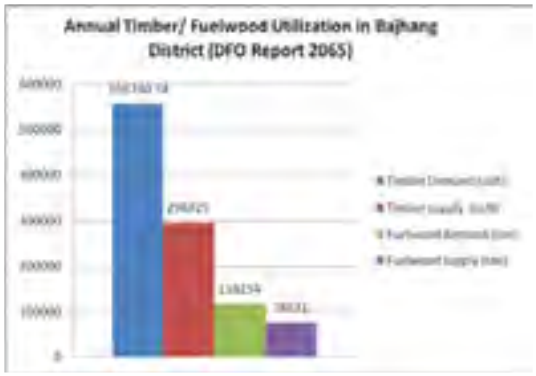
cft, and 11,533 cft respectively (DFO 2005). High timber demand is related partly with illegal timber trade across the border.

Figure 3.24 Fuelwood transported for sale to Simikot

Figure 3.25 Timber export to Tibet via Hilsa (Photo credit Yogi Kayastha)



a



b

Figure 3.26a-b Annual timber/fuelwood demand and supply in Humla and Bajhang Districts

Non-timber/Medicinal plants. The KSL-Nepal region comprises rich source of non-timber/medicinal and aromatic plant species MAPs). The local communities collect MAPs, but generally in small quantities for personal use; however, a large quantity of NTFPs/medicinal plant species is collected for trade to China and India. Over 50 species are found to be commonly traded (Annex 13). Major trade routes in the KSL-Nepal region, and the major traded items are shown Figure 3.27 and Table 3.22.

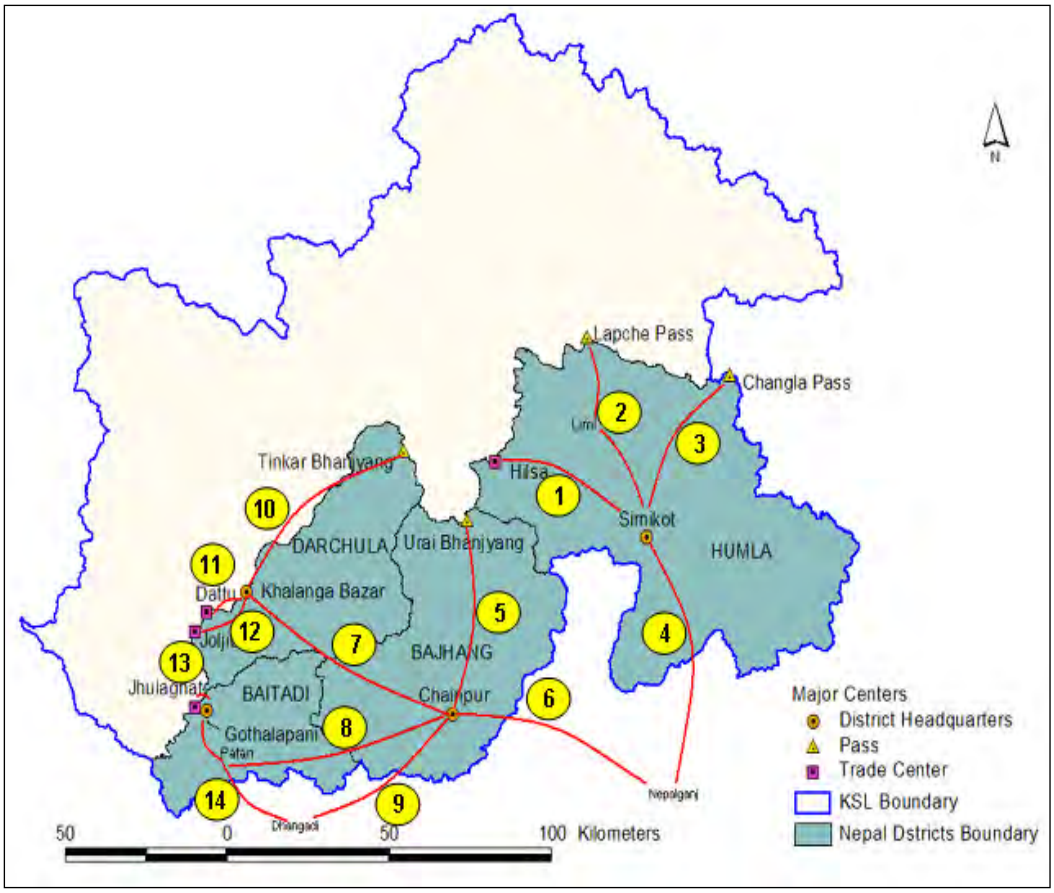


Figure 3.27 Major trade routes in the KSL-Nepal region

1. Simikot- Hilsa**, **2**. Simikot-Limi-Lapche,* **3**. Simikot-Changla*, **4.** Simikot-Nepalgunj**, **5**. Chainpur- Urai Bhanjyang*, **6.** Chainpur-Nepalgunj*, **7.** Chainpur- Darchula Khalanga*, **8.** Chainpur- Patan- Gothalapani,** **9.** Chainpur- Dhangadhi/ Mahendranagar**, **10.** Darchula Khalanga- Tinkar bhanjyang**, **11.** Darchula Khalanga- Joljivi- Dharchula**, **12.** Darchula Khalanga- Dattu- Dharchula*, **13.** Gothalapani- Jhulaghat**, **14.** Gothalapani- Patan- Dhangadhi/Mahendranagar**, **15.** Baitadi- Darchula- Tinkar- Taklakot* (** Major routes, * Occasional routes)

Table 3.22 Major trade routes with different types of exported and imported materials

Route No.	Route Name	Export	Import
1	Simikot- Hilsa	Timber, Medicinal Plants, Wildlife products	Alcohol, household consumption items
2	Simikot-Limi-Lapche	Medicinal Plants,Furu (wooden bowl)	Alcohol, Household consumption items
3	Simikot-Changla	Medicinal Plants, Wildlife parts	Alcohol, household consumption items
4	Simikot-Nepalgunj	Medicinal Plants, Agricultural products	construction materials, household consumption items
5	Chainpur- Urai Bhanjyang	Medicinal Plants, Wildlife parts	Alcohol, household consumption items
6	Chainpur- Nepalgunj	Medicinal Plants, Agricultural products	household consumption items
7	Chainpur- Darchula Khalanga	Medicinal Plants, Wildlife parts	household consumption items
8	Chainpur- Patan- Gothalapani	Medicinal Plants, Wildlife parts	household consumption items
9	Chainpur- Dhangadhi/ Mahendranagar	Medicinal Plants, Agricultural products	household consumption items
10	Darchula Khalanga- Tinkar bhanjyang	Medicinal Plants, Wildlife products, Agricultural products	household consumption items
11	Darchula Khalanga- Joljivi- Dharchula	Medicinal Plants, Wildlife products, Agricultural products	household consumption items
12	Darchula Khalanga- Dattu- Dharchula	Medicinal Plants, Wildlife products, Agricultural products	household consumption items
13	Gothalapani- Jhulaghat	Medicinal Plants, Agricultural products	household consumption items
14	Gothalapani- Patan- Dhangadhi/ Mahendranagar	Medicinal Plants, Agricultural products	household consumption items
15	Baitadi- Darchula- Tinkar- Taklakot	Medicinal Plants, Agricultural products, Wildlife parts	household consumption items

Quantity of Major Forest Products and Revenue Generated. The District Forest Offices of four districts have recorded quantity of major forest resources and revenue generated from them. Main forest resources traded include medicinal herbs, timber, lokta (*Daphne* species) bark, *Taxus wallichiana* leaf, and resin (khoto) from pine (Table 3.23, Figure 3.28). A list of top ten plant species under trade from the KSL-Nepal region shows that *Sapindus mukorossi* (ritha) was collected in large quantities (about 1,921 tonnes) in five years (between 2005-2009) (Table 3.24a). However, revenue generated by *Cordyceps sinensis* was highest, over NRs. 18 million in five years (Table 3.24b).

Table 3.23 Major forest products traded and revenue generated

S.N.	Particular		Unit	Districts				Total
				Baitadi	Darchula	Bajhang	Humla	
1	Quantity of traded major forest products	Medicinal Herbs (2005-2009)	Kg	2215601	1250022	142104	157920	3765647
		Timber (2005-2009)	cft	20127	11533	1693	1675	35028
		Lokta (2005-2009)	Kg	30040	0	7000	0	37040
		Taxus (2005-2009)	Kg	0	33300	70000	0	103300
		Khoto (2005-2009)	Kg	567928	0	0	0	567928
2	Royalty collected from sales of major forest products	Medicinal Herbs (2005-2009)	NRs	7010509	20334393	4252751	2195399	33793052
		Timber (2005-2009)	NRs	106705	423020	59050	103008	691783
		Lokta (2005-2009)	NRs	85080	0	33000	0	118080
		Taxus (2005-2009)	NRs	0	556500	1750000	0	2306500
		Khoto (2005-2009)	NRs	1267643	0	0	0	1267643

Source: Annual reports of District Forest Office (Baitadi, Darchula, Bajhang and Humla)

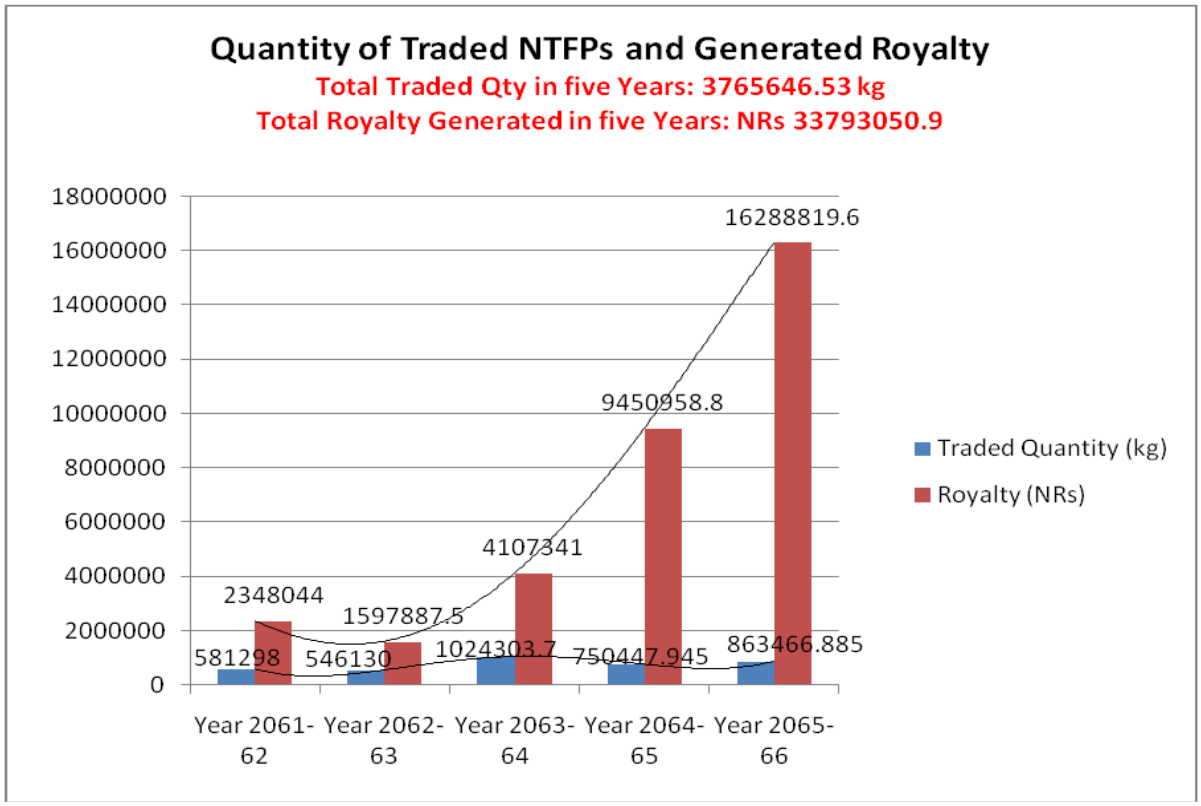


Figure 3.28 Amount of traded NTFPs and revenue generated for five years

Trade and Revenue of Major Medicinal Plants. A list of top ten plant species under trade from KSL-Nepal shows that *Sapindus mukorossi* (ritha) is collected in large quantities (about 1,921 tonnes) in five years. However, royalty generated by *Cordyceps sinensis* is highest, over NRs. 18 million in five years (Table 3.24a and 3.24b).

Table 3.24a Top ten plant species under trade (in terms of quantity)

S. No.	Species	Quantity traded from 2005-2009 (Kg)
1	*Sapindus mukorossi*	1,921,346
2	*Cinnamommum tamala*	351,495
3	*Bergenia ciliate*	288,300
4	Pawan ko bokra *(Machilus* species)	223,600
5	Lichens *(Usnea longissima)*	136,000
6	*Persea odoratissima*	137,600
7	*Phyllanthus emblica*	117,450
8	*Nardostachys grandiflora*	108,311
9	*Neopicrorhiza scrophulariiflora*	47,556
10	*Swertia chirayita*	35,627

Table 3.24b Top ten plant species under trade (in terms of royalty generated)

S. No.	Species	Royalty generated from 2005-2009 (NRs)
1	*Cordyseps sinensis*	18,737,350
2	*Sapindus mukorossi*	4,324,936
3	*Usnea longissima*	2,254,500
4	*Nardostachys grandiflora*	1,604,956
5	Pawan ko bokra *(Machilus* species)	1,268,000
6	*Persea odoratissima*	934,500
7	*Cinnamommum tamala*	699,000
8	*Bergenia ciliata*	613,900
9	*Neopicrorhiza scrophulariiflora*	601,578
10	*Valeriana jatamansii*	478,440

Forest Resource Based Small Scale Industry. There are altogether 67 small-scale industries based on forest resources. They include furniture (28 industries), followed by fibre (17), Nepali paper (14), rattans (6), and refining factory (2) (Figure 3.29; and Table 3.25).

Forest Management. Forest is being managed under various approaches. Still a larger area of the forest is being managed by the government (76%) followed by community forest (23%). Leasehold forest and private forests are very low (Table 3.26 & Figure 3.30).

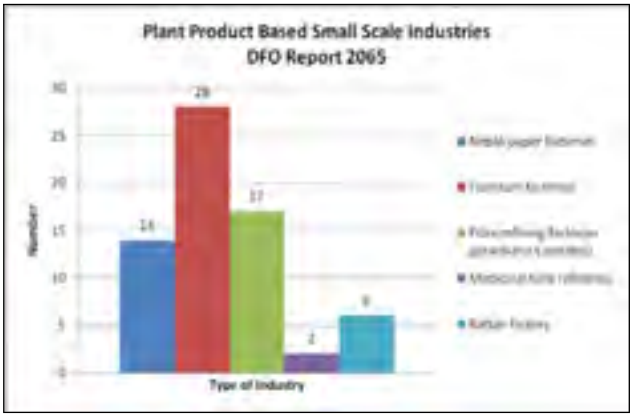


Figure 3.29 Plant product based small scale industries

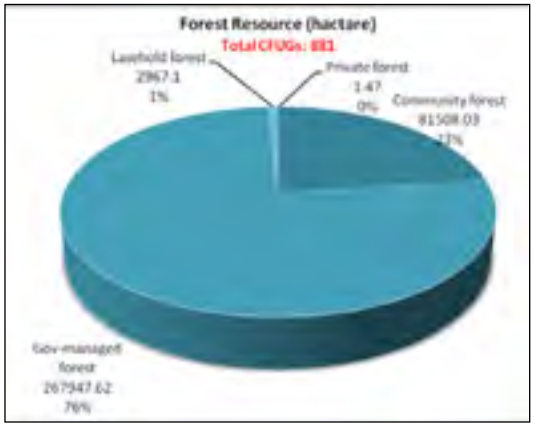


Figure 3.30 Total forest area of KSL-Nepal

Table 3.25 Forest product-based industries

Particulars	Baitadi	Darchula	Bajhang	Humla
Nepali paper factories	3	1	10	-
Furniture factories	13	2	11	2
Fibre refining factories (*Girardiana-Cannabis*)	4	-	13	-
Medicinal herb refineries		-	-	2
Rattan factory	6	-	-	-

Source: Modified after Five Year District (Baitadi, Darchula, Bajhang and Humla) Forest Report 2008

Table 3.26 Distribution of forest management in four districts (Year 2008)

Forest management	Baitadi	Darchula	Bajhang	Humla
Government managed forest (ha)	77,881	52,916.78	88,305.44	48,844.4
Community forest (ha)	24,280.29	20,064.25	12,272.49	24,891
Leasehold forest (ha)	53.93	0	1,865.17	1,048
Private forest (ha)	0	1.47	0	0
Total				
CFUGs (Number)	*298*	*232*	*293*	*58*

3.2.9 Rangelands (Pasturelands)

The KSL-Nepal region comprises both natural as well as man-made pasture lands (*kharka* or *patan* or *bukiyan* in Nepali). Rangelands are broadly categorized as summer and winter pastures. The natural rangelands located at high altitudes (i.e. summer pastures) include subalpine and alpine meadows, which are dominated by forbs and shrubs (Figure 3.31a). These pastures are located in the treeless zone above 3800m asl. In the KSL-Nepal, two distinct forms of alpine meadows prevail, namely moist and dry alpine meadows. The highland pastures are bigger in size, and open as compared to the pastures at lower altitudes. In *goth* areas (livestock assembly points) presence of grazing resistant/tolerant species, such as *Athyrium wallichianum*, *Morina nepalensis, M. polyphylla*, *Rumex nepalensis*, etc. clearly show some level of high grazing pressure.

Most of the summer pastures of lower belt (2700-3500m asl) are forested pastures as these are either located within the forest or surrounded by forests (Figure 3.31b). These pastures are originated from human interference, and are maintained by biotic factors such as grazing, forest clearing and fire. Still, the grazing areas are maintained by repeated fire and subsequent clearing of trees and shrubs.

The lower-altitude pastures are locally known as *jairini kharka* (the pastures with jungle), and are mostly surrounded by or occur near mixed broad-leaved forests. The winter pastures are located just above or near the permanent settlements, and are smaller in size consisting of an open central part where the herds are kept at night, but the livestock are allowed to graze in wider areas including the adjoining forests and grasslands. Besides these, individually-owned lands near the settlements, cropping fields, and the homestead areas are used for livestock grazing particularly during winter.

a b

Figure 3.31 Pasturelands in Humla District (a-subalpine; b-temperate)

Livestock Raising in Dozam and Chhipra – Case Study

There are 15 major pastures in Dojam area of Thehe VDC and 8 pastures in Chipra VDC (Table 3.27). In Dojam, some of these pastures are further differentiated into a number of grazing units or sub-pastures classified and delimited for rotational grazing and harvesting reources (mainly medicinal plants). In Chipra, due to the lack of sufficient rangelands, the number of grazing units was quite few (Table 3.27). Alpine meadows in Changlakhola valley in Dozam area are comparatively better in terms of productivity tolerating some extent of increasing grazing pressure due to their bigger size stretching widely in U-shaped valleys which could accommodate large herd sizes.

Table 3.27 Pastures mostly used by people in Thehe and Chhipra VDCs

Name of the pasture	Location		Altitude (m)	Users
	Village/Valley/Forest	VDC		
Manal	Changlakhola	Thehe	2700	People of Dojam, Baijubara; Thehe VDC
Jabak	Changlakhola	Thehe	2840	People of Dojam, Baijubara; Thehe VDC
Gyal dorje	Changlakhola	Thehe	2950	People of Dojam, Baijubara; Thehe VDC
Jabkung	Changlakhola	Thehe	3100	People of Dojam, Baijubara; Thehe VDC
Polakyon/Poltyong	Changlakhola	Thehe	3200	People of Dojam, Baijubara; Thehe VDC
Tukling	Changlakhola	Thehe	3400	People of Dojam, Baijubara; Thehe VDC
Ladegompa	Changlakhola	Thehe	3550	People of Dojam, Baijubara; Thehe VDC
Ladekhola	Changlakhola	Thehe	3600	People of Dojam, Baijubara; Thehe VDC
Nyaltang	Changlakhola	Thehe	3600	People of Dojam, Baijubara; Thehe VDC
Seding	Changlakhola	Thehe	3700	People of Dojam, Baijubara; Thehe VDC
Thadesangu	Changlakhola	Thehe	3700	People of Dojam, Baijubara; Thehe VDC
Kurugwa	Changlakhola	Thehe	4000	People of Dojam, Baijubara; Thehe VDC
Lajarma	Changlakhola	Thehe	4200	People of Dojam, Baijubara; Thehe VDC
Rakarbu	Changlakhola	Thehe	4100	People of Dojam, Baijubara; Thehe VDC
Gudung gada	Changlakhola	Thehe	4100	People of Dojam, Baijubara; Thehe VDC
Chulibisauna	Chandranath CF	Chhipra	-	People of ward 8 and 9 of Chhipra VDC
Khod	Chandranath CF	Chhipra	-	People of ward 8 and 9 of Chhipra VDC
Raul bas	Chandranath CF	Chhipra	-	People of ward 8 and 9 of Chhipra VDC
Jumarakhya	Chandranath CF	Chhipra	-	People of ward 8 and 9 of Chhipra VDC
Lekh majh (Maja)	Hilsa CF	Chhipra	-	People of ward 1-7 of Chhipra VDC
Hale Kharka	Hilsa CF	Chhipra	-	People of ward 1-7 of Chhipra VDC
Bhainse Kharka	Hilsa CF	Chhipra	-	People of ward 1-7 of Chhipra VDC
Narthala	Hilsa CF	Chhipra	-	People of ward 1-7 of Chhipra VDC

Source: Field study 2010

Animal husbandry is one of the most important occupations among the people of Thehe and Chhipra VDCs. It is the basic subsistence system which has been practiced for a long time. As the area consists of vast stretches of grazing grounds, each and every household owns at least some livestock (Figure 3.32). The major livestock reared in the study villages are goat/sheep and jopa/jhoma (yak-cow cross breeds). Small numbers of yak/chauri are found in Dojam area of Thehe VDC and cows/buffalos in Chhipra VDC (Table 3.28 & 3.29). A total of 1,752 livestock were reported in 57 households of Dojam village of Thehe VDC with high (31) livestock holding per household. Chipra VDC, as a whole, comprises total livestock population of 1,976 with livestock holding per household to be 12.8. The major livestock products are milk, curd and chhurpi (dried cheese), only the latter being sold in the lower altitude villages or in the villages of mid-altitude districts (Bajhang, Bajura) when people seasonally migrate to these areas with their herds of goat/sheep for grazing during winter months. Goat and sheep are also directly sold to these areas, which provide an annual earning of NRs. *ca*. 20,000-200,000 per household.

Table 3.28 Livestock population in Dojam area of Thehe VDC

Units	No. of livestock	Number of households rearing livestock
Goat/Sheep	1,500	40
Cows	12	5
Yak/Chauri	20	20
Jhopa/Jhoma*	150	40
Mules/ass	20	15
Horses	50	25
Total	**1,752**	

Source: Field study 2010

Table 3.29 Livestock population in two community forests in Chhipra VDC

Type	No. of livestock grazed in Chandranath CF	No. of livestock grazed in Hilsa CF
Goat/Sheep	400	400
Cows/buffalo	300	650
Jhopa/Jhoma*	75	100
Mules/ass	20	15
Horses	6	10
Total	801	1,175

*yak/cow cross breed

Utilization and Management of Pasture Resources: Transhumance

The common modes of utilization of pasture resources are: rotational grazing based on a system of transhumance, and medicinal plant harvesting. Rotation of livestock grazing is undertaken in high altitude and low altitude pastures during summer and winter seasons, respectively (Figure 3.33 - 3.37). The rotational grazing system is an informal system of management in the area since ancient times. Herders mostly take their livestock in the pasture area within their traditional territories where rotation of livestock takes place in high altitude and low altitude pastures during summer and winter seasons, respectively (Figure 3.33 - 3.37).

Figure 3.32 Local herder milking his Jopa

People of Chhipra VDC also utilize pasture resources of Yari village (Muchu VDC) during summer months. As a traditional practice, most of the people take their herds of goats/sheep during winter months in the low lying area as far as Sanfe Bagar in Achham District and other areas of Achham and Bajura Districts (Figures 3.33 & 3.34). During severe winter and dry months, other livestock are kept in the village and are provided with stall fodder comprising grasses such as *Cymbobogon* sp. (gajo), dried stalks of wheat and finger millet. As a traditional management practice, grasses and other plants are cut annually only once in September-October. The grasses are dried, stored and used as fodder only during winter months.

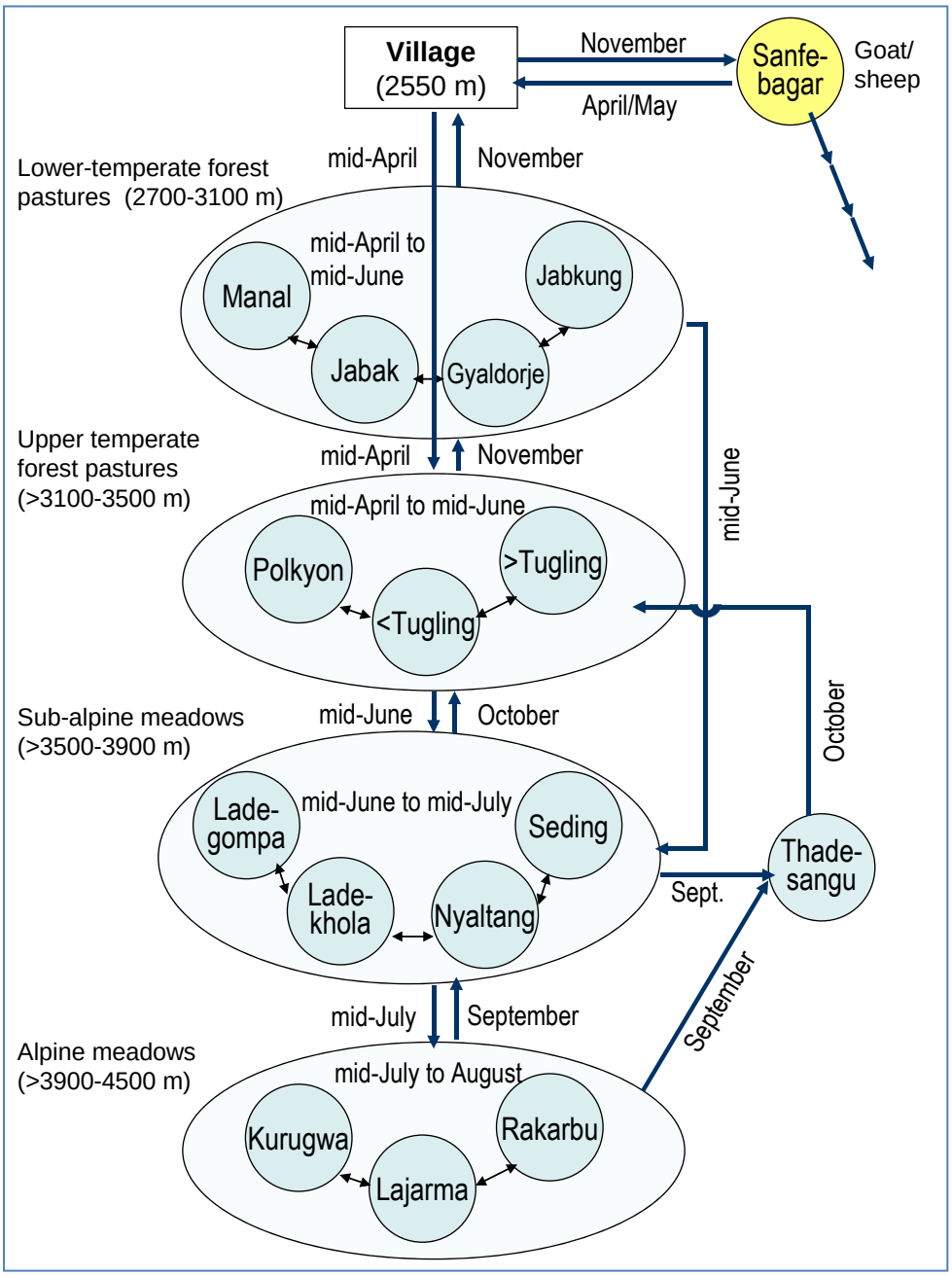


Figure 3.33 Chart showing movement of livestock in different pastures for rotational grazing in Changlakhola valley in Dozam, Thehe VDC, Humla

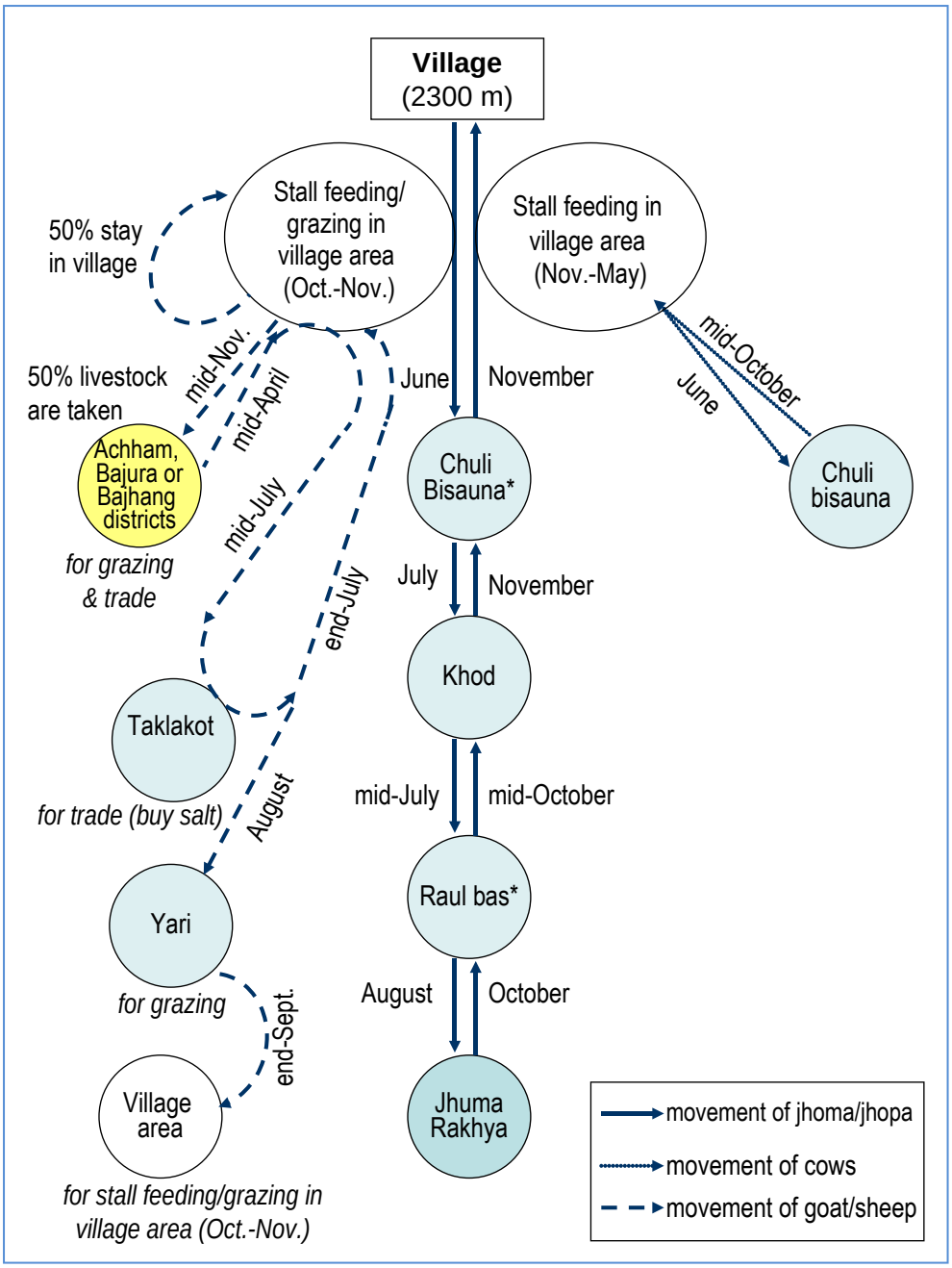


Figure 3.34 Chart showing movement of livestock in different pastures for rotational grazing in Chandranath Community Forest, Chhipra VDC, Humla

*Lack of drinking water in some of the pastures (Chuli bisauna and Raul bas) is the main issue in livestock herding in Chhipra VDC.

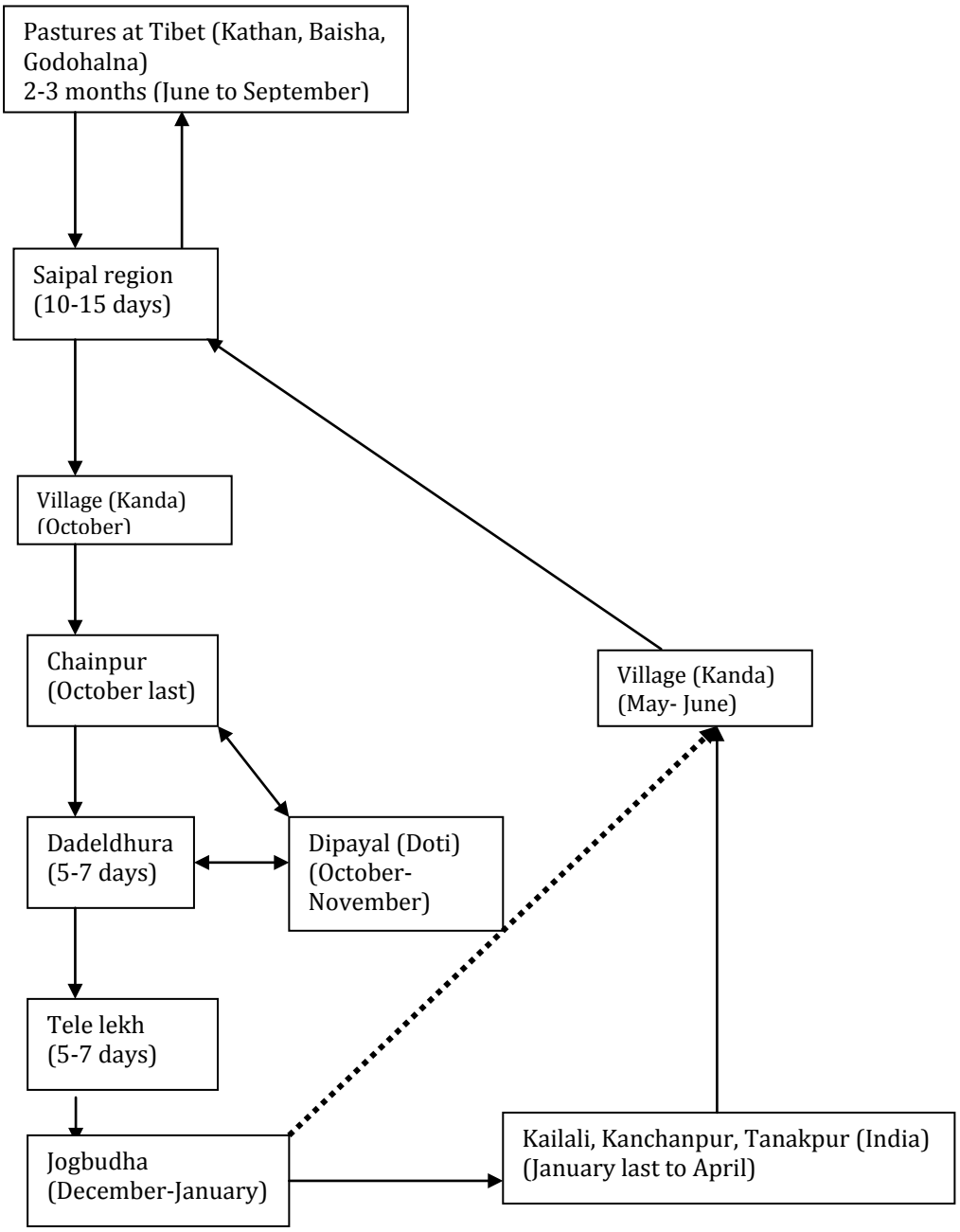


Figure 3.35 Traditional seasonal grazing pattern followed by the sheep of Kanda VDC, dotted line shows the current route

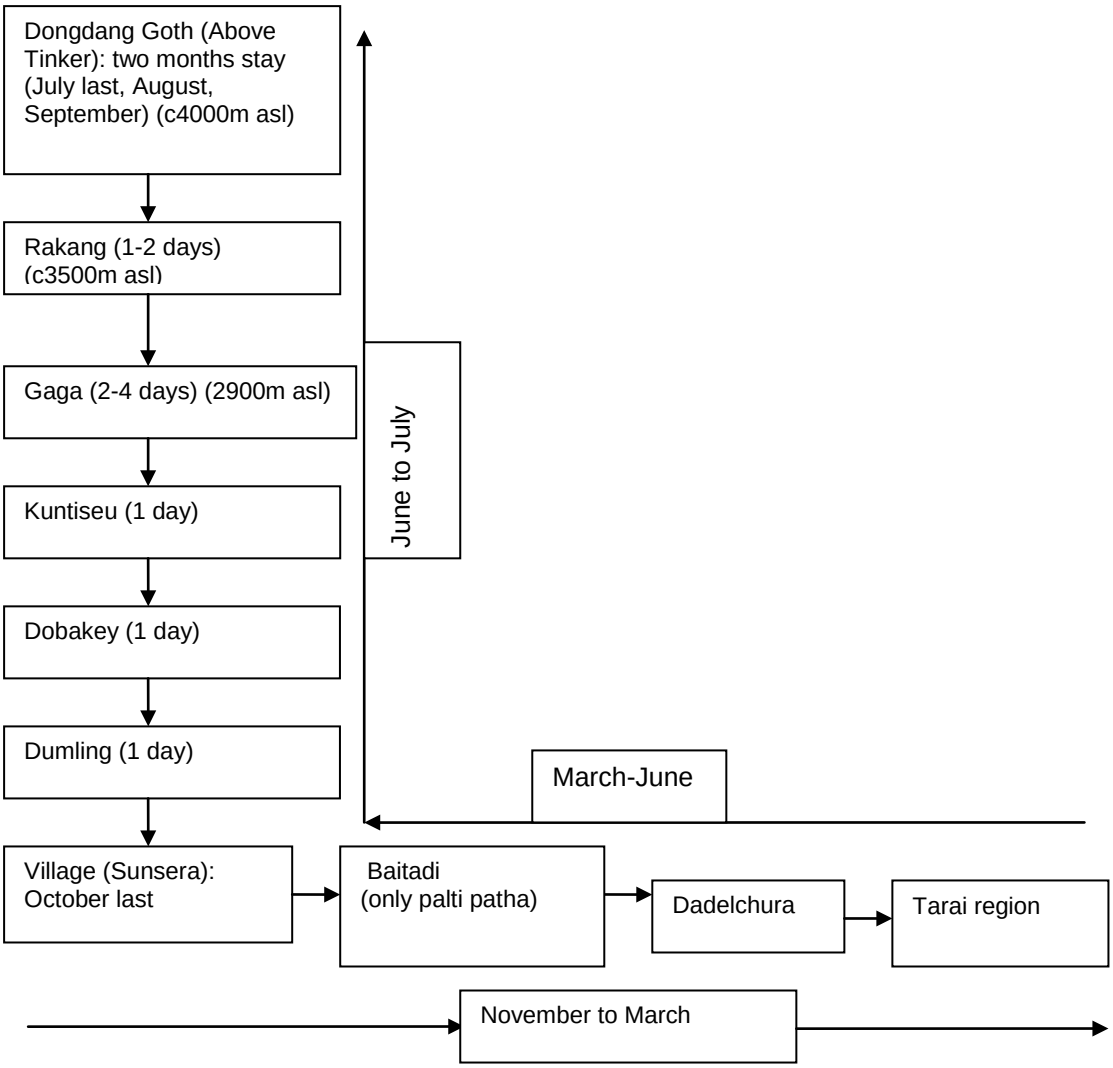


Figure 3.36 Traditional seasonal grazing route for sheep of Sunsera VDC (Darchula) and adjoining areas

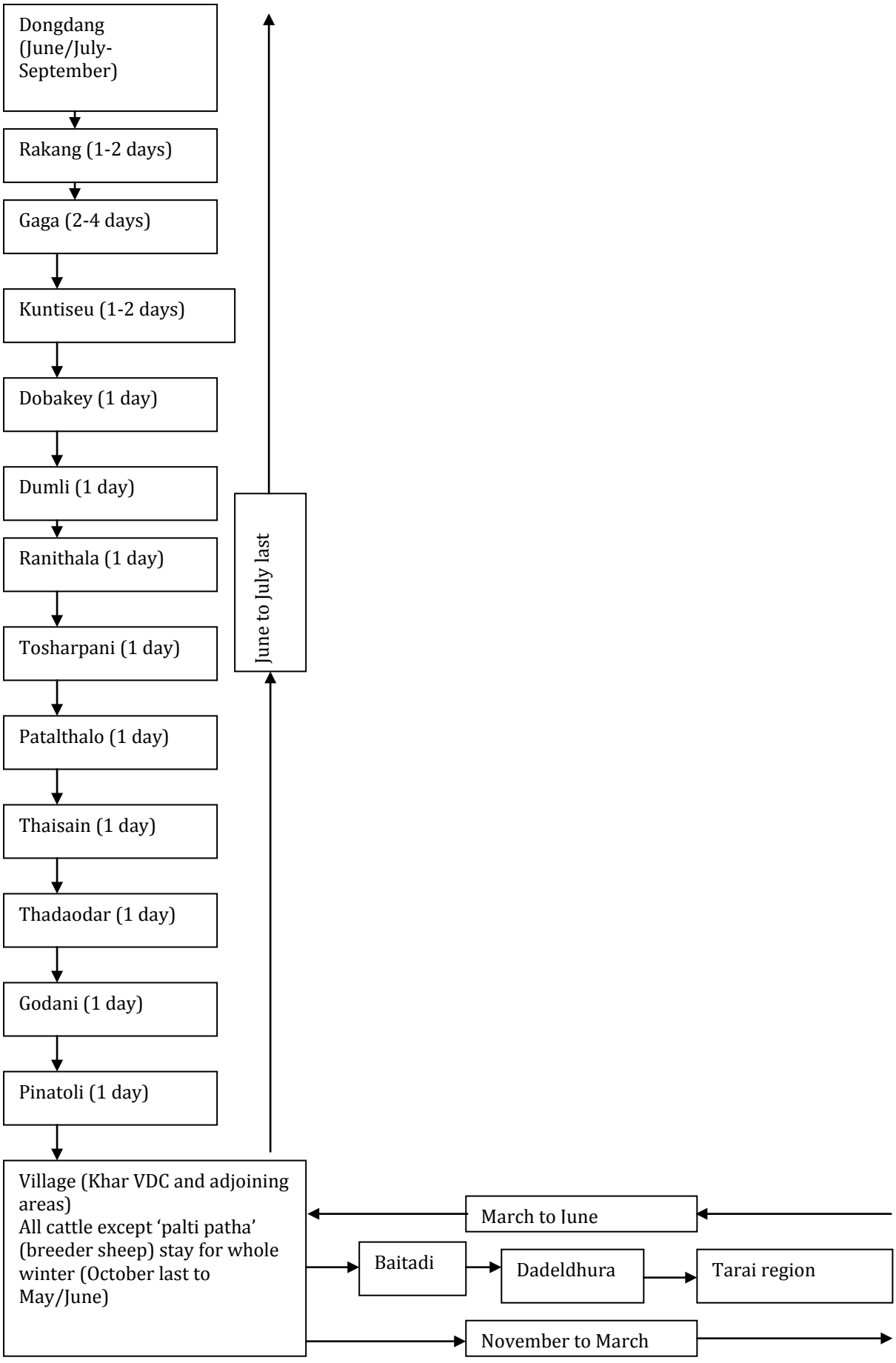


Figure 3.37 Traditional seasonal grazing route for sheep of Khar VDC (Darchula) and adjoining areas

3.3 Socio-Cultural Characteristics

3.3.1 Settlements and demographic pattern

Population

The total population of the KSL-Nepal region according to 2001 Census, is 564,035, with male 274,967 (48.75%) and female 289,068 (51.25%). Male population is lower compared to female in general, except in Humla district and few VDCs in other districts where the ratio of male is higher. Ethnically, the region is largely dominated by Chhettris followed by Brahmin, Thakuri, Dalits, and Lama (Figure 3.42a). Villages in higher elevation of Humla district, called 'Jadan' area, are inhabited by Lama People of Tibetan origin. An indigenous group Byasi inhabits in the Byas and Rapla villages in the north of Darchula district, and at the foothills of the Byas Himal. Majority (94%) of the people in the KSL-Nepal region are Hindus, followed by Buddhists residing mainly in upper parts of Humla. Other religions (Jain and Muslim) are in minority. Total number of household is 96,957, with an average household size of 5.82 (CBS 2001) (Figure 3.38 & 3.39, Table 3.30). There is a wide variation in social and natural fabrics among these four districts of the region.

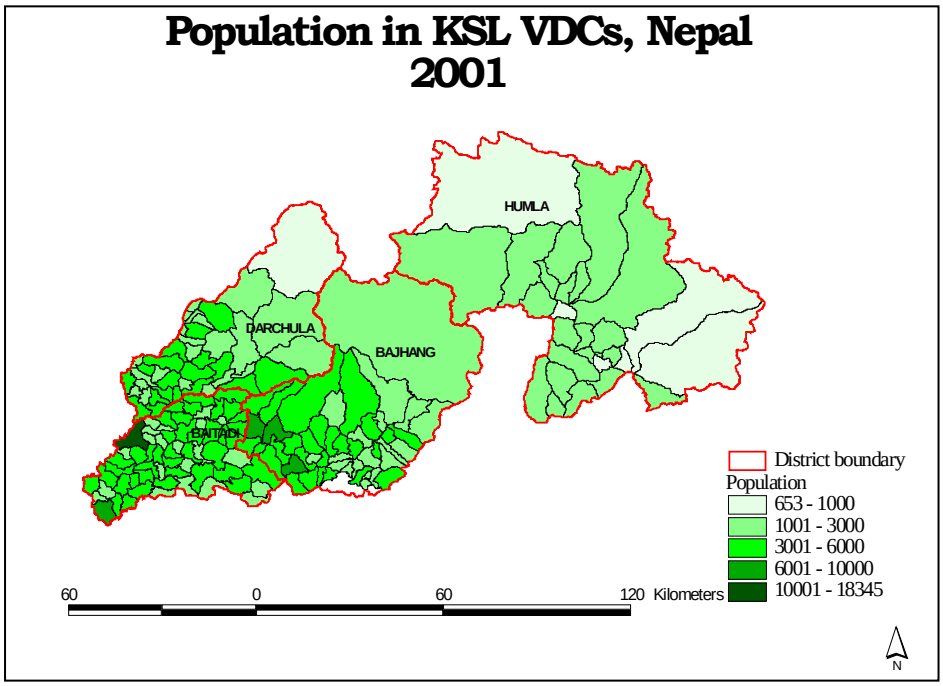


Figure 3.38 Population size in different VDCs/municipality of KSL in 2001
Source: ISRC 2008.

Table 3.30 Population size and density in four districts

District	Population (2001 Census)	Census HHs	HH size	Projected Population 2009	Population Density	
					2001	2009
Baitadi	234,418	40,387	5.80	265,113	154	174
Bajhang	167,026	21,029	5.80	193,103	49	57
Darchula	121,996	28,588	5.84	140,932	53	61
Humla	40,595	6,953	5.83	47,229	7	8
Total	**564,035**	**96,957**		**646,377**		

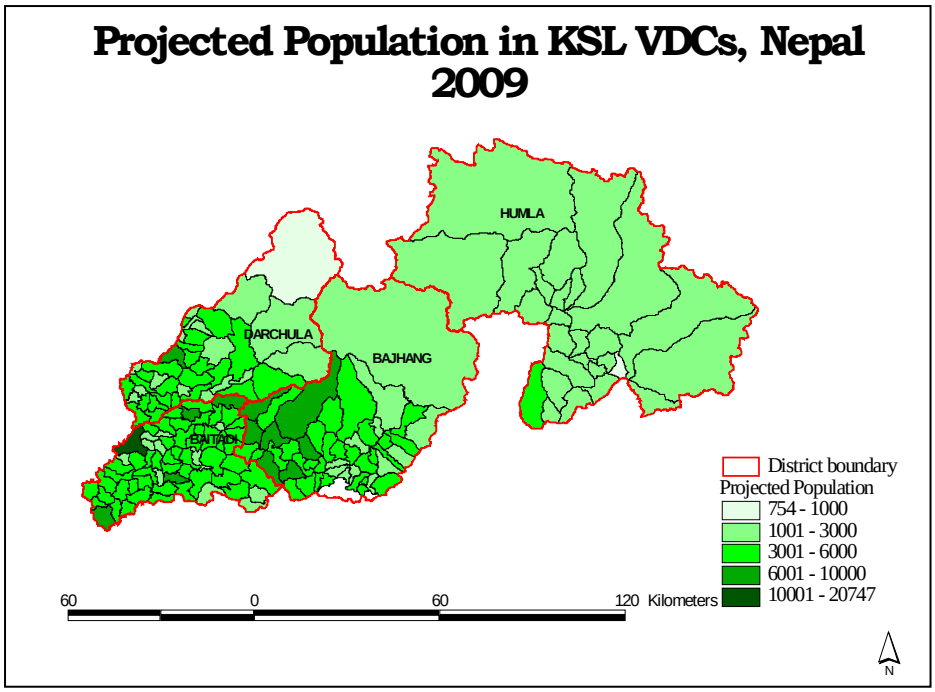


Figure 3.39 Projected population size in different VDCs/Municipality of KSL in 2009
Source: ISRC 2008.

Population Density

The KSL-Nepal region is inhabited by 564,035 individuals residing in 96,957 households, among them 48.75% are male and 51.25% are female. Highest family size is in the lower part of the area in general. There is also a wide variation in these VDCs in terms of population density with as low as 0.83 persons per sq.km. in Limi VDC of Humla District to as high as 427.62 persons per sq.km. in Huti VDC of Darchula District (Figure 3.40 & 3.41).

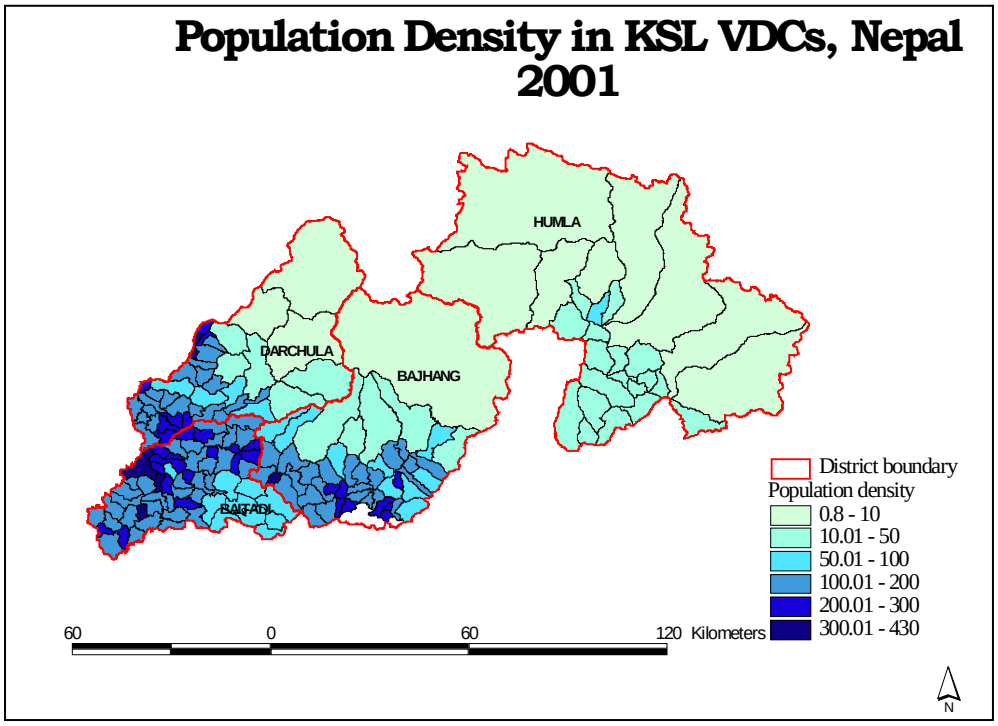


Figure 3.40 Population densities in different VDCs/ municipality of KSL in 2001
Source: ISRC 2008.

Ethnic Composition

Ethnically, the region is largely dominated by Chhetris followed by Brahmins, Thakuri, Dalits, and Lama (Table 3.31). Villages in higher elevations of Humla District are inhabited by Lama people of Tibetan origin and is called Jadan area. An indigenous group, Byasi, inhabits the Byans village to the north of Darchula District and the foothills of Byas Himal. The Byasis are also called Saukas, however, they like to be called Rango after the name of the Ranga cloth worn by priests of the deity Namjung. A larger population of Byasi also lives in the area of Kumaon across the border from Darchula. Figures 3.42a, 3.42b, & 3.43 show ethnic distribution and composition of the region. In Humla District, northern VDCs are almost exclusively inhabited by Lama Population. Thehe VDC (Humla), although shown as having more than 50% or more Chhetris, has a Lama population of 20%. Most of the VDCs shown 'without any majority ethnic group' (no ethnic group with at least 50% of the total population) have mostly Chhetri, Bahun, and Thakuri population jointly forming the majority (Figure 3.42a). Pancheswar VDC of Baitadi District has the highest proportion (46%) of Dalit population. Altogether nine VDCs in the whole region have more than 25% Dalits. Among other ethnic groups, Dhanuks are found in Bhatana, Bhumiraj, Hatairaj and Udaydev VDCs of Baitadi District. In Bhatana, Dhanuks represent 41% of the total population. Similarly, Sanyasis inhabit mostly Gokuleswar, Rudreswar, Hatairaj, Sreekedar VDCs of Baitadi and Matela, Dandakot, Bhairavnath, Chainpur, Kharkanda, Rithachaupata of Bajhang District. Other ethnic groups inhabiting the area are Nurangs and Lohars. Both Lama and Byansi have their own unique languages and ways of life. Byansis are also traders and both groups conduct their trade between Taklakot in Tibet.

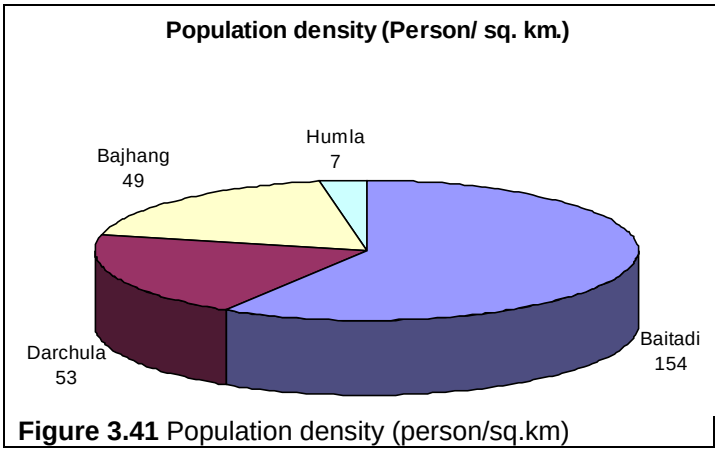


Figure 3.41 Population density (person/sq.km)

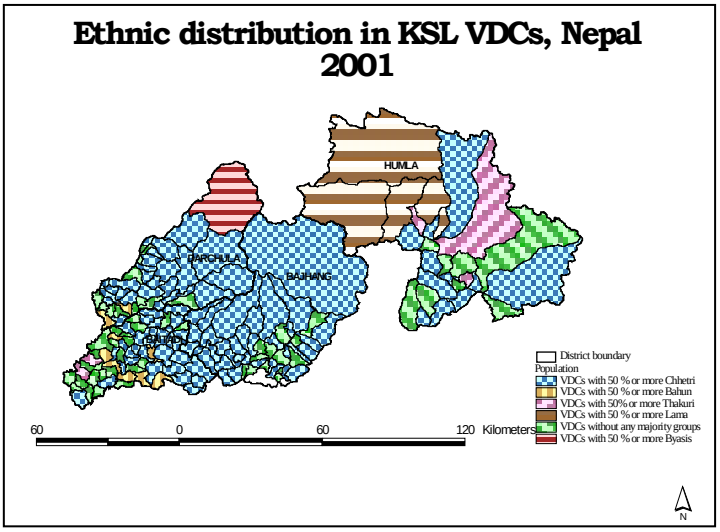


Figure 3.42a Ethnic composition of KSL- Nepal

Table 3.31 Population by caste (%)

Ethnic Group	Baitadi	Darchula	Bajhang	Humla	Average
Chhetri	48.12	59.2	63.93	44.3	53.88
Bahun	20.2	18.5	10.76	6.2	13.91
Thakuri	8.23	6.6	5.61	19.5	9.98
Dalit	10.75	11.6	4.77	9	9.03
Lama				16.1	4
Other	12.7	4.1	14.93	4.9	9.15

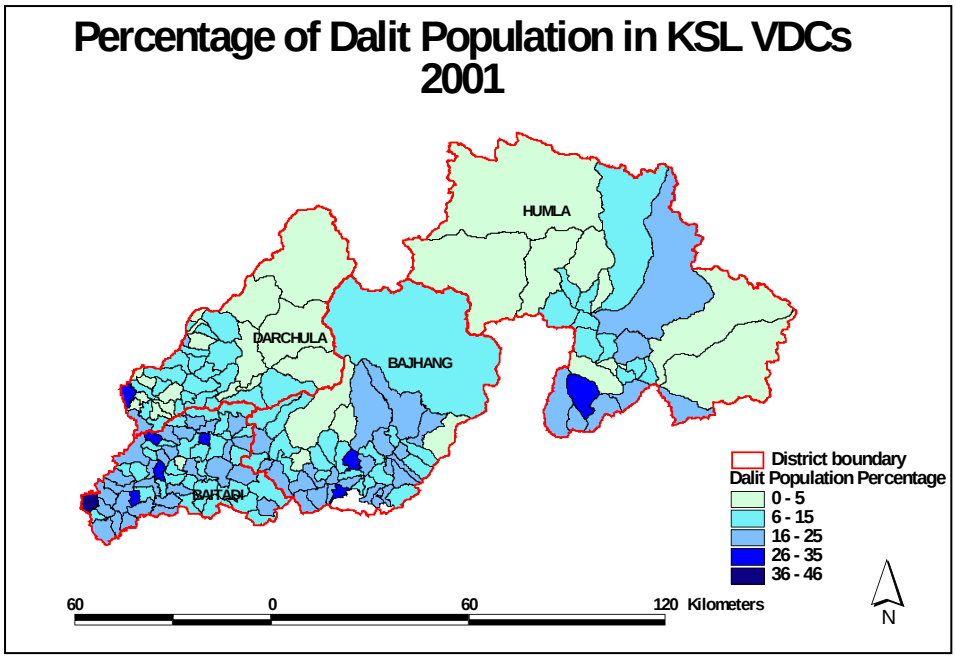


Figure 3.42b Dalit population in KSL- Nepal

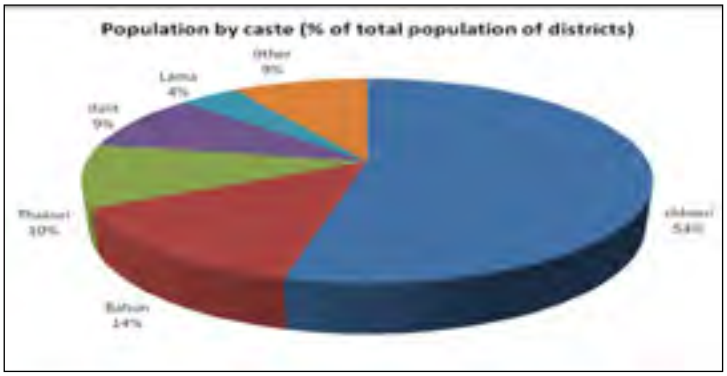


Figure 3.43 Population by caste within KSL-Nepal

Religion

Majority (94%) of the people are Hindus, followed by Buddhists residing mainly in upper parts of Humla. Other religions (Jain and Muslim) are in minority (Table 3.32).

Table 3.32 Population by religion

Religion	Baitadi	Darchula	Bajhang	Humla	Average
Hindu	99.78	99.71	99.77	78.2	94.36
Baudha	0.02	0.2	0.2	20.2	5.15
Jain	-	0.02	-	-	-
Muslim	0.02	0.01	0.01	-	-
Other	0.18	0.06	0.02	1.6	0.48

Population distribution by sex

Total number of households is 96,957 with an average household size of 5.82 (CBS 2001). Male population is lower compared to female in general, except Humla District and few VDCs in other districts where ratio of male is higher (Figure 3.44).

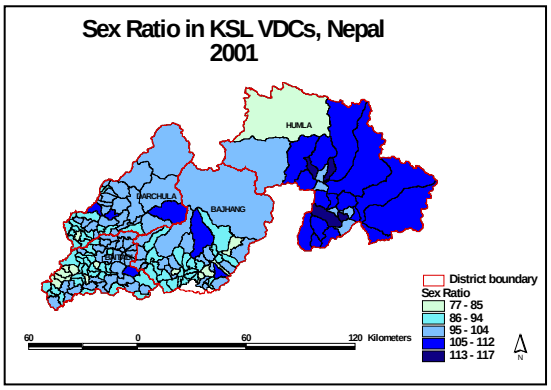


Figure 3.44 Sex ratio within KSL VDCs Nepal

Occupation

Generally, agriculture is the main livelihood means of the population. However, percentage of the population dependent on agriculture varies from district to district. In Darchula, more people (32.4%) are dependent on job employment than on agriculture (22.2%). However, in Humla District, percentage of population dependent on agriculture is as high as 88%. Generally, people residing in bordering area of India (Darchula District) are less dependent on agriculture as livelihoods mean (Table 3.33).

Table 3.33 Population by occupation

Occupation	Baitadi	Darchula	Bajhang	Humla	Average
Agriculture	88.5	22.2	84.09	87.57	70.59
Job-employee	4.2	32.4	5.31	2.6	11.12
Business	3.2	3.4	2.48	3	3.02
Pot-manufacturing	-	3	-	-	-
Pension	-	2.2	-	-	-
Production	-	-	2.05	3.4	-
Other	4.1	36.8	6.7	3.43	15.27

Literacy rate and educational institutions

The average literacy rate of the area for 2001 and 2009 are 40.70% and 46.75%, respectively, both of which is below the national average literacy rate of 86.5% (CBS 2001, 2009). Average literacy population of male is 59.45%, whereas female literacy is 23.32%. There is a wide variation in literacy rate both among and within the districts. Villages in Humla District have low literacy rate, with the lowest in Limi at 9%. VDCs of Darchula and Baitiadi Districts bordering India generally have higher literacy rates up to 72% (Table 3.34 & Figure 3.45).

Table 3.34 Literacy rate in four districts

District	Literacy rate (%)		Literacy rate (%)		Disadvantaged Population (%)
	2001	2009	Male 2001	Female 2001	
Baitadi	51.55	58	71.5	33.8	0.93
Bajhang	35.26	41	57.6	15.2	14.52
Darchula	49.39	57	67.41	32.5	2.97
Humla	26.62	31	41.3	11.8	59.97
Average	40.70	46.75	59.45	23.32	

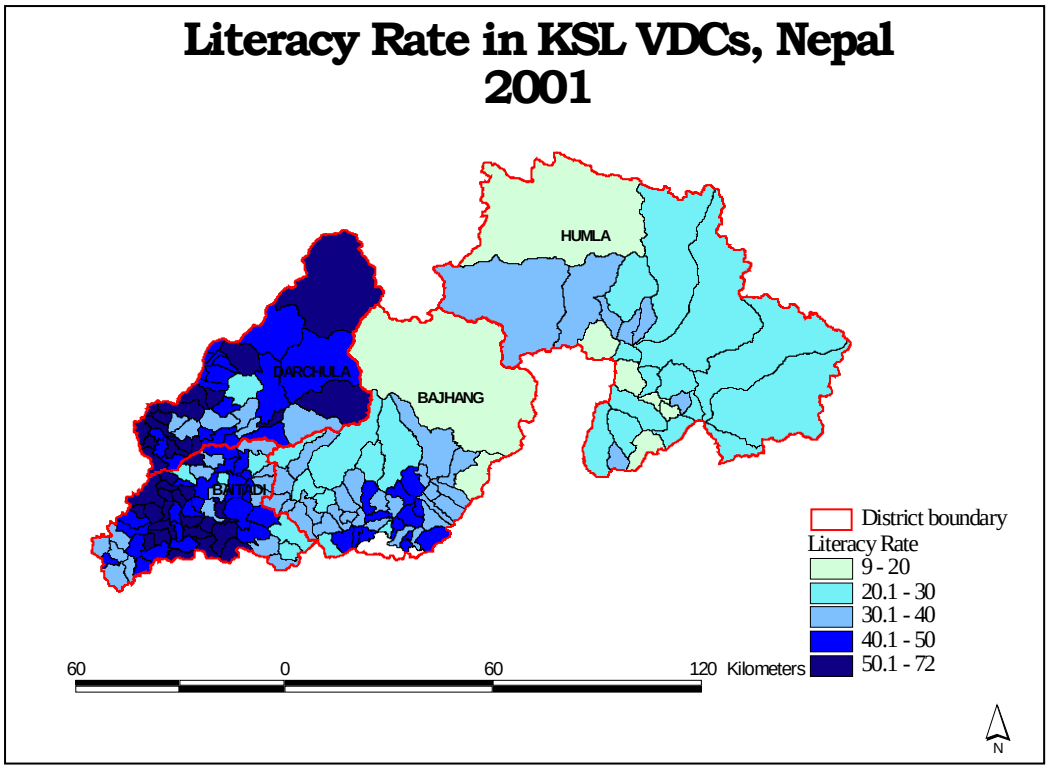


Figure 3.45 Literacy rate in KSL VDCs, Nepal

Educational Institutions

There are a total of 1,690 institutions including 1,168 primary, 289 lower secondary schools, 127 secondary, 8 higher secondary schools and 2 campuses based on 2006 information (Table 3.35).

Table 3.35 Number of institutions and students in 2001 and 2006

Educational Institutes and Students	Baitadi		Darchula		Bajhang		Humla	
	2001	2006	2001	2006	2001	2006	2001	2006
Primary schools	263	409	294	300	279	348	108	111
Lower secondary schools	103	108	73	73	70	84	23	24
Secondary schools	49	53	34	34	35	46	9	9
Private schools		96		-		-		-
Higher Secondary schools		8		-		-		-
Campus		2		-		-		-
Students in Primary schools	36,492	52,085	24,598	24,801	22,062	42,863	4,284	9,043
Students in Lower secondary schools	10,021	10,677	6,727	7,322	4,961	7,471	1,449	1,359
Students in Secondary schools	3,509	4,175	3,040	2,198	2,035	2,880	387	483

Source: CBS 2007

Health

The overall health index (rank) of these districts is poor compared to other districts in Nepal. There are few hospitals, health centres, and Ayurvedic clinics. High incidence of diarrhoea is reported from all districts. Among the four districts, incidence of tuberculosis is highest in Baitadi; malaria and HIV positive in Darchula, and typhoid in Bajhang district (Table 3.37). Some health indices are shown in Table 3.36.

Table 3.36 Health Indices

Health	Baitadi	Darchula	Bajhang	Humla
Health index (rank) (ICIMOD 2003)	66	62	74	67
Health institutions density	3.6	2.5	2.01	1.78
Population per doctor (District Profile 2063)				40,595
Ayurvedic Clinic			5	
Hospitals	1	5	1	1
Health centers	12	11	2	10
Sub-health centers	55	29	45	16
Doctor	1	-	1	1
Per doctor benefitted population		46,090	120,000	45,674
Chronic malnutrition among children under 5 yrs (index) (National: 0.72)	0.64	0.79	0.68	0.11

Table 3.37 Incidence of major diseases

Disease	Baitadi	Darchula	Bajhang	Humla
Diarrheal diseases	8,716	3,140	7,354	6,236
Tuberculosis	185	38	22	15
Measles	12	213	2	NA
HIV positive	NA	289	NA	NA
Malaria	9	421	NA	NA
Leprosy	NA	NA	14	NA
Typhoid	NA	NA	3,595	NA

Source: District Profile 2063

Indigenous communities possess sound knowledge of medicinal plants and traditional medicinal practice. In our field study in May-June 2010, we found more than 100 plant species that are being used in traditional medicinal practice by the local communities. This suggests that a detailed study is required to fully explore the medicinal plant species and traditional medicinal practice of the communities.

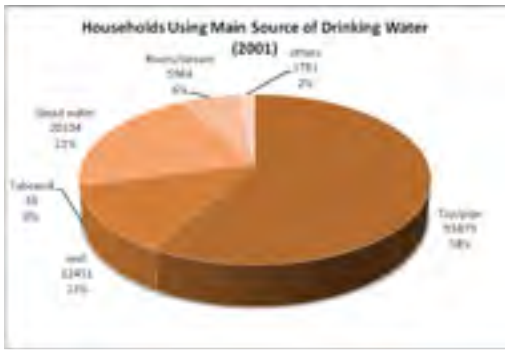
Water and Sanitation

Households with access to safe drinking water vary from 44 % (Bajhang district) to 71.4 % (Darchula district), which is below the national average of 84.1% in 2008. However, few places in Darchula district get very poor supply of water. Most villages have a communal water supply through using tap from a spring or stream. Sanitation coverage is between 10.8% (Bajhang) and 23.5% (Baitadi), much lower than the national average of 49.2% (Table 3.38, Figures 3.46a & 3.46b).

Table 3.38 Water and sanitation gap by district (ranked by sanitation coverage)

Districts	Sanitation Coverage	Water Coverage	Sanitation Gap	Remarks
Baitadi	23.5	60	-36.5	Water and sanitation less than national average
Darchula	14.4	71.4	-57	Water and sanitation less than national average
Bajhang	10.8	44	-33.2	Water and sanitation less than national average
Humla	18.3	64.5	-46.2	Water and sanitation less than national average
Average	16.75	60.0	43.25	

Source: CBS 2001; cited in WaterAid Nepal 2004



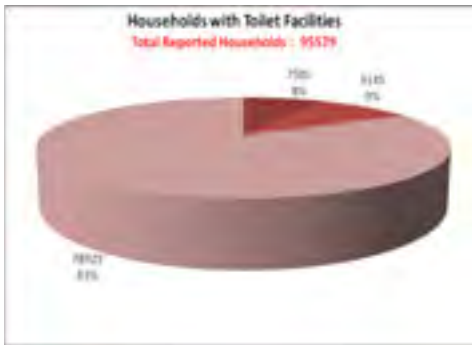


Figure 3.46a & b Water and Sanitation in districts of KSL-Nepal

Energy

Households here depend heavily on traditional sources of energy. Household connection to electricity is very low. Only 14.2% of the households in the region have access to electricity for lighting compared to 56.1% of national average (Figure 3.47 & Table 3.39). About 98% of households use firewood for cooking purpose followed by 1.7% of households using kerosene and 0.2% LP gas. Table 3.40 and 3.41 present the source of electricity and cooking fuel in the region.

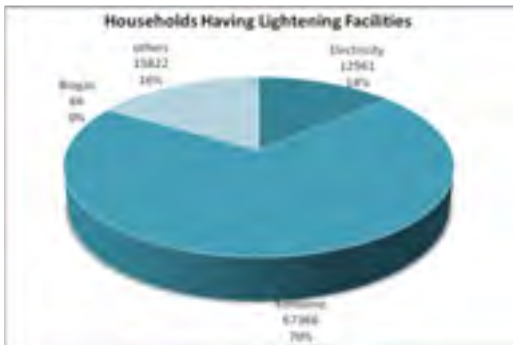


Figure 3.47 Lighting facilities in districts of KSL-Nepal

Table 3.39 Number of households using electricity

District	NEA	Solar	Micro-hydro	Total HHs	Percentage
Baitadi	3,802	317	1,554	40,387	14.05
Darchula	1,276	1,103	204	21,029	12.28
Bajhang	745	279	961	28,588	6.94
Humla	266	329	1,038	6,953	23.49

Source: NEA 2000; cited in GoN-NPC and UNDP-Nepal 2006

Table 3.40 Number of households using different sources of cooking fuel

Fuel Type	Baitadi	Darchula	Bajhang	Humla	% total surveyed HHs
Wood	38,800	20,355	28,028	6,736	98%
Kerosene	771	592	276	12	1.7%
LP gas	312	0	0	0	0.2%
Bio gas	55	0	0	0	0%
Santhi/Guitha (cow dung)	0	0	0	168	0.1%
Others	65	41	0	0	0.1%

Table 3.41 Number of households using different lighting facilities

Lighting Facilities	Baitadi	Darchula	Bajhang	Humla	% total surveyed HHs
Electricity	8,903	1,750	1,462	846	13%
Kerosene	29,036	17,405	20,556	369	71%
Biogas	55	0	0	11	16%
Others	2,030	1,824	6,286	5,682	0%

Road Network and Communication

Road network in these districts is poor, although road construction is one of the priority sectors of the local government. Road construction is now taking place at a faster pace. Road network in districts of neighboring countries is much better than in KSL-Nepal (Table 3.42). Many villages in these districts still do not have telecommunication facilities. However, this service is growing very fast, and it will not be long before all VDCs have access to telecommunication facilities like cell phones.

Table 3.42 Length of roads (km) in 2004

Road type	Baitadi	Darchula	Bajhang	Humla
Blacktopped	53	0	0	0
Gravelled	0	0	0	0
Earthen	90.5	66.4	73.2	0

Settlement Pattern in Humla

The majority of villages in Humla conform to a pattern of settlement extending over a large part of the Karnali Zone irrespective of ethnographic and linguistic boundaries (Haimendorf 1988). All ethnic groups live in villages of similar type. Houses are built wall to wall in such a way that their flat roofs form a large terrace on which one can move from house to house without having to descend to the bottom. In some villages like Kermi, Yalbang, and Yangar, houses cling to a slope with each house touching the one below and one above giving an appearance of a fort from afar. But in villages like Muchu and Yari, the houses are bigger and stand by themselves. Houses in Limi Valley are also connected to one another, but they are big and have larger space inside. Houses are flat-roofed and mostly of three storeys. The ground floor in these houses serves as cattle-shed, the first floor and second floors are used as living rooms and stores (Figure 3.48).

Figure 3.48 Settlement pattern in Humla

There is a system of creating secondary dwellings for exploitation of resources at different elevations in the region. Generally, people have one primary dwelling with permanent structures in the main village, while they move in tents in high pastures. Thus, settlements are all-season settlements. However, there is also another system whereby people have two almost equally important dwellings at two elevations, such as is practiced in the villages of Dinga and Hepka. Here, each household has two settlements: one for summer and another for winter. Each household owns a homestead in both the upper and lower settlements. These are named Lek Dinga and Byasi Dinga. In addition to having permanent structures at two elevations, they live in tents in high pastures.

3.3.2 Livelihood and Poverty

Livelihood

Crop production and animal husbandry, aided by seasonal trade, are main livelihood strategies adopted by people throughout KSL-Nepal. Contribution of each of these sectors in household economy varies from region to region, and even within a particular settlement. The diversity of climate, ranging from subtropical in lower elevations to temperate and alpine in higher reaches, offers a variety of ecological niches and accompanying livelihood opportunities. In addition to crop production and animal husbandry, collection of herbs, NTFPs like *Morchella*, and bee keeping provide means for subsistence.

Agriculture is the most important sector of KSL-Nepal. The area is primarily composed of agrarian society living in rural communities. Farming is mainly of subsistence type and is dependent on own farm inputs such as seed, manure, human and animal labor. Use of external inputs such as improved seeds, chemical fertilizers, and pesticides are either non-existent or very low. The average

landholding size is very small and the yield per unit land is very low. Land distribution pattern indicates predominance of forest, pasture, and agricultural land.

Crop Production

Crop productivity is relatively low in the region. Details of cropped area and production are shown in Table 3.43. Table 3.44 shows the production of several major crops in 2002 and 2007 (CBS 2007). Inadequate irrigation facilities, rainfed farming system and minimum use of modern technologies are the major reasons for low productivity. Throughout the region, rice is the preferred crop. It is often reported that the common episodes of hunger are caused by scarcity of rice rather than scarcity of food items.

A wide variety of crops are grown in the region. Variation in climatic conditions and physiographic features offer opportunities to grow diverse crops. Food items collected from the wild constitute important means for supporting livelihoods. However, a comprehensive documentation of these crops and cultivation practices is lacking. Most of the available information on agriculture is based on secondary information. The study team collected primary data on agricultural system of Humla District. A detailed study of the region is urgently needed (Adhikari 2008).

Table 3.43 Area and production of different crops

Crops	Humla		Darchula		Baitadi		Bajhang	
	Area (ha)	**Prod.** (m tons)	**Area** (ha)	**Prod.** (m tons)	**Area** (ha)	**Prod.** (m tons)	**Area** (ha)	**Prod.** (m tons)
Paddy	550	910	3,950	7,480	5,330	9,660	6,005	9,200
Maize	82	140	5,900	10,970	9,500	17,270	3,650	6,261
Millet	1,360	1,300	1,115	1,000	870	950	2,285	2,170
Wheat	990	431	5,965	4,255	5,000	4,355	6,100	6,317
Barley	680	280	1,200	792	500	500	1,510	1,350
Oilseed	58	21	154	67	250	170	120	24
Potato	664	6,640	716	9,216	725	7,975	950	7,272
Sugarcane	-	-	32	495	-	-	30	450
Cardamom	-	-	-	-	3	0.6	-	-
Ginger	-	-	42	510	56	310	10	60
Garlic	10	63	12	76	8	16	120	600
Turmeric	-	-	4	34	7	14	140	560
Chilly	26	93	5	17	12	24	150	110
Lentil	15	10	61	53	700	560	470	198
Chickpea	-	-	50	31	40	22	8	3
Pigeonpea	-	-	1	1	-	-	5	2
Blackgram	50	37	270	162	150	130	480	288
Horsegram	4	4	164	160	484	250	50	25
Soybean	28	25	775	557	515	400	160	98
Others	85	56	248	146	130	80	290	150

Source: SINA 2008/2009

Table 3.44 Annual production (in m ton) of major crops in KSL-Nepal

Crops	Baitadi		Darchula		Bajhang		Humla	
	01/02	**06/07**	**01/02**	**06/07**	**01/02**	**06/07**	**01/02**	**06/07**
Paddy	10,660	8,138	7,120	7,289	9,557	9,949	602	910
Wheat	10,100	6,500	7,450	9,500	8,915	9,155	863	975
Maize	12,750	16,450	8,850	9,145	5,285	6,200	109	140
Millet	1,090	770	1,200	990	2,239	2,285	1,062	1,090
Barley	560	500	1,034	1,050	1,653	1,510	1,680	1,190
Oilseed	250	250	110	126	166	120	33	50
Potato	622	640	5,350	865	5,350	940	4,887	580

Source: CBS (2007)

Irrigation

Irrigation facility in the KSL-Nepal region is poor and limits crop production. Among the four districts, Darchula ranks highest with 13.37% of agricultural land under irrigation while Baitadi ranks lowest with only 3.55% of agricultural area under irrigation. Table 3.45 and Figure 3.49 show the level and type of irrigation in the region.

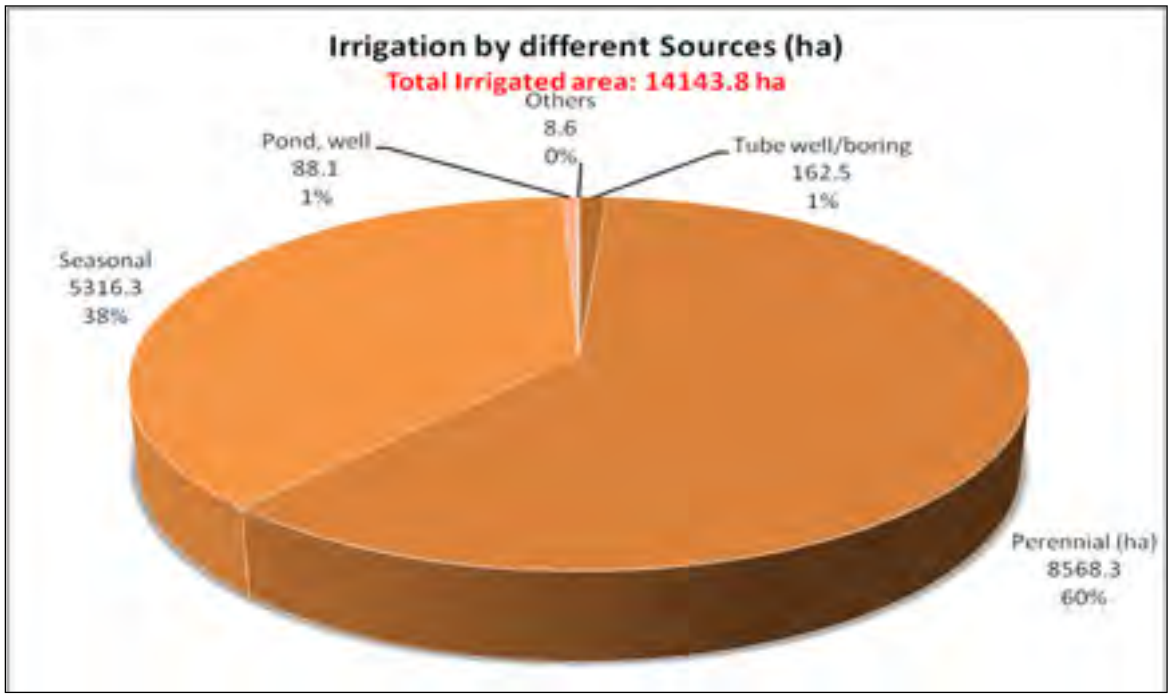


Figure 3.49 Irrigation by different sources

Table 3.45 Irrigated area (ha) by different sources

Irrigation	Baitadi	Darchula	Bajhang	Humla
Tube well/boring	11.9	6	133.4	11.2
Perennial	3,400	1,952	2,527.3	689
Seasonal	1,899.9	1,111.3	2,035.1	270
Pond, well	80.7	3.5	2	1.9
Others	6.6	0	2	0
Mixed	0	0	0	0
Irrigated Area	5,399.1	3,072.8	4,699.9	972
Irrigated Area (%)	3.55	13.37	7.77	5.5

Source: CBS 2007

Fertilizer and Other Inputs

Use of external inputs like chemical fertilizers and pesticides is low, thus resulting in low productivity. The table below gives a picture of the level of external inputs in four districts.

Table 3.46 Use of agricultural inputs by district

Inputs for different crops	Baitadi	Darchula	Bajhang	Humla
Paddy				
Area (reported) treated with mineral/chemical fertilizers (ha)	545.5	188.4	149.6	0
Mineral/chemical fertilizers quantity used (kg)	72,714	8,678	16,061	0
Number of holdings using insecticide	192	348	139	410
Maize				
Area (reported) treated with mineral/chemical fertilizers (ha)	1,184.4	364.5	8.1	0
Mineral/chemical fertilizers quantity used (kg)	280,929	31,235	1,743	0
Number of holdings using insecticide	329	209	119	90
Wheat				
Area (reported) treated with mineral/chemical fertilizers (ha)	2,148.1	197.3	250.8	0
Mineral/chemical fertilizers quantity used (kg)	329,460	13,462	24,280	0
Number of holdings using insecticide	384	501	337	746
Potato				
Area (reported) treated with mineral/chemical fertilizers (ha)	65.6	1.1	21.7	0
Mineral/chemical fertilizers quantity used (kg)	9,075	56	3,089	0
Number of holdings using insecticide	55	97	139	359
Sugarcane				
Area (reported) treated with mineral/chemical fertilizers (ha)	1.4	0.2	0	0
Mineral/chemical fertilizers quantity used (kg)	274	14	0	0
Number of holdings using insecticide	0	14	0	0
Vegetables				
Area (reported) treated with mineral/chemical fertilizers (ha)	100.9	12.3	10.6	0
Mineral/chemical fertilizers quantity used (kg)	13,901	2,239	3,327	0
Number of holdings using insecticide	165	306	277	892
Other crops				
Area (reported) treated with mineral/chemical fertilizers (ha)	777.1	2.1	7.1	0
Mineral/chemical fertilizers quantity used (kg)	99,529	904	4,258	0
Number of holdings using insecticide	55	70	396	286

Source: CBS 2001/2002.

Livestock Farming

Livestock farming is an integral component of the farming system in KSL-Nepal. Integrated crop livestock farming system is a special characteristic of animal production. Improvement in livestock productivity will contribute to improving living standards in rural areas while facilitating structural transformation of the economy. The priority animal by Agricultural Perspective Plan (APP) in mid-west and far-west hills and mountains are dairy cattle, goats, sheep, Angora rabbit, and yak (APP 1995). Cross breeds of yaks and local cattle are also popular in the upper reaches of KSL-Nepal. These animals serve various purposes such as ploughing, transportation, and production of milk, ghee (butter), meat, hide, fur, and manure. Sheep are still used to carry loads of about 14 kg on either side of their backs. Sheep also produce 0.5 to 1.5 kg wool per year, and the animals are used for transportation, meat and wool (Adhikari 2008). A restriction placed by the Chinese government on trade in 1961 brought dramatic changes in livestock raising systems and their numbers. This mainly affected the Bhotia population of upper Humla (including Mugu District). The Chinese government: (i) shifted the market from Chotu (close to the border) to Pangdu (three days walk from the border), (ii) artificially lowered the price of salt and wool; and (iii) restricted grazing of animals from Nepal side in Tibet (Adhikari 2008).

Livestock numbers in four districts shows a decreasing trend from 1991 to 2003 (Figure 3.50).

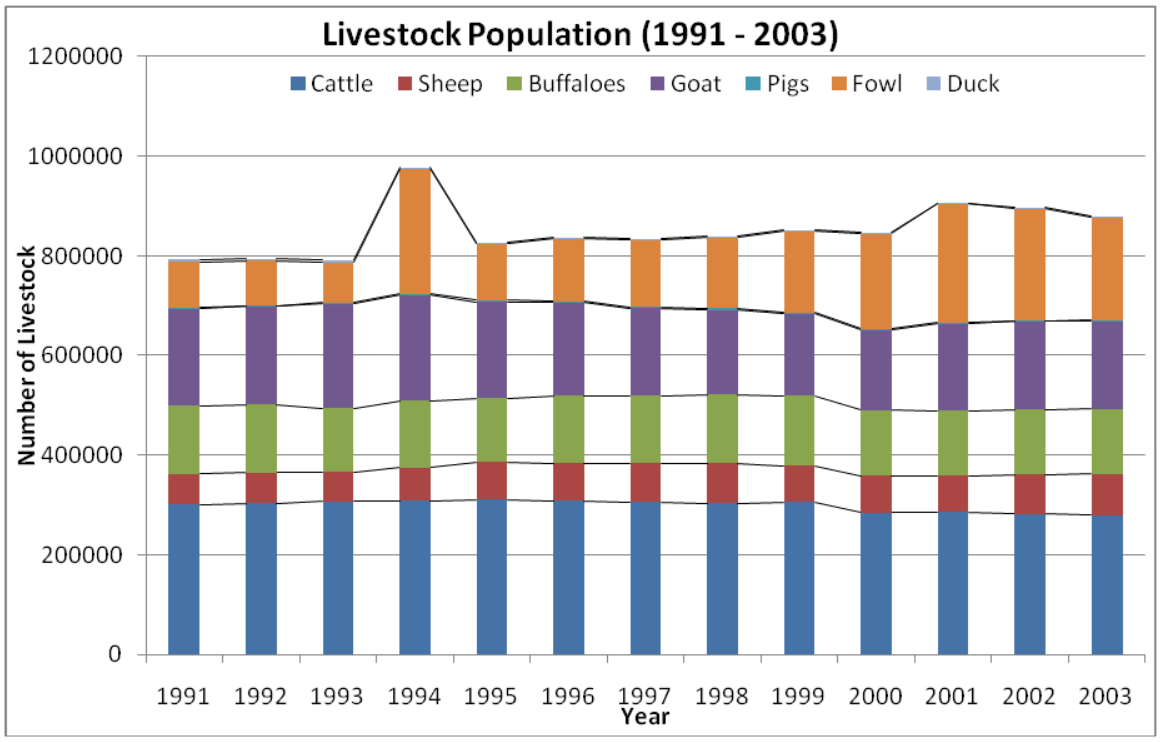


Figure 3.50 Livestock population in the districts of KSL-Nepal (Source: CBS 2007)

NTFPs Trade Pattern and Generated Royalty

Non timber forest product, especially medicinal and aromatic plants, play an important role in the overall economy of the region and household economy of individual households. A total of 55 species are traded as medicinal plants from KSL-Nepal. In the last five years, a total of 3,765,647 kg of herbs were traded generating total revenue of Rs. 33,793,051 (Table 3.47).

Table 3.47 Total Quantity of NTFPs traded and royalty generated in the last five years

Year	Quantity (kg)	Revenue (Rs)
2065-66 (2009)	863,467	16,288,820
2064-65 (2008)	750,448	9,450,959
2063-64 (2007)	1,024,304	4,107,341
2062-63 (2006)	546,130	1,597,888
2061-62 (2005)	581,298	2,348,044

Source: DFO Annual reports

Food Availability and Requirement

The region has remained a chronically food deficit area and famines are common episodes. Data available for 2005/06 (Table 3.48) shows the severity of food deficit in terms of cereal availability and requirement. These figures show the food deficit in aggregate amount, but the severity could be worse in individual VDCs.

Table 3.48 Food availability and requirement in the region in 2005/2006

District	Population	Cereals Availability (m tons)						Required (m tons)	Deficit (m tons)
		Rice	Wheat	Maize	Millet	Barley	Total edible		
Baitadi	251,560	4,706	5,940	10,310	629	138	21,723	50,564	28,841
Bajhang	181,396	5,309	6,669	3,702	1,870	351	17,901	34,647	16,746
Darchula	132,257	4,013	7,055	3,303	808	278	15,457	25,261	9,804
Humla	43,796	197	108	93	887	399	1,684	8,365	6,681

Source: VDC Profile 2008

There is a wide variation in social and natural fabrics among these four districts of KSL-Nepal. The description above provides a broad general scenario of the region.

Socioeconomic Features of Humla District – A Case Study

A comprehensive study of the whole region is necessary to document major and subtle socio-economic features of the region. The study team visited Humla District in May-June 2010 and conducted research on socioeconomic features of the district. Following are descriptions of these features of Humla District.

Agriculture Practice

Generally, there are no large compact areas of cultivable land, and people utilize large numbers of scattered plots. Although some settlements have reasonably level fields, cultivation in steep slopes is a common sight. Small patches of forests in steep slopes are cleared for cultivation, and evidences of slash and burn agriculture are also found. Buckwheat is mostly grown utilizing this method of shifting cultivation. These plots are abandoned after two to three years of cultivation.

Figure 3.51 Rice cultivation in low cut valley across Dharapori village, the last Thakuri village

In the low valleys, crops like rice and millet are grown in limited quantities. At higher elevations, these crops recede and naked barley, buckwheat, *chino* millet, radishes, and potatoes become the staple food. A certain level of correlation is found between types of crops grown and ethnicity. Though Thakuris have adapted themselves in many ways to life in higher reaches and resemble greatly with Lamas in house types, agricultural implements, and methods of animal husbandry, they have mostly settled in areas where at least some rice can be grown (Furer-Haimendorf 1988). Rice cultivation was found up to a place across Dharapori (at an elevation of 2,400m; Figure 3.51), the last Thakuri village in an area inhabited by Lamas.

Figure 3.52 Naked barley is the staple crop in the upper reaches of Humla District

In the lower elevation areas crops can be grown twice a year. In areas north of Simikot, up to Muchu, major crops grown are naked barley, wheat, barley, finger millet, *chino* millet, buckwheat, amaranth (*Marse)*, turnip, potato, and local variety of radish. Depending on snowfall and rainfall, naked barley, wheat and barley are sown in October/November and harvested in May/June. Finger millet, Chino, Marse, buckwheat, potatoes, turnip are grown as summer crops. Although some farmers reported of growing sweet varieties of buckwheat, mostly bitter buckwheat is grown and preparation for summer crops begins in March/April. Land left fallow in winter for summer crops is first prepared. Finger millet, chino, and buckwheat are sown after land preparation. Potatoes and radishes are also planted. In late-May and June, naked barley (Figure 3.52), barley, and wheat are harvested. These fields are immediately ploughed and buckwheat and chino are sown as summer crops. Weeding of summer crops is done in July/August. The early sown buckwheat is harvested in September/October. Naked barley, barley, and wheat are sown immediately after land preparation. No agricultural work is done from December to February. Winter crops are weeded in March, and then the new cropping cycle begins.

In higher elevations like Limi valley, and Yari village, crops can be grown in one season only. Major crops grown here are naked barley, wheat, pea, rape seed, potatoes, and radishes. Best fields are grown with naked barley. Fields are plowed in April/May. In Limi valley fields are plowed with one *Dzo.* Usually crops are weeded once in July/August and harvested in October. In Limi valley, fields are planted almost a month later in Halji than in Zhang and Tila villages. However, being in relatively warmer place compared to other two villages, crops ripen sooner in Halji. People from these three villages exchange labor during planting and harvesting among the relatives, or labor exchange circles. Crops are grown in level fields with several small plots designed to facilitate irrigation (Figure 3.53).

Figure 3.53 In Limi valley crops, are grown in level field consisting of several plots for irrigation

Crops are irrigated regularly till July/August. These villages have well established traditional irrigation systems. Each water turn, called *chhyuri,* is well respected and strictly adhered to. They have well defined and implemented rules for maintenance and operation of irrigation canals. Some of the canals are installed with polythene pipes in place of traditional wooden sluices. This type of water management has been practiced successfully by farmers in Manang village, Manang District. This system requires less labor and contributes towards efficient management of available water quantity (Dannevig 2007), supply of which is decreasing annually.

Some of the cultivable lands in Limi Valley belong to the monastery and community. Households cultivating these lands pay a tribute of three to four units of grain for one unit of seeds sown. Regions with one agricultural season face more acute food shortage than regions with two agricultural seasons.

Animal Husbandry

Livestock rearing is an integral part of household economy of all residents of the district. In lower Humla, cattle and buffaloes are kept in limited numbers. As one moves to higher elevations, *dzo, jhuma¸* cross-breeds of yak and local cattle become common. An ethnic correlation is noticed in animal husbandry, as well. Although dzo and jhuma are kept by Chhetris and Thakuris in areas adjoined by Lama Communities, yaks are kept exclusively by Lama Communities who cross-breed these animals to produce dzo and jhuma. The herding of yak involves seasonal movement to higher pastures.

Hybrids of local cattle, called *lulu,* and yaks, both male and female, are prized highly as pack animals and good milk yielders. Many Lama Communities keep a few *kirkoo* bulls to cross with *chauri*s (yak). Jhuma is prized for higher milk yield. Offspring of Jhuma and *Lulu* bulls are called *Tolba* (male) and *Tolbini* (Female) and are of relatively little value.

Figure 3.54 Transhumance is an additional major form of subsistence livelihood in Humla

People used to maintain large flocks of goats and sheep. Unlike many other parts of Nepal, sheep and goats here are kept as pack animals, as well. However, over the years, with scarcity of winter grazing land for sheep and goats in southern neighboring districts and dwindling salt-grain trade, the numbers of goats and sheep has reduced drastically. In

lower elevation, *rong-lu* (low country sheep) breed of sheep, characterized by coarse wool, are generally raised. In Limi Valley, *chiang-lu* (northern sheep), with finer wool are kept. A yak costs Rs 30-35,000 and Tsauris about Rs 30,000.

Transhumance

People, especially in the northern parts, practice transhumance, moving their herds to pastures of different elevations. In the summer and rainy seasons, animals are taken to high pastures while in winter season, they graze around main settlements. People in northern parts of the district follow a seasonal calendar while grazing their animals. All the animals are taken to summer season/ pasture, called *Soika* after planting of crops (Figure 3.54). In some villages, pack animals such as dzo and horse are not taken to pastures, but are grazed near the villages instead. In other villages, these animals are brought back to the villages from the high pastures if there is a need to carry loads (Figure 3.55).

Pastures for rainy season, *Yarka,* are located higher up. Around August, with the onset of *Tonka* (Autumn), pastoralists start to bring their animals to pastures in lower elevations. The *Tonka* pastures are the same as *Soika* (Summer) pasture. Around the end of the *Tonka* season, crops are also harvested and animals are brought back close to the village when the *Ghunka,* winter season begins. These rotational grazing systems are closely monitored and regulated by the community. If any individual is found grazing animals in Ghunka pasture in other season, s/he is severely punished. Even within a particular seasonal pasture, the community decides where to take animals so that pasturelands are maintained. For example, in Limi VDC, people take their animals to Ning Khola, Talung, Artang in Soika; Shakya Khola, Gyau Khola in Yarka; Talung, Ning in Tonka, and in the villages of Rak and Ning Khola in Ghunka season (Figure 3.50).

All households do not go with their animals to higher pastures. People with few animals request their neighbors/relatives to look after their animals in their herds. In such cases, absentee owners provide food and other required materials to the herders. In the case of collective herding of milking animals, ghee and dried cheese *chhurpee* are divided among the animal owners in proportion to number of milking animals or the amount of milk produced by the animals, the division-system varying in different villages.

Although people of Limi valley still use traditional tents made of yak fur in high pastures, people of Hepka, Dojam and lower villages were found using synthetic tents available in the market. The traditional tents, though of high quality and durability, are bulky and require two yaks to carry them. Hence, people with better access to the market have started using light polythene tents (Figure 3.56 a & b).

Each village has traditionally defined and recognized pasturelands. Communities regularly monitor their pasturelands to ensure that these are not encroached. However, despite such efforts, these recognized boundaries are often encroached upon. For example, pasturelands traditionally utilized by Limi residents is encroached by pastoralists of Hepka village. Hepka residents have been gradually encroaching bordering pastures like Tolung Khola across the Nyalu Pass and are taking their livestock further into other pastures including Dhakche and Shakya Khola near the international border.

Figure 3.55 Caravan of goats and sheep a as pack animals

Some people of Hepka resent the practice of other fellow Hepka residents of taking their animals deep into the pasture land traditionally owned by Limi. People of Limi had already communicated in a letter to Hepka not to take their animals in the pastureland belonging to Limi. However, people of Hepka informed that they would take their animals across the Nyalu Pass to Limi irrespective of whatever was written in the letter (Figure 3.52). The dispute between Limi and Hepka is not only limited to pasturelands. People of Limi complained that last year pastoralists from Hepka engaged in illegal collection of herbs in Limi, despite their prohibition. The police post, even after receiving formal complains, took no action against the perpetrators.

Figure 3.56 a & b Traditional and modern types of tents used by herders of Limi and Hepka

Issues of Animal Husbandry

Traditionally, herders from Yari and Limi would take their animals to pasturelands now in Tibet, during the winter season, as the pastures there are better and wind blows the snow away. However, with the new political arrangements between the two countries, such practice of cross-border winter grazing has been stopped completely. This has had a severe impact and the number of animals herders can keep has been greatly reduced. Political boundaries do not match with the ecological and traditional livelihood boundaries of the region. Although Nepalese herders are not allowed to take their animals across the border, local people reported that animals from across the border are grazed in pasturelands in Nepal. Flocks of goats and sheep from Sera (China), a town across the border near Hilsa (Nepal), were found grazing in the Nepal side (Figure 3.57). However, officials in Tibet were reportedly not allowing their animals to cross the border to prevent disease infection. There was an outbreak of Foot and Mouth Disease in Limi two years ago and people of Tila, a village in Limi, alone lost about 40 *chauris* (yak and cattle cross-breeds).

Although the number of animals has been reduced significantly, this has not been reflected in the quality of pastureland. In fact, because of the pressure on pastureland and decreased snowfall, the quality of pastures has been reportedly deteriorating. Availability of pastureland has been reduced not only on the northern side, but access to traditional winter grazing areas for goats and sheep in southern neighboring districts like Achham, Bajura and Bajhang has greatly diminished leading to reduction in number and size of flocks. Combined with the lack of grazing areas, labor shortages to herd animals, because of children attending schools locally or in India with support from different foundations, have led to reduction of herd size.

Trade

Although the centuries-old salt-grain trade has become almost non-existent since a few decades owing largely to influx of Indian salt and political changes in Tibet, the deep-seated culture of trade in the region manifests in other minor trading activities. The cessation of salt-grain trade has severely impacted the local economy. People of Limi, the northern most VDC of Nepal, still recall the days of storing a good quantity of red-rice traded with salt. This change has also contributed to aggravation of food security problem.

Some market centers in the district have been slowly evolving over the yeras. Some of these centers include Dharapori, Sarkeghat, Shreenagar, Maila, Lali, Muchu, Melchham, Darma, and Simikot (Humla DDC 2010). However, in the northern parts of the district, trade with Taklakot in Tibet carries high significance. Most consumer goods, including food items, are bought from Taklakot. Usually, Hilsa - the bordering trade center in Nepal - remains closed in the winter months as little trading activities takes place through the Nara Pass (4,560m) which becomes impassable in the winter. In the last few years, Hilsa has become a major trading center with people from different parts of the district, including from Mugu District, opening shops here. Until the Maoist insurgency, this settlement remained an agricultural village, but now no crops are grown here and all the land has been converted into building construction site. With the growth of Kailash-bound tourism, several lodges have also been built.

The most common item of export from Humla from this point has been timber. Planks of wood and beams, usually from forests above Kermi, are carried on Dzopa and sold in Taklakot. A load of Dzopa would fetch as little as Rs 500. Over the years, the volume of timber export has been fluctuating. It was reported that when people have alternative income opportunities like working for Food for Work program of World Food Program, the export of timber declines. Stacks of wooden planks prepared for export become a common site in the forest beyond Kermi village. Although there was a range post of District Forest Office in Yari village, supervision of the District Forest Office was found ineffective. Neither is there any control/checks at the bordering town.

Figure 3.57 Sheep and goats from Tibet graze in Nepal

Trade of NTFPs. Since the last one year, a large quantity of herbs is being exported via this route mainly for two reasons: (i) to avoid the hassles of paying taxes, and (ii) for better prices in Taklakot. The state has not established any regulating/tax collecting unit in Hilsa. The Police check post here operates only for about six months. Large quantities of Chinese drink, locally called *Thobe*, and wheat flour were the most common items bought by Dzopa owners to be traded in Simikot. A bottle of Thobe in Hilsa costs about Rs 72 and in Simikot Rs 200. For Dzo owners, the Thobe trade is flourishing. Interestingly, though rice is available in Taklakot and Hilsa, people do not buy it much as buying rice from Food Corporation in Simikot would make economical sense. Although, there is a chronic shortage of rice in the district, most of the locally-made alcoholic drinks are made from rice and not from traditional alcohol preparing grains like naked barley and millet.

Figure 3.58 Processing of Phuru, a wooden tea bowl, a major trade item

Another common item of export is *Phuru*, a small wooden tea bowl manufactured from *Acer* species (Figure 3.58). People of Limi and surrounding areas buy Phuru in India or prepare them by carving out trees in lower elevation. These Phurus are further processed and painted in the villages and sold in Taklakot. People of Limi also buy grains like naked barley and other materials, much more than other villages. The growth of economy in Taklakot provides employment opportunities and increases the demand for Nepalese products like timber and herbs.

Although Limi area is rich in herb production, quite interestingly unlike many northern districts of Nepal, *Amchi* practice (Tibetan medicine system) based mostly on herbs is almost nonexistent in Limi; however, people in Dojam and Chhipra area do use medicinal plants to treat common diseases/ailments. Training of a few people in this field would not only help add value to the products but also cater to the health needs of local people.

Trade Channel of NTFPs. NTFPs including medicinal plants are one of the most important natural resources supporting significantly to the economy and healthcare of local people. The most important species of MPs in terms of local economy and healthcare are given in Table 3.49. Among these, Jatamansii (*Nardostachys grandiflora*) and Kutki (*Neopicrorhiza scrophulariiflora*) are highly traded from almost all parts of Humla district including Thehe and Chhipra VDCs. According to DFO records about 9000 kg of dried rhizomes of Nardostachys grandiflora have been legally traded from the district in 2009/2010. However, according to villagers' estimate, Dozam area (Thehe VDC) alone contributes about 4000-5000 kg of dried rhizome of *Nardostachys grandiflora* in annual trade from Humla district. The difference in trade data between DFO records and villagers' estimate indicates that large volumes of NTFP are being involved in trade through illegal channel. The other most commonly traded species of MPs are *Morchella species, Delphinium himalayai*, *Valeriana jatamansii* and *Fritillaria cirrhosa*. Almost all of the products are traded in crude form. Practices of processing and value addition are virtually absent. The collected products are traded to district-level traders who directly sold the products to the Tarai whole sellers from where the products are exported to India (Figure 3.59; Table 3.49). In this process many agencies and agents are engaged. In recent years, medicinal plants and other NTFPs have also been illegally exported to nearby Chinese markets. The trade of NTFPs generates important revenue for a large number of local people including collectors, middleman, porters and local traders.

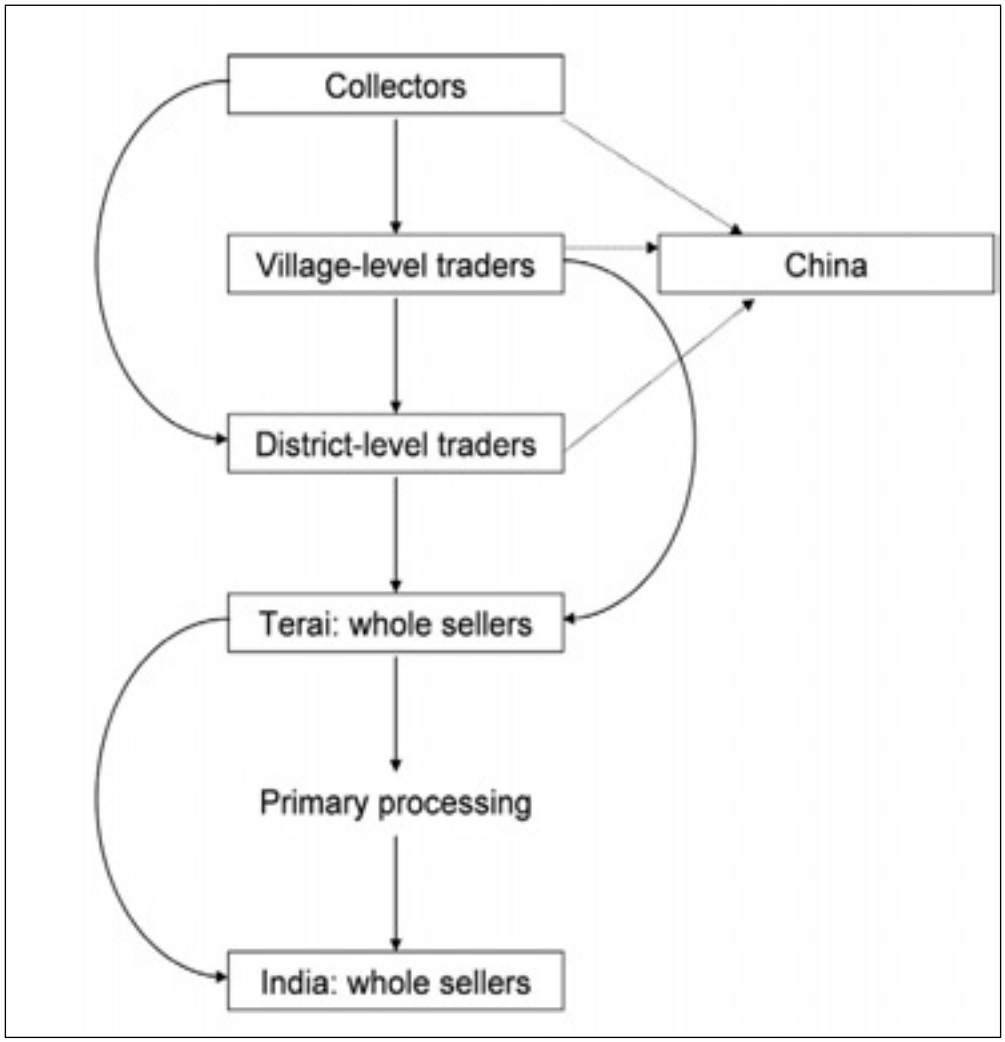


Figure 3.59 Trade channel of NTFP (based on local information in Dozam village)

Table 3.49 Highly traded species of NTFPs from Dozam and Chhipra area[†]

Botanical name	Local name	Trade name	Trade amount (kg air dry weight) from Dozam*	Trade amount (kg air dry weight) from Chhipra*	Market price (Rs/kg)
Dactylorhiza hatagirea	Hattajadi	Panchaunle	13	nt	1,700-1,800
Nardostachys grandiflora	Bhultya	Jatamansi	5,000	nt	300-400
Neopicrorhiza scrophulariiflora	Katuki	Kutki	4,000	450	550-800
Fritillaria cirrhosa	Podya	Kakoli	100	nt	2,000-3,500
Delphinium himalayai	Alusi	Atis	350	nt	?
Morchella species	Guchhi chyau		100	5	6,000-15,000

[†]source of information: local people and NTFP collectors
*amount traded in 2009
nt = not traded yet

NTFP processing and micro-enterprise. There are ample opportunities for the value addition of the herbal products by establishing processing units and promoting locally affordable micro-enterprise technologies. Recently, an essential oil processing unit (capacity 1000 kg) has been established by DFO in Kurilla area of Karpunath VDC with a total cost of NRs. 2.8 million. The main raw materials for this plant are rhizomes of Nardostachy grandiflora and Valeriana jatamansii. Beside this, there is one micro-enterprise for extracting juice from seabuckthorn (Hippophae salicifolia) berries in Thehe VDC. These efforts, although encouraging, are not sufficient given the amount of resources that are being involved in trade from the area. Value addition technologies of different capacity should be established in order to provide sustainable earnings to the poor collectors.

Apiculture

Honey production plays an important role in the livelihood of the people of the KSL, Nepal area. Humla, Bajhang, and Darchula districts are ideally suitable for apiculture. Bee keeping is popular in areas below 3,000m. Dojam area (Thehe VDC) is famous for honey production. Each household owns several honey bee hives (locally called *thour* in Humla) which is manufactured by local farmers. A quality *thour* is made from log of *Pinus wallichiana*, and lasts for six to seven years.

Each *thour* produces about six to eight kg of honey. Most of it is consumed locally, and a part is sold at a rate of about Rs. 600 per kg. Many farmers keep several of such hives. A farmer in Baijubara village (Thehe VDC) was found to own 90 *thours* which are kept in the roof of his house, kitchen garden, and inside the forest. Processing of honey is done using standard equipments by his family. Honey extracted is exported to Nepalgunj and Kathmandu by air.

Farmers fix honey bee hives at suitable locations in May and harvest honey by October. In the forest, *thours* are hanged on a big rock with the help of rope/bark made from *Desmodium elegans*. Rocks where *thours* are fixed are owned by individual farmer for several generations, and the rock is automatically transferred to the next generation as parental property. Some farmers, who do not get time to fix the bee hives in the rock owned by his/her family, may allow other families to fix their hives for some rent or share (Figure 3.60a & b). It was learnt that there are 3-4 types of honey bee; and the bees survive in winter by migrating to low lands in the adjoining districts - Accham, Bajura, Bajhang, etc.

a

b

Figure 3.60a & b Apiculture in Humla district

Foreign employment

Unlike in many other parts of Nepal, where foreign employment has become a common sought-after strategy, foreign employment in general sense is non- existent in Humla. However, for people of Limi valley, employment in Taklakot is of paramount importance. Most of the youths from Limi go to Taklakot after sowing naked barley. Mostly, they get work in construction sites to carry cements and sand or other construction materials. As the construction work there is proliferating with the rising economy the employment opportunities for these youths is good. They get work mostly on the basis of personal contacts and quite often drivers help them to secure a job. Normally, the daily wage rate ranges from Rs. 700 to 800. However, people from other villages like Yari, although as close as Limi to Taklakot, are not involved in such employment there. It was reported that females get job easily mostly because of their sincerity. Before the growth of construction work in Taklakot, only a few persons from Limi would get job in Taklakot, mostly to herd animals in pastureland. But now they do not work as agricultural labors there anymore. The work opportunities in Taklakot have been a key in keeping household economies in Limi afloat.

3.3.3 Tourism

Although the region abounds in natural beauties and inherits rich cultural heritage, the tourism activities in the region is at minimal level. Some of the major tourism attraction centres of the region are rivers like Mahakali, Chaulani, Karnali; mountains like Api, Nampa, Byash, panchachuli, Saipal; and other attractions like Surma sarobar lake, dudhkund lake, Kailash cave, Jaya Prithvi Nagar, Limi Valley. The region has two Protected Areas Khaptad National Park and recently declared Api Nampa Conservation Area and adjoins the Rara National Park. The region's natural beauty is matched by cultural diversity and richness. Being largely an under-exposed area, it holds an immense potential for tourism development. Besides, the region had been traditionally a trade route linking Taklakot of Tibet and southern parts of Nepal and India. It has also been a route for pilgrimage to Kailash/ Mansarovar for devotees from Nepal and India.

The KSL-Nepal region holds a good prospect of being developed into a major tourism hotspot (Table 3.50, Annex 15). Currently, tourism activities are concentrated on a few locations like Simikot to Hilsa in Humla district. The region displays richness and diversity in natural and cultural attractions. After opening of the region for tourism in mid-1960s, number of visitors to the region is gradually increasing. In the time of insurgency, the area experienced a drastic decline in the number of visitors coming to the region. The region has several potentials for the development of nature-based tourism, such as: Himalayan range with unique beauty as well as sacred place (Kailash and Mansarovar) for the peoples of different religion, rich cultural and religious heritage, popular route for the pilgrims to Kailash-Mansarovar and the traders to Taklakot, unique biological diversity, several lakes and ponds, hot springs, traditional herding and agricultural system, handicrafts, sheep caravans and farms, etc. Development of ecotourism in the region would be a major source of economic, socio-cultural and environmental protection and more significantly reducing the level of poverty in the area (Karnali Area Development Master Plan 2008)

Major features of tourism attractions are high mountains- Nalakangkang range: Nalakangkang (7337m), Tankh Himal, Chalna Himal; Byash-Rishi Himal range, Api Himal (7134m), Nampa (6757), Saipal (7036m); rivers, lakes, religious sites like Halji and Reling monastery in Humla, temples of Tripurasundari in Baitadi. Details of these sites are listed in table and Annex.

Main pilgrimage and trade route in the region are Baitadi-Darchula-Tinkar-Taklakot, Chainpur-Taklakot, and Nepalganj-Simikot-Hilsa-Taklakot. Among these three routes first two routes are frequented less as there are high passes and open only seasonally. The Nepalganj-Simikot-Talkakot route is the most followed route in the region now. Details of these routes have been provided in Annex 15.

Table 3.50 Important sites in KSL–Nepal

	Baitadi	**Darchula**	**Bajhang**	**Humla**
Main tourist sites	Khalanga Bazar, Khalanga Bazar, Shera gaun, Patan, Jhulaghat, Killekot, temple of Dewalghaat, Temple of Tripurasundari, Jagannath temple, Ishwari Ganga, Patal Bhumeshwar, Raulakedar, Thehimandu Bhagwati	Byash-Rhishi Himal range, Jaskar range, Tinkar Bhanjyang (6097m). Darchula Khalanga, Tapoban, Gokuleshwor Temple, Malikarjun, Joljivi, Chhangru, Tinkar, Ukoo	Nampa (6757m)- Bankiya lekh (6936m)- Saipal (7036m)- Kapkot (6373m), Khyuri khala (5992m); Chainpur, Jayaprithvinagar, Surmasarobar, Dhuli, Thalhara, Khaptad Lekh	Mountan Ranges:A) Nalakangkang range: Nalakangkang (7337m), Tankh Himal, Chalna Himal, B) Jarkar range, Nampa Chalang, Saipal Range (7036m); Simikot, Darma, Sorugalfa, Limi, Reling, Kharpunath, Muchu
Important Plant Areas	Gwallekh Dhura, Deulekh, Ghanghasya Lekh (Silanga), Khochlekh-Deulekh (Siddapur)	Khandeshwari VDC, Byash VDC, Rapla VDC, Ghusa VDC, Marma VDC	Majhigaun, Pauwagadhi, Kalukheti, Kada VDCs, Talkot, Bungal	Thehe, Khagalgaun, Mimi, Raya, Limi
Important Bird Areas	Grassland near Indian border side	Khandeshwori VDC	Khaptad National park	Chipra, Dojam, Khagalgaun
Important Wildlife Areas	Border area of Darchula and Baitadi	Lipu lekh	Majhigaun, Pauwagadi, Kalukheti, Kada- tallokot, bungal areas	Ladekhola, larchham forest, parangdunga forest and Raling himal's surrounding, Takchi forest, Changli lekh, and Tibetan border pastureland
Areas of socio-cultural importance	Tallo Sorad and Few parts of Upallo Sorad, Purchaudi Haat	Tinkar, Chhangru, Byash area, Ukoo	Khaptad lek, Dhuli, Channa, Kada VDC, Byasi VDC Kailash VDC	Tumkot, Muchu, Limi, Darma, Thehe
Areas of historical importance	Khalanga bazaar, Killekot, Raula Kedar	Uku VDC, Malikarjun VDC, Tinkar	Jayaprithvinagar, Thalhara, Banni kot, Chainpur	Limi, Sorugalfa, Simikot, Tumkot
Important religious sites	places of sorad (Tripurasundari, Melauli Bhagwati, Ninglashaini, Patal Bhumeshwar, jagannath temple, Ishwari Ganga, Dewal Ghat), Gwallek Kedar dhura	Malikarjun VDC, Khandeshwari VDC, Gokuleshwar	Khaptad Lek, Surma, Kailask cave(Kailash VDC), Baddi Jyaban	Kharpu nath VDC, Halji, Reling, Mount Changla
Important trade centers	Khodpe, Patan, Satbajh, Khochlekh, Jhulaghat, Baiatdi khalanga, Gokuleshwar	Khalanga bazar, Gokuleshwar, Tinkar chhangru, Joljivi, Pasti, Dallek	Sunkuda, Thalara, Daulichaur, Bagthala, Deura, Deulek	Limi, Naka, simikot, Sarkideu, Paiyan bzar

Source: Mechi dekhi Mahakali samma (in Nepali language), DFO reports 2008, District Profiles 2008, Field visit 2010

Although the whole region holds potential for tourism development, till date, foreign tourists' arrival has been only in Humla district and Khaptad National Park. Rara National Park, adjoining to the region has also received foreign tourists. Number of tourists arrival in Humla and the protected areas are shown in the table. Tourism flow has been only to Humla district and Khaptad. The tourists arrival declined drastically after 1999 owing to insurgency and has started picking up again from 2007. The revenue generated by the two national parks from tourism fee in 1999 was Rs. 199,708, but declined to a meagre amount of Rs. 34,406 in 2005. In 2007 it was at Rs. 72,296 (DNPWC 2008) (Table 3.51).

Infrastructure for tourism promotion in the whole region can be characterized as barely minimal. Since among all the four districts in the KSL Nepal region, most of the tourism activities take place in Humla district, overview of infrastructure development in Humla would help shed the light for the whole region. The existing infrastructure and facilities for the region has been listed in Annex 15. The section below presents the opportunities and challenges for tourism in Humla district.

Table 3.51 Number of tourists visiting KSL-Nepal

Year	Humla		Rara and Khaptad National Parks
	Foreign Tourists*	Indian Tourists	
1994	-	-	222
1995	-	-	190
1996	-	-	100
1997	-	-	565
1998	-	-	161
1999	NA	NA	705
2000	400	-	78
2001	384	1	38
2002	299	36	10
2003	259	31	24
2004	473	266	5
2005	412	109	29
2006	800	516	53
2007	1,000	2,000	151

* Foreign tourists does not include Indian tourists.
Source: Karnali Area Tourism Development Master Plan 2008

Tourism in Humla

Tourism is one of the most promising sectors holding key for the socio-economic transformation of the Humla district. Currently also, it contributes significantly in generating revenue for the district. The District Development Committee charges Rs. 500 per tourists from the SAARC region and Rs 700 per tourists from other countries. According to the District Profile of Humla district, the revenue generated from such a collection of fees amounted to Rs. 288,040 in the FY 2065/66; Rs. 245,134 in the FY 2064/65, and Rs. 299,535 in FY 2063/64. These figures account for 20.18 %, 19.58 %; and 35.85 % respectively for those fiscal years (DDC Humla 2010).

Although tourists flow and the role of tourism in revenue generation is significant, at the current stage, the attraction of Humla lies mainly as a gateway to Kailash/Mansarovar rather than being a tourist destination by itself. However, the region has several cultural and natural resources which could make it one important tourist destination in itself.

Natural beauties

Lofty snow capped peaks like Mt. Saipal, Mt. Changla; vertical cliffs; scenic landscapes ranging from series of temperate forests to idyllic alpine meadows; several lakes, waterfalls, and rivers; abundance of several flora and fauna makes the region a rich natural store house of tourism attraction. Wild animals like - Himalayan marmot, musk deer, Blue sheep; Beautiful bird species like - Ibisbill, Grandala, Chukar, Snow Pigeon, Lammergeier, Himalayan Griffon and many more are found in the region. These natural infrastructures provide opportunities for varieties of tourism like adventure tourism, trekking, and nature tour (Figure 3.61).

Figure 3.61 Scenic landscapes are major attractions of the region

Cultural Infrastructure

The cultural fabric of the region matches the natural beauty and exhibits a rich diversity. The southern part of the district is largely dominated by Hindu groups like Chhetri and Thakuris, whereas the upper reaches of the district are inhabited by people subscribing to Tibetan Buddhism. Diversities manifest in subtle to marked differences even within these subgroups in cultural practices. Several monasteries in the northern part and temples in the southern part stand testimony to such diversities (Figure 3.62).

Some of the renowned monasteries in the region are Namkha Khyun Dzong Monastery of Yalbang; Drikung Kagyu Waltse Rinchenling monastery in Halji, Limi; and Reling monastery. The Halji

monastery was established by Rinzin Zampo (985-1055) and later extended by Chinga Lingpa (Tara Gaon Development Board 2008). About forty years ago, two other villages of Limi, Tila and Zhang, built their own monasteries – Kunzom Dhongak Chhoeling monastery in Tila and Phenzeling monastery in Zhang. Monasteries in the region subscribe to different sects of Tibetan Buddhism. For example, the monastery in Yalbung subscribes to Ningmapa sect, whereas the one in Tumkot subscribes to Shakyapa sect, and those in Limi valley subscribe to Drikung Kagyu. The monastery of Halji, besides being one of the oldest monasteries in the country, owes its importance to the fact that the previous head of the Kagyupa sect resided in this monastery. The current head of the sect, Kyangen Rinpochhe who resides in India, visited this monastery in 2008. *Wang,* a special blessing ceremony, is organized during his visit. A large number of people from Tibet attended the Wang during his visit 15 years ago, but only local people attended the ceremony in 2008. Besides these monasteries, there are several smaller monasteries maintained at household level.

Figure 3.62 The upper reaches of the district has several monasteries

The monastery in Yalbang has monastic schools *Lobdra* and *Shedra*, offering classes in Buddhist studies equivalent to college level. These monasteries, apart from assisting people in spiritual aspirations, play a vital role in conservation of wildlife. The southern part of the district is predominantly Hindu, and one major attraction is Kharpunath temple. Apart from these cultural monuments, rituals, festivals and transhumance way of life are other cultural resources which could attract tourism.

Historical Importance

The region falls on the historic salt-grain trade route that survived for centuries and flourished the local economy and culture. However, with political changes in TAR-China and the influx of salt from India, this trade was brought to an almost complete halt. The remnants of this once-flourishing trade add to the beauty of the region.

Tourism Infrastructure

The most common route followed by trekking groups from Simikot to Hilsa is via Kermi, Yalbang and Muchu crossing the Nara Pass at 4,560m. The trail is generally in fairly good condition, although it could be improved in several sections. Condition of bridges is good along the trail. There are reasonably good camping sites managed by individuals at regular intervals. Although there are small tea houses along the trail, their condition is very poor. Most of these teahouses are not in a position to provide reasonably good lodgings or food even for Nepall tourists, let alone foreign tourists. Hygiene of most of these small teashops is poor (Figure 3.63). There is either piped water or traditional, makeshift water spouts. Some of these water tap stands built by NGOs have already been damaged although they do not appear to be old.

Figure 3.63 Tourism infrastructures are at minimal levels

Although many of these houses have installed improved smoke-free stoves and solar lights, their general hygiene condition is very poor. Some households grow vegetables in small plots. However, they are currently unable to provide green vegetables to visiting tourists. Boiled drinking water canisters have been installed at a few places, but since they are not available at regular intervals, they have not been used.

Few teahouses have reported receiving basic level of training on cooking, but they have not been able to practice what they have learned. Other trained tourism human resources like nature guides and trained lodge owners are virtually non-existent.

Except for a couple of information boards displayed in Simikot, there are no information boards or signposts along the trekking route. There are also no tourist information posts in the district headquarters. The DDC places its staff in the airport to collect local fees from tourists. However, there are no facilities, such as cultural museum, to engage tourists in Simikot or other villages.

Beyond Simikot, telecommunication facilities are non-existent. No communication can be made in case of emergencies. Some trekking groups were found carrying satellite telephones. People in Hilsa, although in the Nepalese side of the border, can communicate with people across the border in TAR-China, but not with people in Nepal. The police post in Hilsa, which operates for only about six months, has a wireless set. Currently, construction of a telecom tower in Hepka VDC has begun. Upon its completion, communication facility should improve at least up to this VDC.

A new hotel, designed especially to provide services for tourists, has been established in Simikot. There are a few other lodges/hotels in Simikot which are reasonably good and in a position to host foreign tourists.

Current Tourism Pattern

The final destination for most tourists coming to the district is Mt Kailash/Mansarovar. The tourism season starts in May and ends in September, although a few tourists arrive in October also (Table 3.54). Two clear patterns of tourism movement can be identified from this gateway to Kailash/Mansarovar. Western tourists trek from Simikot to Hilsa, the frontier town in the Sino-Nepalese border. The trek normally takes five to six days. Tourist flow in this route is a one-way traffic; no tourist treks from Hilsa to Simikot. After reaching Kailash, they mostly travel to Khasa. These tourists travel in organized self-contained groups. All food items, trekking gear, equipment and accessories are flown to Simikot and carried by mules and porters.

Indian tourists, who form the largest group of tourists, mainly fly from Simikot to Hilsa on a helicopter and proceed to their final destination. Their return journey also involves the same route. A few Indian tourists return from Kailash via Khasa. However, both groups of tourists fly from Nepalgunj to Simikot (Table 3.52).

Although some Indian tourists spend a night in Simikot (2,979m) before flying to Hilsa (3,654m), many of them spend less than an hour in Simikot before boarding a helicopter to Hilsa. They then stay the night at Taklakot in TAR-China. This practice of rapidly gaining elevation from less than 100m (Nepalgunj) to about 4,000m (Taklakot) in a day puts their health at grave risk. According to residents of Hilsa, last year about six Indian tourists succumbed to altitude sickness. It is strongly recommended that travel agencies organizing such pilgrimages plan for Indian tourists to spend at least a day in Simikot for acclimatization. This would not only minimize health risks but also help in supporting local economy.

Economic Benefits

Currently, economic benefits from tourism are of mixed type. The potential for tourism to boost local economy has not yet been exploited. Most benefits from tourism go to travel agencies and not to the local economy. It gives employment opportunities to a few porters, mule owners, and local agent of travel agencies. The Cook and Guide are both brought from outside the district. A porter is paid about Rs 600 a day, and a mule is hired for about Rs 700 a day. The campsite owner gets Rs 100 for a sleeping and toilet tent and Rs 200 for dining

Figure 3.64 Benefits of tourism to local people is at minimal level

and kitchen tent per night (Figure 3.64). No local food items are sold to these tourist groups. However, support staffs consume some items. Besides these fringe benefits from tourism, local people do not get any direct benefit from tourism. Curiously, souvenir trade, a common activity at other tourist areas, was conspicuously absent here in Humla or along the trail. The souvenir shop of Simikot was not operating.

Most tourism benefits are accrued by tour operators based outside the district. Airlines operating helicopter services base their choppers in Simikot for over two months and benefit from Indian tourists. Indirectly, the district generates most of its revenue from tourism. However, revenue generated from tourism has not been utilized to promote tourism in the region.

Table 3.52 Tourists Arrival in Humla in 2009

Country	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**July**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**	**Male**	**Female**	**Total**
Austria				4	58		2	7	20	9			47	53	100
Canada					2								2		2
China				3									3		
Czech Republic						9		5					10	4	14
Estonia										10			6	4	10
France				3	12		9	6					21	9	30
Germany					62	2		6	49				65	54	119
India					34	168			95				144	153	297
Ireland					1									1	1
Israel					1								1		1
Italy									7				5	2	
Malaysia					1								1		1
Mexico					1								1		1
Netherlands					14		1		15				20	10	30
Russia					5	4	1		4				10	4	14
South Africa						4							2	2	4
Spain				1										1	1
Switzerland					13				34				26	21	47
Ukraine					16								3	13	16
United Kingdom				2	8				3				9	4	
USA					12		4		3				11	8	19
Yugoslavia									8				7	1	8
Total				**13**	**240**	**187**	**17**	**24**	**238**	**19**			**394**	**344**	**738**

Source: Humla DDC 2010

Impacts of Tourism

Tourism flow in the region is low compared to other major trekking routes like Annapurna or Everest regions in Nepal. However, in many places, problem of solid waste management is already prominent (Figure 3.65). All tourist groups carry their own fuel, so there is no direct pressure on forest resources. Cultural impacts of tourism are also visible. In almost all the villages frequented by tourists, children ask for 'pen' and 'copy'. This may be a byproduct of well-intentioned tourists assisting local people. Although the level of sanitation and hygiene could not be ascertained as having improved over the years as a result of tourism, these conditions are still poor. Developing and displaying minimum impact code for tourists should be a priority.

Figure 3.65 Solid waste management is already a becoming a persistent problem

Future Issues for Tourism

There are several issues which should form the core of future tourism planning in the district. One such objective should be to promote the district as a tourism destination in itself rather than merely a gateway to Kailash/Mansarovar. Another objective should be to diversify tourism products. One such diversification could be promoting Limi Valley as a tourist destination.

Even with the current focus on Kailash/Mansarovar destination, an alternative route – Simikot-Salli-Nyalu-Limi-Hilsa – could be promoted (Figures 3.66 and 3.67). Limi Valley, because of its rich cultural heritage as well as scenic trail, with gorges, alpine pastures, high altitude lakes and views of Mansarovar and Kailash from Nyalu La (5,004m) and Lapche La, could be promoted as an important destination similar to Upper Mustang or Upper Dolpa. In addition, when the Hilsa-Simikot road is completed, this alternative route could still attract trekking tourists. However, to promote this route, investment on tourism infrastructure, such as lodges, campsites, human resources, is required.

Figure 3.66 Potential trekking route displayed in Simikot

Figure 3.67 Promotion of Limi Valley as a tourism destination or an alternative route to Hilsa would help diversify tourism in the district

Another focus should be to promote tourism that contributes directly to the local economy. In its current form, most of the benefits accrue outside the district. Promotion of Free Independent Tourism (FIT) could help local people to derive benefits from tourism. Tourism products like cultural/nature tour that aims to lengthen stay of tourists or to engage them in Simikot would help boost the local economy.

One immediate step that needs to be taken is requiring travel agencies to plan the pilgrimage of Indian tourists so that they stay at least one night in Simikot for acclimatization. This would help in contributing to the local economy.

Humla DDC is already taking steps to improve tourism infrastructure in the district. They organized a tour of tourism entrepreneurs and officials from the district to the Annapurna Conservation Area and are planning to improve some tourism attraction spots while providing better information to tourists.

4. Major Environmental Degradation and Cultural Integrity

The major existing and emerging environmental issues of KSL-Nepal are primarily associated with ecological fragility, deforestation, poor management of natural resources, poverty and inappropriate farming practices. The cumulative impacts of these threats result in accelerated loss of biodiversity along with loss of cultural integrity. Major issues regarding biodiversity and natural resources, tourism, socioeconomic and cultural integrity are briefly discussed.

4.1 Ecosystem and Species Degradation

Habitat loss and deforestation: Habitat loss in the mid-western and far-western Himalayan subalpine conifer forest is severe, with over 70% of the natural vegetation lost (Mittereneier 2004). KSL-Nepal contains some of the least disturbed forests in western Himalayas that need appropriate conservation. Deforestation has been observed very frequently in all districts in KSL-Nepal (Fig 4.1).

Figure 4.1 Deforestation at Gothi, Humla (Photo: Yogi Kayastha)

Forests: Forests are rapidly being destroyed for various purposes in all districts. Forests near the border, especially on the banks of Humla Karnali and Mahakali Rivers where most of the settlements are located, are accessible to communities and thus degraded. Trees of Humla and Darchula are harvested for timber which is exported to TAR-China (Taklakot) and India (Darchula), respectively (Figure 4.2a). In some places, forests are destroyed for slash and burn agriculture. Moreover, forests on steep slopes have also been converted into agricultural land (Figure 4.2b). Forest fires are common in the region. In some sites, people reported that such fires were initiated to vent anger on the community. However, these claims could not be corroborated. With construction of the Hilsa-Simikot road in progress, a realistic possibility of further forest degradation exists as large volumes of timber could be easily transported to feed the ever increasing demands on the Tibetan side. However, such a possibility could be thwarted if the District Forest Office acts effectively. As of now, their activities in these vulnerable areas are ineffective. Evidence of reduced timber export when people are employed with food for work programs offers an opportunity to mitigate this potential threat. High-demand timber trees are *Abies spectabilis* and *Taxus wallichiana;* both of which are government protected species.

Figure 4.2a Stack of wooden planks ready for export to Taklakot

Figure 4.2b Bringing steep slopes under cultivation is increasing forest degradation

Energy: Fuelwood is the main source of energy in KSL-Nepal. Electricity production is very low.

Rangelands: Rangelands are under grazing pressure. The rapid spread of *Rumex nepalensis* (an unpalatable species) around cattle sheds and highly fertile areas, and *Berberis* scrub in comparative dry area is an example of change in species composition. All gentle and accessible meadows have undergone extensive habitat degradation due to overgrazing, trampling, and commercial harvest for medicinal plants.

Poaching: Wildife poaching includes snow leopard and red panda for their beautiful pelts, musk deer for musk pods, and bear for bile. Poaching is rife across the border in China (Lee *et al*. 2000) and India (DNPWC 2008). Local price for one musk pod was NRs 7,000 (approximately US$ 100). Poacher/trader use ghee (clarified butter) bottles to hide musk pods and supply them to Tibet and India. Poachers use different techniques to kill musk deer including snaring, trapping and shooting (DNPWC 2008).

The unregulated border allows a big window of opportunity for illegal trafficking of wildlife products. A few years ago, four individuals from Humla were arrested with wildlife products in Taklakot. The lack of presence of state in the border, which at best can be characterized as very minimal, fuels such wildlife trafficking.

Human-wildlife conflict: As in other areas in Nepal, human-wildlife conflicts result in retaliatory killing of wildlife. Despite a strict ban imposed by the government and 'Lamas' on killing of wild animals, retaliatory killing and illegal hunting is still prevalent. Snow leopards in upper Humla and Darchula are livestock predators. Regular wildlife crop damage is commonly observed around Khaptad National Park.

Wetlands: The high Himalayan wetlands are glacial in origin, whereas in the middle mountain zone these are tectonic in origin. Among several wetlands in KSL-Nepal, only two lakes (Khaptad and Rara) have relatively good information. Information is needed to understand the impact of climate change in the formation and disappearance of lakes.

Over-exploitation of biological resources: Several species of medicinal and wild edible plants are collected unsustainably or at a premature stage. Local people and cattle herders have started to uproot *Angelica glauca* (locally called *gadalnno* - its root is used to flavor tea and pickle, as well as to cure gastric and rheumatic problems), *Dactylorhiza hatagirea* (*panchaule*), *Thamnocalamus spathiflorus* (*deulo nigalo*), *Morchella* species and other medicinal plants such as kutki, jatamansii, chirayito, and yartsa gumbu.

Loss of agrobiodiversity: Traditional crops growing in KSL-Nepal are vulnerable to fluctuations in weather patterns. Food production per capita has also been declining. This has adverse impacts on loss of traditional varieties of crops, both major and minor varieties.

Protected areas: Conflicts and threats exist in the protected area system in Nepal (Annex 16). Grazing, hunting, illegal collection of fuelwood, timber and NTFPs, and fire are major environmental threats in Khaptad and Rara National Parks.

Invasive species: The number of species of IAS was higher in east and central Nepal in comparison to west Nepal. There is no study of IAS in KSL-Nepal; however the impact is severe at lower altitudes. *Ageratina adenophora* has seriously invaded Baitadi District.

4.2 Socio-Economic and Cultural Integrity Degradation

Poverty and food security: Though Karnali region produced sufficient food to meet its basic needs until the mid-1960s, KSL-Nepal at present is a food deficit area. The region has also faced a high level of vulnerability caused by adverse weather conditions. Fluctuation in snowfall in the upper part of KSL-Nepal is another reason for reduction in food production. Trade link with Tibet was cut off and this adversely affected the traditional system of trade migration and livelihoods of local people.

There was a decline in animal husbandry, particularly sheep, and other income sources (like honey production, local cloth weaving, etc) (Adhikari 2008). The only alternative for people was to migrate more extensively to India (also a small population from Limi to China) and other parts of Nepal for work.

Cultural and religious sites: The KSL-Nepal region comprises rich cultural and religious heritage. However, many important cultural and religious sites are in need of protection and management. Kharpunath Temple of Chhipra VDC and Halji Gompa of Limi VDC, among others, need proper management.

Water and sanitation: Access to water and sanitation is low in the KSL-Nepal region. This is associated with several water-borne diseases.

Vulnerability: Natural disasters such as flash floods and earthquakes have been reported in the KSL-Nepal region. Incidents have been reported from Darchula District which is located beside the border town of India. Incidents of human diseases are very high. No documentation of animal diseases across the border in KSL-Nepal has been available. Among the major diseases, khari is prominent in Baitadi and Darchula Districts (Table 4.1).

Table 4.1 Disease profile of KSL-Nepal districts

SN	Disease	Percent appeared	Remarks
1	External parasites	19.86	
2	Liver fluke	17.32	
3	Round worms	13.60	
4	Digestive disorder	15.74	
5	Manges mites	6.67	
6	Khari	56.20	A big problem,
7	Respiratory sign	5.73	
8	Infertility	0.81	
9	Mastitis	0.37	
10	Red urine	0.35	
11	Abortion	0.20	
12	Sudden death	0.04	
13	Others	13.13	
	Total	**100.0**	

Pollution

- Air pollution: No data is available on air pollution in KSL-Nepal. Air pollution may increase in the future along with construction of roads in various districts headquarters. Baitadi District, with a few blacktopped roads, also has some traffic related hazards.
- Water pollution: Information on water pollution is also not available. Major settlements and district headquarters do not have sewerage treatment plants, and water is directly drained to the major river systems. Karnali River gets water discharge also from Tibetan settlements in China; and Mahakali River from settlements in India.
- Solid waste: Solid waste is increasing in headquarters and trekking routes as well. Local authorities have not initiated solid waste treatment facility. Plastics are often burned without considering environmental hazards. Tourist routes are also affected by solid waste pollution; whereas problem of water and beer bottles, as well as local wine is seen in towns and villages.
- Chemicals and fertilizers: Use of chemical fertilizers and pesticides is slowly increasing in districts with road access; however, Humla continues to be an organic district.

4.3 Globalization

Globalization Larger global and regional development changes occurring in China and India have an impact in the KSL-Nepal region too. Consequences have been observed in two major fields: (i) climate change and (ii) tourism.

Climate change. Nepal's national development plans do not seriously consider the possible impact of climate change. The KSL-Nepal region is vulnerable in terms of environmental changes and livelihoods of local communities. Local people have clearly perceived impacts of climate change in many sectors related with livelihoods, including crop productivity, increasing incidents of diseases, and lack of water availability.

Tourism. Impact of tourism has been reported on main trekking trails and protected areas. Solid waste disposal is also increasing. Moreover, local people are not wearing their local dresses, and are changing their food habits, as well as lifestyles. Use of local languages and dialects is also declining since no efforts have been made by the government to protect them.

Observations, perceptions, and projections of climate change, and/or other environmental change processes

The KSL Conservation Initiative aims to develop a Conservation Strategy and a Regional Cooperation Framework, while establishing a regional knowledge sharing platform to *inter alia* enhance promotion of regional cooperation on environmental and climate change monitoring and networking, and community-based climate change adaptation mechanism. It is expected to provide greater opportunity to address emerging threats of climate change on mountain people and communities, ecosystem services, and livelihoods.

This chapter focuses on a few key elements, namely climate change trend, transboundary climate change issues, threats and impacts of climate change on biodiversity and livelihoods, adaptation needs and major initiatives undertaken on UNFCCC implementation to support development of a regional framework that addresses ongoing and emerging threats of climate change on biodiversity and mountain communities in KSL-Nepal.

Continued and accelerated emissions of GHGs from industrialised countries have raised atmospheric temperature and affected the Himalayas causing, among others, increased snow melting. Realizing the adverse impacts of climate change on the Himalayas and on biodiversity, several response measures are in place at both international and national levels. Most efforts are concentrated in developing frameworks to address these impacts individually or jointly.

Climate Change Trend

Extreme variation in topography, south-easterly monsoonal system and temperature help to understand climate change and its potential impact. Thirty years of average rainfall data (1976-2005) indicates nearly 80 percent of the total rainfall during the monsoon season, followed by about 12 percent during the pre-monsoon season. This exemplifies changes in average rainfall patterns for Nepal but does not clearly indicate inter-seasonal variations.

Nepal receives about 1,875 mm mean annual rainfall (Figures 4.3 and 4.4) with high degree of observed temporal variation from eastern to western and southern to northern parts of the country. In general, eastern, central, and western development regions receive higher rainfall compared to mid-western and far-western Nepal. Similarly, rainfall increases from south to north till the foot hills of High Mountain Region and then declines sharply further north causing rain shadow effect (MoE 2010).

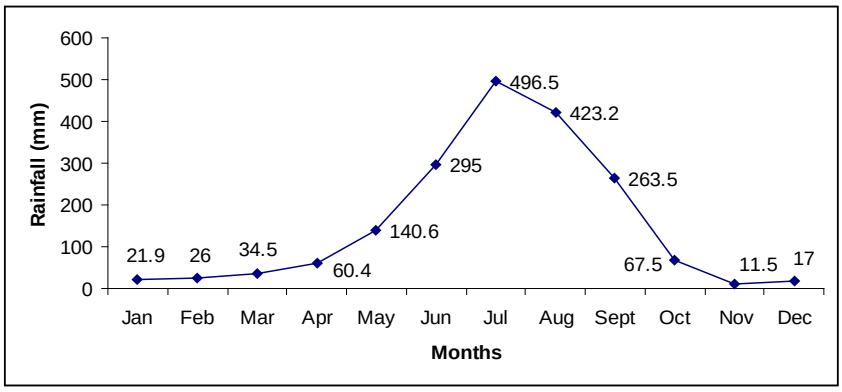


Figure 4.3 Monthly rainfall distribution
Note: Average of 30 years data (1976-2005); Monthly rainfall from 166 stations**.**
Source: Practical Action 2009.

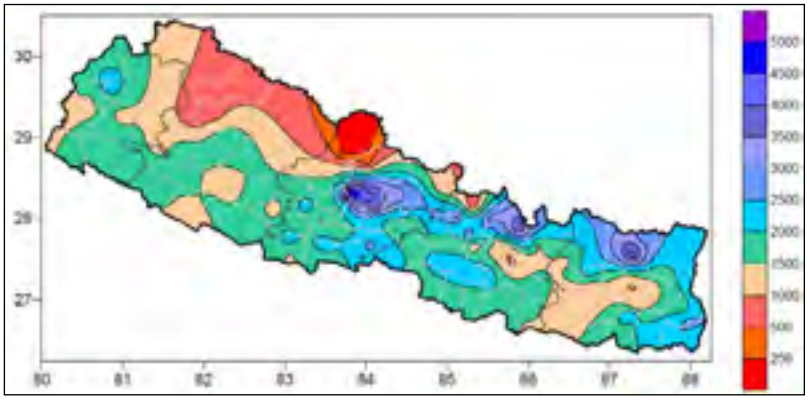


Figure 4.4 Annual mean rainfall distribution
Source: Practical Action 2009.

Distribution of mean rainfall in the pre-monsoon, monsoon and post-monsoon is similar to mean annual rainfall distribution (Figures 4.5, 4.6 and 4.7). Mean winter rainfall, however, shows temporal distribution declining from west to east and north to south (Figure 4.8). Far-west and mid-west Nepal receive higher rainfall compared to western, central and eastern Nepal.

An analysis of about 30 years of observed temperature of Nepal shows that maximum temperatures in Nepal are increasing at an alarming rate (Shrestha *et al*. 1999; Figure 4.8). A study carried out by the Department of Hydrology and Meteorology (DHM) shows that all-Nepal maximum temperature increased by 1.8ºC in 32 years between 1975 and 2006, which is equivalent to about 0.06°C per year (Figure 4.9). Such warming was more pronounced in the northern high altitude regions of Nepal including Kailash landscape. Warming is equally pronounced in the winter compared to other seasons.

The climate vulnerability map based on sensitivity, risk/exposure, adaptation capacity and climate vulnerability using available historical data of districts indicates ten highly vulnerable districts that require urgent and immediate actions (Sharma and Shrestha 2010) (Figure 4.10). Overall vulnerability ranks of the four districts in KSL-Nepal range from high to very high (Sharma and Shrestha 2010; unpublished report in MoE 2010).

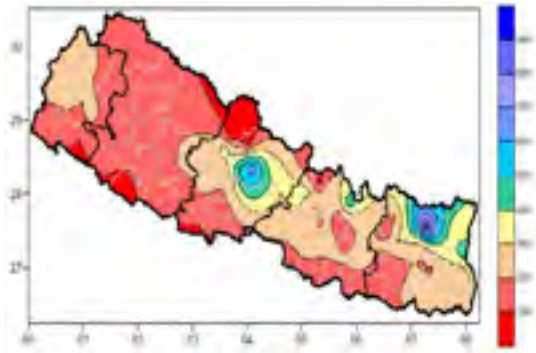


Figure 4.5 Pre-monsoon mean rainfall distribution

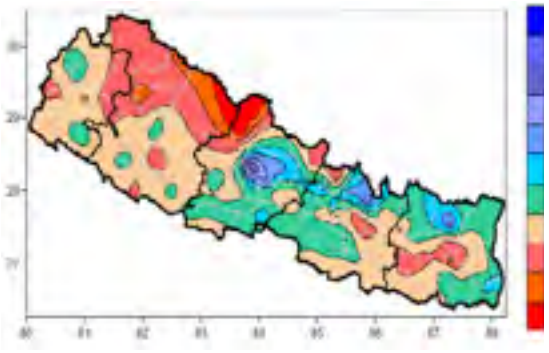


Figure 4.6 Monsoon mean rainfall distribution

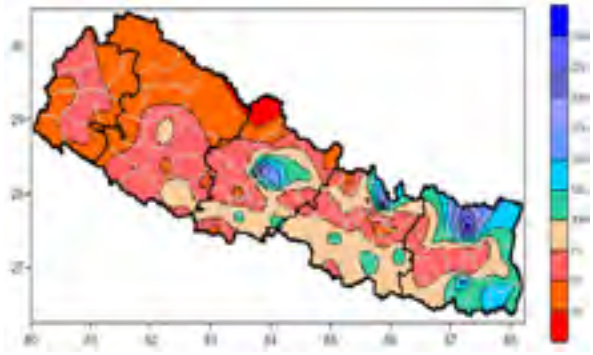


Figure 4.7 Post-monsoon mean rainfall distribution

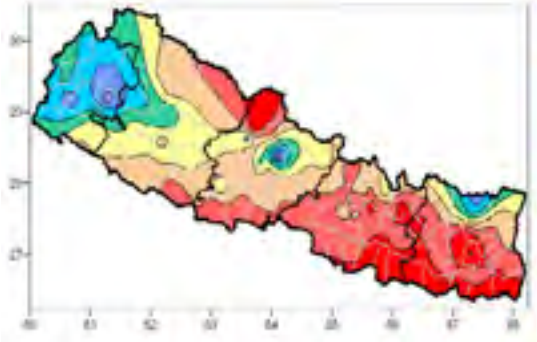


Figure 4.8 Winter mean rainfall distribution.
Source: Practical Action 2009.

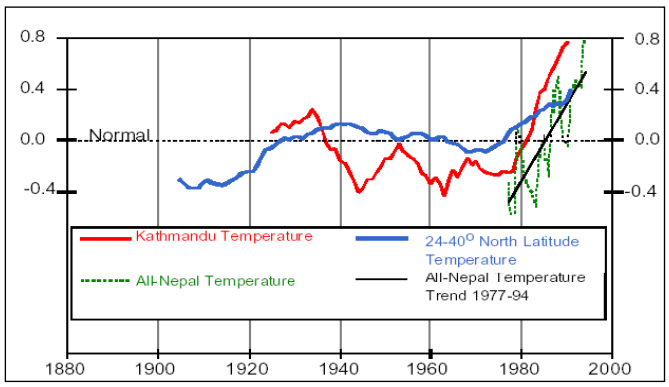


Figure 4.9 Temperature change between 1975 and 2006

Figure 4.10 Vulnerabilty map of Nepal

Transboundary Climate Change Issues

Climate change is a global transboundary issue requiring global, regional and sub-regional efforts to address it. Increased use of carbon intensive socio-economic development path; continued dependence of majority of the people on forests and its products; decline in forest area and forest productivity; low level of low-carbon technology development, use and transfer are ongoing and emerging transboundary issues related to climate change. Inadequate knowledge and understanding of the science and effects of climate change, together with skills and finances to develop and use green technologies has limited the promotion of low-carbon sustainable development. Furthermore, low levels of understanding on environmental services provided by uplands to downstream communities would likely emerge as a threat to people living in both the uplands and lowlands. Similarly, increased gap in science-based and community-based information of the effects and impacts of climate change to biodiversity and natural resources, together with little or no monitoring of mountain ecology is another significant issue that requires urgent and immediate action to understand and verify ongoing threats.

Threats and Impacts of Climate Change on Biodiversity and Livelihoods

Ecosystems are particularly vulnerable to climate change, with around 15-40% of species potentially facing extinction after only 2°C of global warming (Stern 2006). Being a mountainous, landlocked and least developed country, Nepal is highly vulnerable to climate change. Impact of climate change on agriculture, water resources, human health and other sectors will directly or indirectly affect biodiversity and livelihoods. With this perspective, possible impacts of climate change in these sectors are summarized below:

Major glaciers are retreating by 30-60m during the period of 1970–1989, and with surface thinning by nearly 12m between 1978–1989. Accelerated melting of glaciers has created many new glacier lakes and expansion of existing ones with possible risk of Glacial lake Outburst Flood (GLOF). If GLOF occurs, it will have devastating impacts on biodiversity and livelihoods along river corridors.

In Nepal, two-thirds of the population derives their livelihoods from agriculture. Crop and livestock bases are highly dependent on climate. Any adverse impacts on crop production and livestock rearing will create food insecurity and threaten livelihoods of large section of the population. Increased humidity also creates favorable environment for spread of pests and diseases. In recent years, major winter crops in the Terai like potato, oilseeds, pulses and onion have been affected by diseases.

Climate change has weakened the livelihoods of poor people by eroding their livelihood assets. Poor people are vulnerable to loss of physical capital (because of damage to shelter and infrastructure), human capital (malnutrition and diseases), social capital (displacement of communities), natural capital (loss of productivity in agriculture and fisheries) and financial capital (increased disasters and lower income). In 2009, outbreak of diarrhoeal diseases, which claimed over 240 lives in western hills, was attributed in part to water shortages due to winter drought and delayed onset of the summer monsoon.

Rising temperatures and changes in water availability might affect biodiversity. It might lead to migration of forests towards higher altitude, change in their composition, and possible extinction of species. Tropical wet forest and warm temperate rain forest is likely to disappear, and cool temperate vegetation would turn to warm temperate vegetation (MoPE 2004). Species most likely to be at risks will be species with low dispersal capacity (e.g. soil fauna, non- flying insects, and tree species with heavy fruits). Climate change will also affect productivity of natural ecosystems, thereby reducing the potential of providing environmental services.

MFSC, in its draft National Forest Fire Management Strategy 2009 (BS 2066), considered climate change as one of the causes of forest fires. Long-term dryness resulting from no rain or little rain might have increased incidents of forest fires. In 2008, forest fires were predominant, particularly during the spring season, resulting in extensive loss of forests and biodiversity from the Terai to high mountains. In Ramechhap District alone, 43 persons including security persons died due to forest fires. Forest fire is increasing in relation to increased dryness in forests. There were 358 fires in Nepal on 25 April 2009. There is an increasing trend of forest fires as dryness increased in spring 2009 (Figure 4.11).

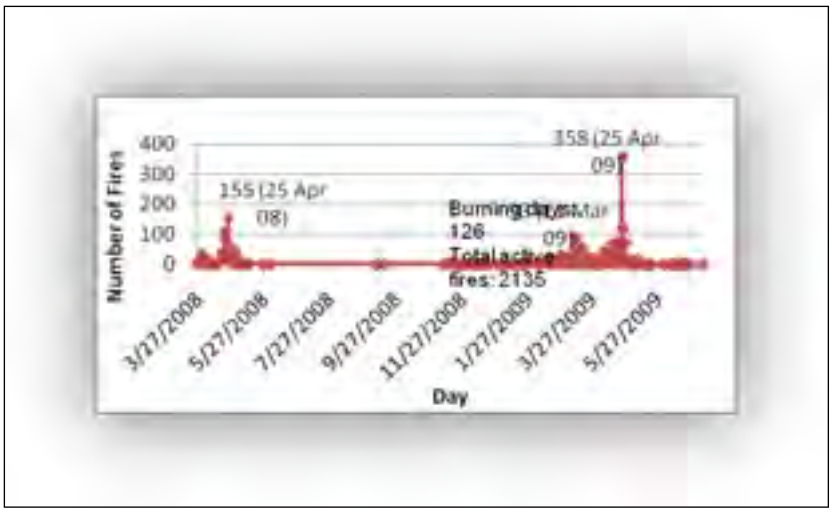


Figure 4.11 Satellite based monitoring of forest fires in Nepal (25 April 2010)
Source: MFSC 2009. National Forest Fire Management Strategy (Draft).

Scientists and people have projected that climate change will change habitat composition and lead to upwards shifting. Approximately 20–30% of plants and animal species assessed so far are likely to be at increasingly high risk of extinction as global mean temperature exceeds warming of 2-3ºC (Fischlin *et al*. 2007 in MoE 2010). Climate change will likely provide favorable conditions for growth and spread of invasive species because of their increased adaptation to disturbance. Geographically restricted ecosystems are potentially more vulnerable due to less flexibility for species distribution.

The NAPA Project has identified impacts of climate change on forests and biodiversity which are related to potential outbreaks of diseases and insects in trees and other plants, and possible reduction of tree species, herbs and NTFPs, local birds, migratory birds and wild animals.

Vertical migration of plants might occur with rising temperatures depending on temperature tolerance capacity of species. Foresters and community forest users in high altitude districts like Dolpa, Jumla, Mugu and Humla have noted that production of high altitude herbs like *jatamansi* and *kutki* have decreased in comparison to previous years. The study on snow leopard habitat indicates that increased temperature will lead to shrinkage of snow leopard habitat (MoE 2010).

Local people in Darchula informed lowered availability of *yartsagumba (Cordeyseps sinensis)* and jatamansi (*Nordostachys grandiflora*), while residents of Dolpa District indicated lowered availability of kutki (*Neopicrorhiza scrophularifolia*) and sughandhawal (*Valeriana wallichii*). This might be attributed to climatic stress such as less water availability and changes in weather patterns. Birds like danphe pheasant (*Lophophorus impejanus*), domicile crane (*Anthropodis virgo*) and other birds will also face increased vulnerability.

In the mid-hills, local communities have experienced increased vulnerability due to dry conditions affecting some moisture-requiring tree species namely banjh (*Quercus lanata*), kharsu (*Quercus semecarpifolia*), katus (*Castanopsis indica*), champ (*Michelia champaca*), and utis (*Alnus nepalensis*). Upward shifting of dhupi *(Juniperus recurva*) and utis has also been reported.

Adaptation and Mitigation Measures

Impacts of climate change could be minimized through landscape level management and creation of biodiversity corridors to ensure vertical as well as horizontal connectivities. Some of the adaptation programs, as also included in the draft NAPA, would be: (i) control of forest fires, forest pathogen, and invasive species; (ii) integrated forest management (with primary objective of water and wildlife conservation); (iii) landscape level forest management; (iv) research and development on adaptation technologies and use, environmental services, and animal food, habit and behavior; (v) development and maintenance of biodiversity database; and (vi) awareness and capacity

building. Latter three categories of activities (i.e. iv to vi) provide information base and capacity to cope with climate change problems and issues.

Global, Regional and National Efforts

Climate change will continue to be the major issue of debate amongst politicians, climate negotiators, policy makers, scientists and people at various levels. It is certain that climate change is happening and will continue to happen. But it is unclear about the degree, magnitude, extent and duration of its impacts. In order to address these impacts, efforts are made at various levels from international to national and local levels. Such efforts are briefly described below:

The international community realized the unprecedented rate of changes in the climate system in the late 1970s and 1980s and urged for developing a legally binding instrument to address potential threats of climate change on people, their life-support system - ecosystem - and livelihoods. In 1988, the United Nations General Assembly decided to take urgent actions and established an Inter-governmental Negotiating Committee (INC) to develop a legally binding instrument. The UN Member States prepared and adopted the UN Framework Convention on Climate Change (UNFCCC) in May 1992 in New York. In order to operationalize the Convention, the Kyoto Protocol was adopted in December 1997 in Kyoto City, Japan. These legal instruments provide ample opportunities to reduce GHG emissions and to address ongoing and emerging threats of climate change if implemented in good faith. The UNFCCC and Kyoto Protocol were entered into force in 1994 and 2005, respectively.

As KSL lies in South Asia, it is worth-mentioning the outcome of the recent 16th SAARC Summit held in Thimpu, Bhutan, in April 2010 that provides, *inter alia*, opportunities for greater regional cooperation to address the adverse impacts of climate change on biodiversity and livelihoods.

Climate Change Activities in Nepal

Nepal signed the UNFCCC on 12 June 1992 during the UN Conference on *Environment and Development* held in Rio de Janerio from 3 to 14 June 1992. After ratification of the Convention by the House of Representatives, the instrument of ratification was submitted to the Depository (UN Secretary General) on 2 July 1994 and it has entered into force in Nepal on 31 July 1994. To be a Party to the Kyoto Protocol, Nepal deposited its instrument of accession on 16 September 2005 and it also entered this into force on 14 December 2005 in accordance with the provision of the Kyoto Protocol. The Government of Nepal made the Ministry of Environment responsible as the Designated National Authority (DNA) for CDM (Clean Development Mechanism) activities on 22 December 2005. Similarly, the Government of Nepal designated the Ministry of Environment in May 2010 to function as the National Implementing Entity (NIE) to the Adaptation Fund Board. Some of the activities that Nepal undertook as a Party to the UNFCCC and KP are summarized below.

In this context, Nepal has done some preparatory work to address impacts of climate change on environmental resources. However, they are limited to policy level and compliance to requirements of the Convention. These initiatives might contribute to initiate KSLCI activities in Nepal's portion at a broader perspective.

5. Identification of Priorities

Uncontrolled grazing, transboundary issues, illegal trade of timber, NTFPs/medicinal plants, and wild animals, lack of monitoring, prevailing poverty and food crisis are important issues in KSL-Nepal. Landuse change and climate change are two major threats to biodiversity (Sala *et al.* 2000). Major issues regarding biodiversity and natural resources, socioeconomic and cultural integrity, as well as climate change are briefly discussed below.

5.1 Biodiversity and Livelihood

In KSL-Nepal, a pertinent issue has been sustainable conservation and use of flora and fauna that are excessively overexploited for trade. Poaching and illegal extraction of local resources are major problems in this region. NTFPs are collected in excess without proper monitoring. Of the many faunal species threatened with extinction, two wildlife species, (Himalayan black bear, *Selenarctos thibetanus*, and Himalayan musk deer, *Moschus chrysogaster*) are prone to poaching for bear-bile and musk pod, respectively. Collective hunting by villagers and commercial poaching by local aristocrats have been traditions in the area via Tibet and Indian border.

Grazing is a major issue in the northern part of Humla and Darchula Districts. Herders operate their cattle sheds in the upper belt as a part of traditional livelihoods. Grazing issues are primarily connected with livelihood patterns of indigenous peoples, such as *Bhotia* in Humla District and *Byasi* in Darchula District. Their occupational dependency is on animal husbandry - sheep, yak, horse and goat. Local communities consider that free grazing in lush grasslands of the region is beneficial to both the animals, as well as the grasslands, since manures left by the animals eventually help maintain soil fertility (DNPWC 2008).

Forests and rangelands are key resources for supporting livelihoods of local people in KSL-Nepal. Sustainable management of these resources needs reliable information on quantity, quality, location and distribution of the resources. This quantitative and spatial information of vital management importance are not available. For this, a detailed resource inventory, in collaboration with local users and other organizations, should be carried out and a baseline information system established to develop management decisions.

There is a need to develop a reliable information base on biodiversity (all taxonomic groups of flora and fauna), as well as human and livestock population, and to monitor changes in land use, and make interventions to minimize impacts of grazing to ensure sustainability. There is need to creating a livestock database, by species, ownership and location, with participation of the CBOs and VDC.

Inadequate development and conservation of community forests have resulted in inadequate habitat management and biodiversity conservation in the region. One of the reasons is inadequate coordination among forest offices, communities, relevant agencies, and user groups and user committees.

Another emerging issue of the region relates to collection of yartsa-gumbu (*Cordyceps sinensis*) and guchhi chyayu (*Morchella* species). When the local people seek their rights to collect yartsa-gumbu as a primary source of income, traders and outsiders grasp this opportunity and raise conflicts in between.

5.2 Socio-Economic and Cultural

A micro level analysis for exploring the situation of agriculture, food sufficiency, wage, livestock development, trade, and tourism development is essential to know about the socio-economic environment. Social and gender discrimination are also causal factors for food security. An assessment of availability of services of roads, electricity, irrigation, education, health services, drinking water and sanitation, communication and available institutions and service delivery patterns gives the tentative scenario of socio-economic environment of people of KSL-Nepal. These issues were explored during the field work. Moreover, some important socio-economic aspects such as

local employment, skill development, conservation awareness, and community development were also considered vital for people's livelihoods. Cultural/religious issues that will be affected by the proposed activities were critically analyzed.

Poverty and food security. Poor people rely more on natural resources for their livelihoods. Due to increasing demand, people often collect biological resources illegally, and even from protected areas. Unless alternative conservation-centered livelihood opportunities are provided, poverty and food security will be a major obstacle in sustainable development and conservation of KSL-Nepal. This calls to divert destructive resource use behavior into conservation-focused behavior.

In this connection, KSL-Nepal has to solicit new local opportunities that directly target poor people and mitigate threats to the areas. Poor people frequently do not receive the benefits of public investment. It is obvious that without direct address and actions, it will not help the poor. The benefits rarely reach to the poor. It is for this reason that the launching of KSL-Nepal has to implement poverty alleviation activities in all districts, with more focus on Humla and directly targeting to the poor of other districts.

Raising Awareness, and Mobilizing Communities

Since the economy of the region is highly dependent on agriculture and livestock, people are concerned about their 'hand to mouth' problem rather than conservation issues. People have not realized that conservation of resources is their heritage. Overexploitation of natural resources will eventually lead to loss of biodiversity and environmental degradation. Therefore, people of the region have to clearly understand the value of biodiversity, animal husbandry, tourism development and employment options for betterment of the society.

People should be made aware of the correlation between biodiversity conservation and tourism and socioeconomic value. Actions for awareness raising and social mobilization should be promoted by involving CBOs, INGOs and GOs.

Market Promotion of Local Products and Value Addition

Local people produce a range of forest-based products including mattresses, baskets, etc. However, there is no market available for these products. NTFPs/medicinal plants are considered a potential for enhancing people's livelihoods, but these have not been exploited for economic production. These resources are sold to traders in raw form that provides little economic return to the communities. Transport of the resources by air is very expensive. Processing of the resources at the local level would add value to the resources. Formation of cooperatives or user groups should be promoted for sustainable harvesting of resources in the wild.

5.3 Tourism

Tourism has been conceived as a potential activity in KSL-Nepal. The tourism plan for Karnali has been prepared showing potential tourism sites/areas. KSL-Nepal has high potential for tourism, whereas the region is also highly popular for Kailash-Mansarovar destination.

The number of foreign visitors has been few; tourists mostly from India visit Kailash-Mansarovar and Humla serves as a gateway to this destination. Religious tourists have not exceeded 200-300 persons per year. Issues pertained to weak tourism activities are linked with difficult and unreliable accessibility, inadequate promotion in nearby towns, and poor infrastructure. Several attractions are under shadow that are related to cultural, religious and nature based. Intangible heritage such as traditional *Deuda, Gaura* and *Byansi* festivals in Darchula District, and 'Lama' culture in Limi, Humla, are equally significant.

Basic air services for both foreign, as well as domestic, tourists are poor; whereas roads connecting to the headquarters can help develop tourism.

Organization at community, district and national levels is needed to manage tourism in this region. One of the major roles of local organizations is to develop 'Tourism Development Guideline' for their

village or community. These guidelines, once agreed at community level, should be submitted by each VDC to the DDC, approved and implemented.

5.4 Cultural Identity

Indigenous people are an making effort to preserve their traditional norms, values and practices. These factors play a key role in socio-economic development and cultural identity. KSL-Nepal is a multilingual and multi-religious area. Religion is deeply rooted and binds people together to perform community activities that preserve their cultural identity and resources.

5.5 Institutional and Capacity Building

Institutional strengthening and capacity building are essential for social mobilization and economic development. These include human resource development; community development; support to infrastructure facility, literacy, drinking water, trail, energy, health and sanitation; tourism promotion and industry development; and creation of alternate opportunities for livelihoods and income generation. Training, awareness and skill development would help build capacity at the local level. However, separate package of programs for Dalits, women, disadvantaged and poor communities in income generation and awareness would be required to bring social justice in the region.

5.6 Illegal Transboundary Trade

There is no data on the extent of wildlife trade by poachers from this region through India, Nepal and China borders. Illegal trades are run by mafias through channels that operate clandestinely with hidden support. Illegal trade across the Sino-Nepal and Sino-India border is active. Wildlife and wildlife products have been used in both Tibetan Medicine and Traditional Chinese Medicine for a very long time and are still widely used in China (Yi-Ming *et al.* 2000). Traders in border areas who send products illegally to other countries are hard to detect. Only one incidence of 215 kg of raw Shahtoosh (Tibetan antelope) wool from Tibet was confiscated in Darchula on 6 April 2003. The wool was in transit from Darchula in Nepal to India for use in pashmina shawls (WCN 2005).

6. Community Perception on Biodiversity, Cultural Values, Environmental Issues, and Climate Change

In KSL-Nepal, different forms of traditional institutions existed at different times for management of natural resources in forests and pastures. People are living in most of the villages since ancient times. People living in Dozam village of Thehe VDC belong to Tibeto-Burman linguistic group and follow a sect of Buddhism. They are known as 'Tsang-ba' in Tibetan (or 'Dojamé' by Nepalese) and trace their origin to Utsang area in Western Tibet. They speak a Tibetan dialect known as 'Tsangtam Kham' which is considered to be very different from Tibetan dialects spoken by people in other northern villages of Humla. Other villages in Thehe VDC and almost all villages in Chhipra VDC are dominated by Indo-Aryans who follow Hinduism and speak Khas Nepali language. The antiquity of these villages can be traced back to the period when Nepal was not unified and this area of Humla District was under the Khasan Empire. According to Tucci (1962), in the thirteenth and fourteenth centuries, west Tibet and a large area of north-western Nepal were united under the Malla kings, whose two capitals were located at Sinja, northwest of Jumla, and at Taklakot, in western Tibet. Towards the end of the fourteenth century, this kingdom collapsed and was divided into *baisi* (twenty-two) raja states.

In Dozam area, natural resources (land, forest, pasture, etc.) have been managed by *Lamas* of Gumbas (monastery) for generations. This system was replaced after the inception of the Talukdari system in 1911 AD. *Talukdars* or *Mukhiyas* (locally '*gowa*') were persons with the main responsibility of local revenue collection for agricultural lands. Besides, as liaison officials between government and local people, the *Mukhiyas* had additional responsibilities of local security, settling disputes, and control and management of lands, forests and pasture resources. The *Mukhiya* was appointed from among the village elite, and in subsequent generations the post was granted only to members from previous *Mukhiya* families. However, this system theoretically ended with the government's new arrangements of local revenue collection by village authorities. The Land Reform Act of 1964 established a new tradition of revenue collection by government officers; thereafter the role of *Mukhiya* was not so strong in villages. However, their influence remained up to the end of the Panchayat system (1990). In the current democratic situation, traditional socio-political structure of villages and defined ownership of land and pastures were changed to some extent. In both Dozam and Chhipra, *Mukhiya* remains to date, but they have little role in resource management. After nationalization of forests in 1956 under the Panchayat System, management of forest areas fell under control of local government. During this period, there was provision of keeping *'Nora'* (forest guard) in each village for management of forest resources, agricultural system and livestock. The number of *Nora* in each village varied from one to many depending upon size of the village and existing resources. Each household had to contribute 10 kg grains to the *Nora*. Later, *Nora* received some cash from both villagers and village treasury.

The traditional pasture management system, which prevails to date, is rotational grazing and is under control of the local community. Decisions are made in village meetings organized in the presence of politically influential persons (village head or *mukhiya*, village political leaders), elderly people and herders. There are a few rules regulating use of traditional pastures and harvesting of resources (Box 3.1). All decisions and rules are community-based, i.e. formulated and decided in community meetings. After declaration of Community Forests (community forests were declared in 1997 in Chhipra and recently in 2007 in Dozam), management of forests and pastures is under the responsibility of Community Forest User Groups (CFUGs).

Local people of Kanda (Bajhang) have perceived and adapted well the changes taking place in the climate of Himalayas. They have almost similar kinds of perceptions about the climate change and its impacts. Mr. Gorakh Bohora (age 40, Kanda village), a school teacher as well as local trader of MAPs, has perceived the climate change in terms of reduced as well as irregular rainfall (at lower elevations) and snowfall (at higher elevations). According to him, germination of 'Yarsagumbu' is directly related to snowfall during winter and rainfall during April-May determines the germination of *Morchella* (Guchhi chyau) species. *Morchella* production has been very low due to the reduced and irregular rainfall pattern. Snowfall has also reduced since last ten years in terms of frequency as well

as intensity and which has attributed to the reduction of the germination of 'Yarsagumbu'. He says that each year, peoples search new habitats of 'Yarsagumbu', and thus it seems that the production of 'Yarsagumbu' has been increasing; but it is only due to the increased habitats from where it is collected.

Krishna Bahadur Bohora (age 86, Kanda village), a renown vaidhya of the region, also have almost similar kinds of perceptions. He correlates the production of the crops during May-June to the amount of snowfall during December-January. He says that if abundant snowfall occurs during December-January and covers the germinating wheat and barley, it is certain that the production of those crops during May-June will be significantly higher than in usual conditions. Because, if the germinating seedlings of those crops are covered with snow, get protected from severe cold temperature and can absorb required amount of moisture too. When the snow melts down, then the seedlings grow up rapidly with the formation of tillers. He also says that snowfall has reduced significantly (less frequent as well as less intense) since last 10-15 years. Those places where heavy snowfall occurred during December of each year (till last 15 years), now receive light snowfall in 2 or 3 or 4 years.

He also says that the crop showing season has shifted to one month earlier, where as the harvesting season is the same. It means, crop maturation period has increased by one month. According to him, barley was used to show during Mansir (November-December) month in the past, but now, shown during Kartik (October-November). However, the harvesting season (Baisakh-Jeth/ May-June) is the same. As a result, they had to replace their local variety of barley with the introduced one. He also memorizes that they had 'yellow-grain' variety of local millet in the past, which was harvested during Mansir (November-December) month, but now is replaced with the 'black-grain' variety (introduced from 'aul' (warmer) region), which is harvested during Kartik (October-November) month. He attributes this change to the slight rise in temperature during winter season. The local variety of barley, called 'Junge Jau' or 'Kalo Jau', local varieties of paddy, 'Khashrya' and 'Gadpakhya' (planted during April) are also disappeared due to an alteration in the crop calendar. To cope with such change, they have introduced the new varieties of barley, millets, and paddy, which are mostly imported from the warmer regions.

According to the local peoples of Chhyangru (Darchula) the amount of snow in the peaks and glaciers has been depleting rapidly, due to which the frequency of avalanches and existence of glacial lakes has retarded greatly. They have also perceived that since last 10 to 15 years there has been a trend that snowfall starts prior to the usual season but the frequency and intensity of snowfall has reduced substantially. As a result, their crops are damaged annually. However, side by side, they have started to grow crops like garlic, onion, tomato, beans, apples, etc. in their places, which, according to them, could not be grown in the place before 10 years. They attribute such change in the agriculture to the rise in temperature of the region.

Conflicts and Issues

In Chipra and Thehe VDCs, a large part of the forest and pasture areas have been recently handed over as community forests. At present, there are two community forests in Chipra VDC – Chandranath Community Forest (242.82 ha) and Hilsa Community Forest (275.53 ha), and one in Dozam of Thehe VDC – Changla Community Forest (1,085.35 ha). Beside these, natural forest areas have also been provided to local communities as Leasehold Forests. Areas used by local people for livestock grazing and resource harvesting for their livelihoods represent traditional forests or pasture areas that they have been using for many generations before establishment of community/leasehold forests. However, at present, conflict exists particularly between local people and owners of leasehold forests. Local people have access to fewer pasture areas with the declaration of community/leasehold forests. Conflicts are also evident between local people and people from other villages in using pastures/forests for harvesting resources other than grazing. For example, most medicinal plant resources and timber species in areas surrounding district headquarters have already been depleted, so residents of district headquarters and surrounding villages are found encroaching into community forests for commercial harvesting of these resources.

Box 6.1 Existing regulations and local cultural practices for resource management

- Cultivation and harvesting of agricultural products are permitted only during specific days decided by the community.
- Harvesting of grasses and other plants for winter fodder are permitted only during September-October.
- In Dozam area, there is a cultural provision of worshipping village god 'Yulha' known as 'Lang Mgo Ra' before cultivation and harvesting of each crop and harvesting of forest resources. Every year, a special *puja* (*Mane Jatra*) is organized in the month of Magh (end-February), during which people offer *torma* (religious cake) and worship the village god for well-being of people, livestock and agriculture. In addition, all the people of Dozam village gather together just before the start of medicinal plant collection and livestock movement in summer pastures and worship the village god. People also believe that each outsider/visitor should worship this village god before entering their forest in Changlakhola Valley. Although the Dozamé are Buddhist, they believe that their god needs animal blood, thus each year when people enter the forest for harvesting medicinal plants, they sacrifice an animal in the village temple.
- Cultural provision also exists protecting a particular species. For example, in Chhipra area, hemlock (*Tsuga dumosa*) trees are considered sacred. The tree is rare in the area and is culturally prohibited from felling. The tree is never harvested by higher caste people (Brahmin/Chhetri or Thakuri); harvesting/collection of any plant part is considered a sin and the act may harm their family. When needed, lower caste people (*Dalits*) paid cash as wages for harvesting such plant parts. *Dalits* must harvest at night without giving notice to the community. Collection of even a small piece of wood is forbidden from harvesting or use by non-Dalits.
- Livestock grazing and harvesting of medicinal plants and other resources are prohibited to people not belonging to Dozam area.
- Collection of products which are greatly depleted are banned in the area (e.g., collection of *kutki* has been banned since last year), and penalties are imposed for unauthorized use of forest and pasture resources.
- Recently, local people in Dozam area decided to protect a forest known as Nyalthang. Resource extraction from this forest is strictly prohibited and the forest has been kept aside as a seed source (i.e. gene bank) of different species of medicinal plants.

Theoretically, pastures are accessible to only one particular community within a VDC. But in practice, livestock grazing is not confined only to community-owned pastures. For example, in Changlakhola Valley, pastures/forests have been utilized not only by residents of Dozam and Baijubara villages of Thehe VDC (traditional resource users), but also by people from Bargaon and Kharpunath VDCs. Besides livestock grazing, these pastures are commonly utilized for commercial harvesting of medicinal plants. This is the main issue of conflict. Local people of Dojam have imposed restriction on livestock grazing, medicinal plant collection and other uses of forests for people not residing in Thehe VDC. They have formulated some rules, banning collection of certain products greatly depleted in the area (such as kutki in 2009/2010), and imposing penalties for unauthorized use of forest and pasture resources of Changlakhola Valley. However, conservation management of forest and pasture resources is greatly challenged by lack of strong enforcement of local rules and regulation due to unstable political situation. Village territorial conflicts also exist between Dozam in Thehe VDC and neighboring villages. Agricultural lands owned by Dojamé for many generations in Lurkya area have not been properly registered in their name. Official ownership of the land is with Khas people from Kharpunath VDC. Local people informed that they do not have easy access to government officials in District Headquarters so their issues have not been properly entertained.

Indigenous Management System and Conservation of Resources in Limi VDC

Indigenous system of management of natural resources is deeply embedded in cultural values espoused by local communities both as a group, as well as an individual. An indigenous management system in Limi Valley is described below.

Limi VDC, the northern most VDC in Nepal, has three main settlements: Tila, Zhang, and Halji. Halji, with four wards, is the largest settlement located between two other settlements. Zhang has three wards, while Tila has two. People here subscribe to Dhikung Kagyu sect of Tibetan Buddhism and follow polyandry system of marriage, though monogamy is also becoming more popular.

The community system is very closely woven with cultural practices. Selection of authorities for management of community system and hierarchy in the society is closely linked with property inheritance system associated with the polyandry system of marriage. People here follow the impartible primogeniture inheritance system where the eldest son inherits property exclusively. If the family does not have a son, the uxorial son-in-law inherits the property. The eldest son of the family who inherits the property becomes a *Dhongba.* If younger brothers do not share the same wife and separate, they get a smaller proportion of the property and become *Dhongjung.* Unmarried sisters who separate from their brothers become *Bhomdang. Bhomdang* receive even lesser property than *Dhongjung.* Dhongba refers both to individuals and estate. The number of Dhongba in a village always remains the same, but the number of Dhongjung and Bhomdang may increase or decrease. A Dhongjung can never become a Dhongba. However, a son born to a Bhomdang can become a Dhongjung. The number of these three different types of households in three villages is shown in Table 6.1.

Table 6.1 Different types of households in three villages in Limi VDC

Name of settlement	Types of Settlements			
	Dhongba	**Dhongjung**	**Bhomdang**	**Total**
Halji	29	31	20	80
Tila	13	11	15	39
Zhang	15	33	14	62

Source: Field visit, 2010

Within the social hierarchy, Dhongba are at the top followed by Dhongjung and Bhomdang. This hierarchical order is also manifested in property ownership with Dhongba owning more property followed by Dhongjung and Bhomdang. Being a Dhongba also involves more responsibilities, especially in religious aspects. Dhongba must contribute more during religious rituals and ceremonies. For example, if a Dhongba family has two sons, one must join the monastery and become a monk, but in the case of Dhongjung such requirement is imposed only if the family has three sons.

Selection of Authorities

Since there has been no elections for local VDC bodies for a long time, people elect VDC chairperson and ward chairpersons locally by following a system called *Hipsing,* wherein lotteries are drawn in the name of each individual (Dhongba and Dhongjung only) for a period of five years. In Tila Village, where there are two wards, one chairman is elected from among Dhongba and the other from among Dhongjung. But in the other two settlements, they are selected from either Dhongba or Dhongjung. In earlier times, only the Dhongba could become the chairman, but the society has become more egalitarian over the years and no such discrimination is made. The system of Hipsing ensures equal opportunities to all potential people. This system is also adopted in other processes such as deciding water turns, selection of pasture lands, etc. Selection of authorities even when official elections were held followed social arrangements rather than political party lines.

There are two more types of officials called *Loiba* and *Lora* which are rotated annually. Loiba are responsible for monitoring forest areas, and pasture land in some cases, while Lora are responsible for ensuring that animals do not stray in the fields. Each village has two Lora. Only Dhongba households are eligible to become Lora. If animals are found straying in a field, the owner must pay a fine of both grains (about 4 kgs of naked barley) as well as Rs 50. The cash component goes to the community fund, while the grain is kept by the Lora. The number of Loiba who look after forests ranges from 4 to 6 and can be represented by both Dhongba and Dhongjung households.

Resource Management

The community decides the date when dried firewood can be collected from the village forest. The Loiba checks each load of firewood just before people enter the village, and if anyone is found picking fresh branches, he/she is fined up to Rs 5,000. These forests are not formally recognized as community forests, but the communities have been protecting them on their own initiative (Figure 6.1). People take oaths before religious idols to refrain from collecting fresh tree parts or felling any trees. Such oath-taking is respected by every individual. A few years ago, dispute arose between Halji and Tila regarding the ownership of a forest. But when the people of Halji proclaimed in the monastery that the forest belonged to them, the people of Tila immediately relented their claim over the forest.

Figure 6.1 A well conserved forest in Halji

Protected forests are of good quality (Figure 6.1). People can harvest trees from these forests for community works like building/repairing monasteries, schools and bridges. Such issues are decided in village meetings. People are strictly prohibited from hunting animals. If anyone is found using a gun, he is fined Rs 50,000. The healthy forests and sight of wild animals like blue sheep stand testimony to the conservation ethos of the local community. People have agreed not to harvest any herbs from community-owned land.

Not only forests, but agricultural practices and calendar of operations are decided by the community and all operations are strictly carried out as per the plan. The community decides when to sow seeds (usually two days allowed), weed crops, cut grasses from fields, irrigate, and harvest. All people strictly adhere to such decisions. If important decisions are to be made between villages, for example deciding turn/rotation of pasture land, ward chairpersons meet in a neutral ground at Sunkhani. Moving animals to high pasture is coordinated among the three villages. They utilize Hipsing to ensure equity among resource users.

Although the whole VDC is immersed in conservation ideals, they have developed a particular resentment against snow leopards. Every year, snow leopards kill their goats and other livestock. Big snow leopard traps dug in the ground could be found in a few places. Some people claimed that these traps were made by Hepka residents when they take their animals to Limi. Regardless of their origin, a deep resentment exists between snow leopard and local people do exist.

Although residents of Limi follow conservation practices that are espoused by Buddhist philosophy, it was observed that Hepka residents, who also subscribe to Buddhist faith, contradict such practices (Figure 6.2). People of Hepka are involved in hunting. In fact, during the field study, a gun was observed outside a Hepka herder's tent. People of Hepka were also found hunting last year in Limi and were handed over to the police, but to the dismay of Limi people no action was taken against the perpetrators.

Figure 6.2 Monasteries play an important role in resource management and in maintaining community systems

People reported decreasing snowfall over the years. One visible impact of climate change has been drying of water sources in many places. People reported that the degradation of pastureland has been mainly because of reduction of rainfall over the years.

Figure 6.3 Halji field washed away by outburst of Tako Chho

One of the most significant problems people experienced in the recent past was the bursting of Tako Chho six years ago in Halji Village. The lake burst in June and flooded the village in the late afternoon. Though there was no human casualty, the flood swept away water mills and destroying agricultural fields (Figure 6.3). Since then, more land is being washed away by the stream every year. This not only damages cropped fields, but also threatens the very survival of Halji Monastery and the settlement. There is also a threat of outburst of Homya Chho and Ghanje Lake. Although people of Halji have made several requests, no concrete support has been provided to protect the land and village from further erosion. Therefore, this needs immediate attention. No comprehensive study could be carried out on how people perceive and observe the process of climate change in the region. As these highland communities are not strong in socio-economic conditions, they have narrow options for adaptation measures and responses.

Deteriorating values of social responsibility also leads to conservation threats. There were clear evidences of harvesting herbs before maturity. However, some monasteries, especially the Yalbang Monastery, have been playing a vital role in encouraging people for conservation. Many people reported that after initiation of the Abbot of this monastery, hunting in Hepka village has significantly reduced. Similarly, conservation practices of Limi Valley could be a good example.

7. Policy and Enabling Environment

7.1 Policies

Conservation of natural resources and biodiversity has been receiving government policy focus from the mid-1950s, when the periodic panning process began in Nepal, in the form of protection of forest, protected area management and land use planning. It got more emphasis with the formulation and implementation of Master Plan for Forestry Sector, National Conservation Strategy 1987 and the Eighth Plan. Environment conservation has been receiving greater importance since the Eighth Plan (1992-1997) when, for the first time in the planning history of Nepal, a separate chapter was included for conservation of environment.

7.1.1 Natural Resource Management and Biodiversity

The Tenth Plan (2002-2007)

One of the objectives of Forest and Soil Conservation sector of the Eighth Plan is conservation and management of forests, plants, soil and watershed, and biodiversity, while developing forest enterprise, continuing supply of forest products and contributing to maintaining environmental balance. In order to achieve the objectives, five strategies have been adopted. The most important strategy is to conserve biodiversity and genetic resources including forests, plants, insects, and wildlife. Four policies and *karya nitis* have been envisaged by the Eighth Plan to contribute to the above strategy which include increasing forest cover to 40% to maintain a balance between natural environment and development; conserving biodiversity by establishing a base for sustainable development by adopting landuse planning system and collaborative forest and soil conservation; and obtaining resources available under Kyoto Protocol by highlighting Nepal's contribution to global environment through protected areas. Implementation arrangements have been stipulated for community and private forests; national and leasehold forests; NTFPs, plants and medicinal plants; soil and watershed conservation; and biodiversity.

Implementation arrangements for biodiversity provides that while conserving, prompting, managing and utilizing forests, even on the basis of public participation and landscape concept, the central focus will be on conservation and utilization of biodiversity.

The Interim Plan (2008-2010)

The objectives of Forest and Soil Conservation sector of the Interim Plan are very different from the objectives of the Tenth Plan. Objectives of the Interim Plan emphasize on access to forest resources of the poor, downtrodden and socially excluded and their rights. One of the objectives provides that balanced environment will be maintained by scientific management of forest, plants, watersheds, biodiversity and protected areas and ensure the access and rights of poor and disadvantaged communities over forest products by increasing sustainable growth in the supply of forest products and empower them socially and economically.

One of the strategies is to follow scientific management system for conservation of forest, plants, wildlife including biodiversity and genetic resources by adopting decentralization, devolution, participatory and people's right-oriented procedures/system. As one of the strategies of the Interim Plan is committed to follow scientific management system for conservation of biodiversity and genetic resources, it creates enabling policy environment for MFSC to promote transboundary landscape management which implies using an integrated approach in the management of extended landscapes, defined by ecosystems rather than boundaries, in which both conservation and sustainable use of components of biodiversity are considered. It would be probably one of the best systems to contribute to or achieve the above mentioned objectives of the Interim Plan.

The Interim Plan has listed over 60 Policies and Karya Nitis. Although they seem more like a wish list, some of them, such as existing protected area management will be strengthened; develop and implement necessary programs to achieve objectives of and fulfil obligations under the CBD while undertaking institutional and infrastructure development for bio-safety; develop infrastructure for nature conservation oriented community tourism; in order to expedite documentation of biodiversity,

and priority should be given to the execution of Biodiversity Implementation Plan, are worth mentioning. The main programs for conservation of biodiversity, genetic resources and bio-safety include documentation of biodiversity in 900 VDCs, 1 of 5 development regions; protection and improvement of habitat/ecosystem in 13 national parks and wildlife reserves; species conservation and management; designating western mountain Api area as a conservation area. Designation of Api-Nampa as a Conservation Area in 2009 is likely to be the biggest achievement of the Interim Plan. It remains to be seen whether and to what extent MFSC will adopt scientific management system for conservation of forest, plants, wildlife, biodiversity and genetic resources.

The objectives of the Environment, Science and Technology sector of the Interim Plan are to emphasize on protection, restoration and wise use of natural environment; prevent pollution of urban environment and promote sustainable development by garnering public participation in the movement to keep rural areas clean and beautiful and ensuring individual's right to live in a clean environment; and effectively implement national and international environmental management commitments. Ensuring an individual's right to clean environment was adopted as one of the objectives mainly because the Interim Constitution declares the right of every person to live in a clean environment to be a fundamental right (Article 16 (1)).

Operate development programs by internalizing environmental management; formulate and implement additional national standards for air, water, soil and noise; and prioritize environmental conventions to which Nepal is party and implement them by formulating action plans are the three major strategies adopted by this sector. During the Interim Plan period, the Ministry of Environment Science and Technology initiated formulation of the Climate Change Policy and NAPA. The draft of the Climate Change Policy has been developed and is yet to be finalized.

Protection and promotion of intellectual, cultural and archaeological heritage; and developing tourism industry as principal part of national economy so that it could contribute to creation of employment and increasing the living standards of people by developing necessary infrastructure and diversification and expansion of tourism and developing Nepal as one of the main attractive destination for tourism are the two objectives of the Culture, Tourism and Civil Aviation sector of the Interim Plan related with tourism. Strategies adopted to achieve the above mentioned objectives include involving local bodies in protection and promotion of nation's cultural heritage; developing tourism sector as the foundation of economy by giving high priority to the tourism sector; diversifying and expanding tourism sector keeping in view regional balance; developing tourism sector through rural tourism so that it can help improve living standards of people. The Nepal part of KSL includes Baitadi, Darchula, Bajhang, and Humla that are districts with high biological diversity and lowest Human Development Index. If the government is indeed committed and sincere in "developing tourism sector through rural tourism so that it could help in increasing the living standard of people." Now the Ministry of Culture, Tourism and Civil Aviation needs to take the lead as MFSC has already designated one national park and one conservation area in this region.

Sustainable Development Agenda for Nepal 2003

The Sustainable Development Agenda for Nepal 2003 (SADAN) maintains that development efforts can never be sustainable if they deplete natural resources and damage ecosystems. Further, SADAN stipulates that environmental conservation should not be an after-thought of modern economic development; it is an intrinsic and inviolable party to poverty reduction and sustainable economic growth. Over the past three decades, GoN has also been active in identifying areas of high biological diversity needing protection.

SADAN has rightly pointed out that in a diverse country with many ethnic and religious groups, gender imbalance and geographical differences, the pattern of access and representation of citizens in institutions of the State is not representative. So by launching an initiative such as KSL, people of

[1] A VDC is the lowest tier of local government. There are 3,915 VDCs in Nepal (NPC 2005). A district development committee (DDC) is on the top. There are altogether 75 DDCs, one each in the 75 districts. The number of VDCs in each district differs from district to district mainly based on population and geographical area of the district. VDCs and DDCs are an autonomous and corporate body with perpetual succession.

KSL region in general can have opportunity for representation and contribution in conservation and sustainable use of biodiversity for the region.

SADAN places emphasis on conservation and management of biodiversity in forests, rangelands, protected areas, wetlands and agriculture. Against the backdrop of the status and objectives for various sectors discussed in four sections, this section summarizes specific existing or new policies that need to be pursued with greater effectiveness by GoN in order to achieve sustainable development as defined earlier.

Nepal Biodiversity Strategy 2002

Nepal Biodiversity Strategy strives towards improvement in the degree of representation and effectiveness of the protected areas system and adjoining areas for protection of biodiversity. The NBS recognizes the need for a comprehensive approach that will aim to conserve forests, soil, water and biological diversity, while at the same time meeting basic needs of people who are dependent on these resources for their livelihoods. To this end, the NBS has adopted landscape planning approach to protect and manage biodiversity on a sustainable, long-term basis (GoN/MFSC 2002). What the NBS resolved in 2002 is now being promoted by the Interim Plan in 2008.

With respect to developing ecotourism, NBS indicated that tourism in Nepal is concentrated mainly in a few protected areas (Chitwan, Annapurna, Sagarmatha and Langtang), which intensifies negative environmental impacts in these protected areas. The potential for developing sustainable tourism in other PAs, as well as other areas of natural and cultural heritage will therefore be explored and promoted. Efforts will also be made to seek maximum involvement of local people in promoting sustainable tourism (GoN/MFSC 2002). The strategies of the Culture, Tourism and Civil Aviation sector of the Interim Plan reiterate the same point which NBS proposed in 2002. However, it remains to be seen whether Interim Plans strategies for tourism sector, i.e. “diversifying and expansion of tourism sector keeping in view regional balance; developing tourism sector through rural tourism so that it could help in increasing the living standard of people” remains a rhetoric or becomes a reality.

National Biodiversity Coordination Committee (NBCC) has been established as proposed by the NBS. The primary task of NBCC, as proposed by NBS, is to develop policies for consideration by government and to provide institutional, political and operational guidance for implementation of the NBS through the Nepal Biodiversity Strategy Implementation Plan (MFSC 2002). It also proposed that the NBCC will approve and publish Annual Biodiversity Plan for the Parliament and Nepali people. It is the highest level of organizational structure proposed by the NBS for its implementation. Although it exists within the MFSC, it has failed to discharge its functions of National Biodiversity Coordination Committee (NBCC) in accordance with the National Biodiversity Committee (NBC).

National Biodiversity Strategy Implementation Plan 2006-2010

The Ministry of Forests and Soil Conservation took four years to develop and endorse National Biodiversity Strategy Implementation Plan (NBSIP) as proposed by the NBS in 2002. It is one of the principal tools to achieve the goals and objectives of NBS. The overall goal of NBSIP is to contribute to achieve the goals and objectives of NBS through its successful implementation for conservation of biological diversity, maintenance of ecological processes and systems and equitable sharing of benefits accrued. The NBSIP has identified 13 priority projects to be implemented from the 2006 to 2010. The only transboundary biodiversity conservation project included in the NBSIP is establishment of Kanchenjunga Tri-National Peace Park. The objective of this proposed project is to establish and manage a Tri-national Peace Park in the Kanchenjunga region.

As the spirit of NBS for the forestry sector is to promote biodiversity conservation outside protected areas through people’s participation, the NBSIP proposed a project on Forests Biodiversity Conservation through Community Participation (outside protected areas). The objectives of this proposed project are to:

- Conserve rich biodiversity in the large block of forest ecosystems that are poorly represented under PAs with active participation of local communities.

- Encourage farmers for domestication of medicinal plants having good market value for income generation.
- Ensure conservation of vegetation/habitat types in different ecosystems those that are *in situ* habitats of endemic and legally protected plants.
- Develop technologies for their conservation and sustainable usage.

Baitadi, Darchula, Bajhang, and Humla Districts form KSL-Nepal. Both the above mentioned projects are yet to be implemented. If KSL is launched in the near future, it will contribute to conservation of biodiversity in the KSL region as well as contribute to partial implementation of one project proposed by NBSIP.

National Agriculture Strategy BS 2061
Nepal Agricultural Research Council (NARC) has developed a 20 year strategic framework to effectively implement programs captured under Agriculture Perspective Plan. This aims to mobilize agricultural and related natural resources on priority basis to meet the challenges of food security and poverty alleviation in Nepal.

Legal measures
The first civil code was adopted in 1854 and covered matters related to natural resources. Modern codification started in 1955.

Interim Constitution of Nepal 2007
The Interim Constitution guarantees equal rights to all citizens (Article 13(1)). It also declares the right of every person to live in a clean environment to be a fundamental right (Article 16(1)).[2] This provision has potential for far-reaching effects in addressing the disproportionate distribution of environmental hazards in urban areas with respect to marginalized groups and poor communities. It is, however, less likely to ensure environmental justice to similarly disadvantaged groups residing in the country's rural areas, who's livelihoods in most cases depend on natural resources.

The Interim Constitution guarantees all citizens the right to acquire, own, sell and otherwise dispose of property, subject to existing law (Article 19(1)). Citizens may move the Supreme Court for the enforcement of fundamental rights (Article 107(1)). The Interim Constitution also confers upon the Supreme Court extraordinary jurisdiction to enforce "any other legal right" (Article 107(2)). With respect to property rights, however, the Supreme Court has ruled that a person claiming their right to property has been infringed must first be able to prove that they possess title over the property in question (Nepali vs. Ministry of Forests and Soil Conservation (2048) 33 NKP 33).
The state is required to make necessary arrangements to "maintain" a clean environment, to "give priority" to environmental protection and to the prevention of further damage, and to increase public awareness about "environmental cleanliness" (Article 35(5)). In addition to these general provisions, the state must make arrangements for "special protection" of the environment and of "rare" wildlife (Article 35(5)).

The Interim Constitution also requires the state to provide for the protection of "forest, vegetation and biodiversity, its sustainable use and for equitable distribution of the benefits derived from it" (Article 35(5)). This clause has special significance for conservation of biological resources and for issues concerning access and benefit-sharing. Had this provision appeared in Part 3 of the Interim Constitution, which outlines fundamental rights, rather than in Part 4 dealing with the "responsibilities, directive principles and policies of the state", access to resources and to the benefits arising out of resource use would have been a fundamental constitutional right. The Interim Constitution, therefore, provides that equitable distribution of benefits from the use of natural resources is a responsibility of the State, rather than a fundamental right of all citizens. If the state fails to fulfil these responsibilities, the matter cannot be taken to court by private citizens.

[2] Prior to the promulgation of the Interim Constitution of Nepal 2007, people enjoyed right to clean and healthy environment as per the judgement of the Supreme Court (Leaders v. Godawari 4 SCB 1).

In “mobilizing” natural resources and heritage “that might be useful and beneficial to the interest of the nation,” the state is required to give priority to local people (Article 35(4)). In the past, however, public policy has deprived communities of tenure and the right to benefit from resources in their own areas. The ‘national interest’ and ‘public interest’ have too often been narrowly defined as the interests of a political and economic elite. If these terms continue to be defined in the future as they have been in the past, natural resource-dependent communities are not likely to receive any additional benefits.

It states that every community enjoys the right to basic education in its mother tongue (Article 17(1)), and to preserve and promote its own language, script, culture, and heritage (Article 17(3)). Similarly, the state must pursue a policy aimed at identifying and protecting traditional knowledge, skills and practices (Article 35(18)). These provisions may prove to be important for conservation of biodiversity and traditional knowledge.

Obligations of the State

Nepal’s commitment to environmental conservation, equitable development and protection of human rights is enshrined in the Interim Constitution of Nepal 2007. The country’s international obligations under various Multilateral Environmental Agreements (MEAs) are given legal cover by the Nepal Treaties Act 1991, which explicitly provides for the primacy of international treaties over national law and requires implementing legislation to be framed at the national level.

Nepal Treaties Act 1991

The Nepal Treaties Act concerns international agreements to which the government is a party[3]. When a matter covered by a treaty conflicts with any law in force, the provisions of the treaty are to prevail over national legislation to the extent of the inconsistency (Section 9(1)). This principle has been upheld by the Supreme Court with respect to the Convention on the Rights of the Child (1989) (Paudel v. Ministry of Home Affairs (2058) 43 NKP 423). When a treaty to which the government is a signatory, but which has not been ratified, acceded to, approved or accepted by parliament, creates additional obligations that require the enactment of legislation, the government must enact laws for its execution in a timely fashion (Section 9(2)).

Despite these statutory requirements, implementation at the national level has remained weak, especially in the case of MEAs, because the government has not enacted the required legislation[4]. Nor has supremacy been recognized of MEAs over national legislation. Poor communities and marginalized groups in general bear the burden of this failure. In rural areas, for example, legislation required to implement certain MEAs would need to provide statutory cover for community rights with respect to access, use and benefit-sharing.

Forest Act 1993

The State has absolute rights over forest resources in national forests. However, if the same resources are located within a community forest handed over to communities according to provisions of the Forest Act, members of the CFUG have the right over those resources but not over land. They can regulate access and sharing of the benefits as per their individual statutes.

By allowing communities to manage forest resources, the Forest Act 1993 implicitly recognizes both community rights to forest resources and indigenous forest management practices[5]. The law provides for the establishment of user groups and allows them to “utilize forest products by developing and conserving forests for the collective interest” (Section 41). User groups maintain a fund through which they finance their activities (Section 45).

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[3] Nepal is signatory to a number of MEAs, notably the Convention on Biological Diversity (1992), United Nations Framework Convention on Climate Change (1992) and Convention on Wetlands of International Importance especially as Waterfowl Habitat (1971), some of which provide for sustainable use, benefit-sharing and public participation.

[4] Certain laws in force, although not enacted specifically to implement Nepal’s obligations under various MEAs, do nevertheless conform to such requirements. For example, the Forest Act and the National Parks and Wildlife Conservation Act contain some provisions which conform to the requirements of the CBD and the Ramsar Convention.

[5] The Forest Act 1993 (Section 74) repeals the Forest Act 1961 and the Forest Conservation (Special Arrangements) Act 1968.

The district forest officer (DFO) may hand over to registered CFUGs any part of a national forest to be managed as 'community forest' (Section 25(1)). This entitles user groups to develop, conserve, use and manage the forest. They may sell and distribute forest products according to a work plan, at a price determined by the user groups themselves. User groups may also make amendments to the work plan (Section 26(1)), but only if such alterations are not "likely to affect adversely the environment in a significant manner" (Section 26(2)).

In theory, these provisions allow communities to participate in management and decision-making, and to share in the benefits from the use of forest resources. This, however, is not always true in practice.

Similar to the provisions concerning community forestry, the Forest Act allows the government to hand over any part of a national forest as a 'leasehold forest' (Section 31) to any corporate body, industry or community (Section 32(1)). Such forests may be used for a number of purposes, including to sell and use forest products, promote plantation, set up tourist operations, and carry out agroforestry or wildlife farming, as long as these activities are compatible with conservation and development of the forest (Section 31). Leasehold forests may also be used to produce raw materials for industries based on forest products (Section 31(a)). Priority, however, is given to community forests: any part of a national forest suitable for community forest use cannot be handed over as leasehold forest (Section 30).

In the case of both community forests and leasehold forests, ownership of the land on which these forests stand remains with the government (Section 67). Similarly, the government retains the right to use community forest and leasehold forest areas for "implementation of the plan having national priority" where no alternative is available, as long as no "significant" adverse effects are created (Section 68(1)). In the case of damage caused to an individual or community by any such measures, the government is required to make "proper arrangements in this regard" (Section 68(2)). Similarly, the Forest Act allows the government to hand over part of a national forest as a 'religious forest' (Section 35) to any religious body, group or community (Section 35(1)). Except for commercial purposes, such religious forests may be used for any religious purposes (Section 36). However, the groups are required not to create significant adverse impact on the environment, loss or damage of public and soil erosion in the watersheds while felling trees.

The government is further empowered to designate any part of national forest which has environmental or scientific or cultural significance or any other special significance as protected forest (Section 23(1)). The Department of Forest is required to develop management plan and have it approved by the MFSC. It is the duty of the DFO is to execute the management plan as approved by the MFSC (Section 24(3)).

National forests not handed over to communities are strictly regulated, and the FA contains detailed provisions aimed at restricting their use. A wide range of activities are prohibited in a national forest, including cultivating land, setting fires, constructing dwellings, grazing animals, cutting or damaging plants and trees, hunting, removing forest products, extracting sand or soil, burning charcoal, and damaging forest products while carrying out licensed felling activities (Section 49).

The DFO is empowered to hear and decide cases related to forest offences involving a fine up to Rs 10,000 and/or imprisonment for a term of one year (Section 65(1)). This provision covers all forest offences listed in the FA as far as fines are concerned; only two offences carry a higher maximum prison sentence (Sections 50(1)(e) and 50(2)) but even here the cash fines fall within the limits set for DFO to hear and decide the case. The DFO's decision may be challenged in an appellate court (Section 65(3)).

User groups are also permitted to dispose of cases related to management and use of forest resources. CFUGs may impose penalties on group members found to be carrying out activities that contravene the work plan and recover damages (Section 29).

Forest Regulations

Government-managed forests are administered according to a work plan which, among other things, specifies the quantity of forest products that may be collected and sold annually (Section 6(1)), and takes into account forest products "required by local people" (Section 3(1)(h)). Forest products cannot be taken, sold or transported without a licence (Section 7). Separate rules and procedures govern the sale and distribution of timber and firewood (Section 9), *Acacia catechu* (Section 10) and herbs (Section 11). Forest product supply committees may be established at the district level to sell timber and firewood for domestic use to "rural people" (Section 9(1)(a)), while the DFO may sell *Acacia catechu* by auction (Section 10). The collection of herbs and other forest products is also regulated with those wishing to do so required to submit an application to the DFO (Sections 11(1) and 14). Timber and firewood may, however, be supplied free of charge for the purpose of "traditional religious function[s] other than construction works" (Section 15). In addition, the government may ban the collection and sale of all forest products (Section 12). Grazing animals is not permitted in the areas covered by a work plan but elsewhere animals may be grazed with a licence (Section 19).

Community forests are also managed according to a work plan, in this case prepared by the users group to which the forest has been handed over, and assisted by the DFO (Section 28). The DFO is authorized to alter, "with the consent" of the users group, and approve the work plan (Section 29(2)). User groups are permitted to collect and sell only those forest products specified in the work plan (Section 32(1)), and must rehabilitate the area after timber and other forest products have been taken (Section 32(2)). Industries based on forest products may be set up outside the area of the community forest, on the recommendation of the DFO (Section 32(4)). User groups are permitted to specify in the work plan activities that are prohibited in a community forest they have undertaken to manage. In addition, certain activities are specifically prohibited in the Regulations. These include clearing a forest area for agriculture (Section 31(1)(b)); capturing or killing wildlife in contravention of relevant laws (Section 31(1)(e)); extracting or transporting rocks, soil, pebbles or sand (Section 31(1)(f)); and carrying out any activity that may cause soil erosion (Section 31(1)(d)). User groups are also not permitted to mortgage or transfer ownership of land on which a community forest stands (Section 31(1)(a)). Homes may not be built inside a community forest (Section 31(1)(c)) but "houses or huts needed for security" may be constructed (Section 31(2)). User groups may obtain loans for these and other forest development activities by offering forest products as collateral (Section 31(2)). User groups are required to include in their operational plans provisions regarding penalties that will be imposed on members found to be violating the work plan (Section 28(1)(j)).

The procedure for handing over a community forest is relatively simple (Section 29). A user group submits an application to the DFO who then undertakes necessary inquiries, studies and approves the work plan, and hands over management of the forest (Sections 29(1) and 29(2)). In exchange, user groups must furnish a bond, stating that they will comply with "the conditions prescribed by His Majesty's Government" (Section 29(2)).

In handing over a community forest, the DFO is required to take into account not only the distance between the forest in question and the village where users are resident but also the "wishes as well as management capacity" of local users (Section 26(1)). Where local users wish to plant trees on public land outside a national forest, or have already done so, such areas may also be designated as community forest "on the condition that the concerned agency itself retains the ownership of land" (Section 26(2)).

Other procedures, such as those concerning the Constitution and registration of user groups (Section 27), are somewhat more complicated. Once they have obtained management control of a community forest, user groups are required to comply with a number of operational procedures, such as issuing permits for various purposes (Sections 33(1) and 35), preparing and registering stamps (Section 34), informing the DFO about the "sale rate" of forest products (Section 32(3)), keeping accounts and maintaining records of all transactions (Section 33(3), and preparing receipts in triplicate (Section 33(2)).

Community forests may be resumed by the government if the user group is unable to fulfil the requirements of the work plan or has carried out activities that have a "substantial adverse effect on the environment", or if laws have been violated (Section 37). In cases where the execution of a project of "national priority" in a forest area causes any loss or harm to local individuals or communities, compensation is to be paid by the "operators" of the project (Section 65(1)), who also bear the expense of cutting, processing and transporting forest products approved for use in the project (Section 65(2)). No such cases have been reported in the study sites.

The remaining provisions of the Regulations concern the establishment and functioning of leasehold forests (Sections 39–54), religious forest (Sections 55–60), and private forests (Sections 61–64)[6].

Environment Protection Act 1996

The Environment Protection Act 1996 obliges proponents to prepare an initial environmental examination (IEE) and/or environmental impact assessment (EIA) report in relation to prescribed plans, programs or projects which may cause changes in existing environmental conditions by physical activity, development activity or change in land use. Section 3 of the EPA requires the proponent to conduct an IEE and EIA in relation to prescribed proposals. It is apparent from this provision that any private party or government agency who wishes to implement any proposals prescribed in the Regulations must prepare either in IEE or EIA, as the case may be. After having prepared the IEE or EIA, the proponent is required to apply to the relevant government agency with the IEE or EIA report for approval of the proposal.

Schedule 1 of the Environment Protection Regulations 1997 provides the list of proposals that require preparation of an IEE. These include, for example, preparation of management plan of a national park, wildlife reserve and conservation areas and buffer zone including wetlands and preparation of all types of District Forest Management Plan managed by the government; and construction of a resort, hotel and safari with capacity of 10-50 beds and small scale and educational institutes, teaching hospitals or any other construction by other than GoN and forest related agencies within the forest area, national park, reserve and conservation areas, buffer zones, wetlands areas and environmental conservation areas. Schedule 2 provides the list of proposals in relation to which EIA must be conducted. These include, for example, establishment of resort, hotel and safari with a capacity of more than 50 beds and medium and large scale educational institutions, teaching hospitals and industries and other construction work within a forest area, national park, reserve and conservation areas, buffer zones, wetlands area and environmental conservation areas and handing over of more than 500 hectares forest areas to a single community for its management and any proposal that will be implemented in national parks, wildlife reserves, wetlands and conservation areas.

National Park and Wildlife Conservation Act 1973

The National Park and Wildlife Conservation Act 1973 takes a strict regulatory approach to the conservation of natural areas and wild species. The NPWCA empowers the government to create five types of protected areas and to transfer ownership of land for the purposes of declaring parks and reserves (Section 3 (1) and (2)). The NPWCA describes five categories of protected areas, namely national parks, wildlife reserves, controlled (strict) nature reserves, hunting reserves and conservation areas. Conservation Area is an area set aside to be managed in accordance with an integrated plan for the protection of natural environment and the sustainable use of natural resources (Section 2 (E1)). NPWCA defines wildlife as any wild animals including birds, fish and reptiles. Schedule 1 of the Act provides a list of protected wild animals. Complete protection is accorded to 26 species of mammals, nine species of birds and three species of reptiles (Section 10).

Nepal's 16 national parks and protected areas have contributed to the protection of biodiversity and habitat. The NPWCA prohibits, among other things, hunting of birds and animals; building any

[6] The Forest Regulation 1995 repeals the following instruments: Forest Products Sale and Distribution Regulation 1970, Forest Protection (Special Arrangements) Regulation 1970, Panchayat Protected Forest Regulation 1978, Leasehold Forest Regulation 1978, Panchayati Forest Regulation 1978 and Private Forest Regulation 1984.

house, hut or other structure; clearing or cultivating any of the land or harvesting any crops; pasturing or watering any domesticated animals or birds; cutting, burning or damaging any tree, bush or other forest products; damaging forest products or harming wildlife, birds inside national park or reserves and blocking, diverting or placing hazardous or explosive materials in rivers, streams or any water fountain (Section 5). It needs to be noticed that the abovementioned activities are prohibited only in national parks and reserves. The Act levies a fine of Rs 500 to 1,000 or three months to two years imprisonment or both as punishments to any person who kills or injures protected birds. This Act was considered to be the most effective piece of legislation in the past. However, the Act is silent about transboundary landscape management.

Buffer Zone Management Regulations

The Buffer Zone Management Regulations 1996 (BZMR) has been promulgated under the National Park and Wildlife Conservation Act 1973. It authorizes the Warden of a national park or reserve to prepare and submit buffer zone management work plan to DNPWC for community development, environmental conservation and balanced utilization of forest resources of buffer zones. It requires the following issues, among others, to be included in the work plan:

- description of forests, bushes, grasslands and fallow land areas
- status of forest boundaries
- description of cultivated and fallow land
- maps showing rivers, streams and other water resources
- description of population, population density, forest areas and utilization of forest resources
- description of forests that can be handed over as community, religious and private forests within the buffer zone
- work plan to be implemented for forest development
- work plan to be implemented for the community development
- programs on soil conservation, tourism development environmental and historic heritage conservation, and
- annual description of collection and utilization of forest resources; implementation of land use system.

It is interesting to note that although the above list requires including maps showing rivers, streams and other water resources, it does not mention about including a plan or any provision for conservation of wetland resources. It is sad to note that the Warden or the person who is responsible for developing the work plan is even required to include programs for soil conservation, tourism development environmental and historic heritage conservation but nothing for conservation of wetlands.

Further, Rule 7 of the BZMR makes the Warden responsible for conservation of (a) wildlife, (b) natural environment and natural resources, (c) biodiversity, (d) forests and (e) development works in the buffer zone area. Despite the fact that wetlands play a pivotal role in the conservation of wildlife and maintenance of biodiversity, the conservation of wetland has not been included in the responsibility of the Warden.

7.1.2 Hydrology and Water Resources

Historically, rights over water resources lay with the king and were granted to subjects along with rights to land or forest. In eastern Nepal, meanwhile, traditional systems of water use and distribution was recognized by the state under earlier land administration arrangements, perhaps because it was next to impossible for the then rulers to extract land revenue and maintain control over the country's far-east without recognizing traditional systems.

Formal state control over the water resources was consolidated in 1992 through the WRA. Earlier laws governing the use of water, such as the Canal Act 1963 and the Canal, Electricity and Related Water Resources Act 1967, prescribed licensing arrangements but made no explicit mention of state ownership. State ownership of water resources is provided statutory cover for the first time under the WRA.

Water Resources Act 1992
Under this law, all water resources are owned by the state (Section 3)[7]. All water use, other than for specified, mainly domestic purposes, is regulated by means of licences (Sections 4 and 8). The law establishes the priority in which water resources are to be utilized (Section 7). The government may develop water resources, and acquire related land, equipment and structures "extensive public use", upon payment of compensation (Section 10).

The WRA allows for the formation of water users associations (WUAs) as a way for communities and groups to utilize water resources for collective benefit (Section 5). Such associations or organizations must be registered with the prescribed official or agency (Section 5(1)). Water-related projects initiated by the government may be handed over to WUAs, which then become the 'owners' of the infrastructure (Section 11). Water users groups also have the right to determine and levy fees on members of the group (Water Resources Regulation 1993, Section 5).

Land or residential buildings may be used or acquired by the government on behalf of licence holders if required for the construction of a dam, barrage, canal or other waterworks, pipelines or water distribution facilities (Water Resources Act, Section 16). Although water users associations are also required to obtain licences, this provision is generally applied to commercial projects and not enforced stringently in the case of small drinking water schemes executed at the village level.

Since ownership of water resources vests in the state, there is no provision for compensation when water resources on an individuals' land are utilized by the state. Compensation is only offered for land, buildings or infrastructure if their acquisition is required (Section 10(3)), and for damage caused to them during the execution of a project (Sections 15 and 16).

Irrigation Regulations 2000
Water users associations are required to hold elections periodically, and election procedures are to be specified in the statutes of each users association (Section 4). Usually, any general member may run for a position on the executive committee.

Service charges are determined by a district-level committee comprising the chief of the district irrigation office, a representative of the district agriculture development office and the chairperson of the users association concerned (Section 26). The service charge may differ from one users association to the next, and may or may not take caste, gender or economic status into account while determining fees; the Regulations are silent on this matter. In some users associations, larger landowners are required to contribute more cash and labor for construction and maintenance of infrastructure than members with more modest holdings.

Drinking Water Regulations 1999
Membership fee for users associations is to be mentioned in the statutes of the association concerned (Section 4(2)). The drinking water fee is fixed by a committee (Section 38). Members may also be required to provide cash and physical labour for the maintenance of infrastructure, as decided by the general body or executive committee of the association. While the fee for irrigation water use is progressive, based on the size of the landholding, fees charged by drinking water associations are the same for all members.

Aquatic Animals Protection Act, 1961
The Aquatic Animals Protection Act 1961 is one of Nepal's oldest pieces of legislation, indicating the early recognition of water, wetlands and aquatic life values. Water[8] has been defined as lakes, marshes, streams, rivers, rivulets, tanks, canals, channels, ponds, reservoirs, artificial reservoirs, wetlands, cages used for fishing and fish farming water in paddy fields and their sources (Section 2 (a)). It does not specify natural or artificial, static or flowing water, but the definition includes lakes, ponds, temporary steams, water courses and entire river systems. Its primary deficiency is the

[7] The Water Resources Act 1992 (section 25) repeals the Canal, Electricity and Related Water Resources Act 1967.
[8] The Original Act had defined "water" as "lakes, ponds, streams, rivers, rivulets, banks, canals, channels, reservoirs, and their sources."

omission of any explicit reference to wetlands. The Act defines “private water” as a lake, pond, ditch, pool, or reservoir which is on land utilised by a person, who has been paying land tax to the government (Section 2 (1)). Hence, the Act provides for privately-owned water bodies or wetlands as well but is silent about the wise use and management of such privately-owned wetlands. The policy gap is that no agency is specified as responsible for its administration and enforcement.

Section 3 renders punishment to any party introducing poisonous, noxious, or explosive materials into a water source, or destroying any dam, bridge or water system with the intent to catch or kill aquatic life. The Act has been in effect since 1961, yet both noxious and explosive materials are increasingly used in water bodies throughout Nepal[9]. It is assumed that poisons, explosives and electric current is being used in about 3,000 rivers out of 6,000 rivers in the country. One of the reasons of extinction of various species of birds is the use of poisons, explosives and current in rivers[10]. There is no reported case of any person being prosecuted for violating the Act. This is clear evidence of the government’s ineffectiveness in developing a surveillance system for conserving aquatic life and wetland habitats. The Act empowers the government to prohibit catching, killing and harming certain kinds of aquatic animals through notification in the *Nepal Gazette.* No notice to this effect has ever been published by the government (Section 4).

Similarly, closing the doors of a dam and any other structure or destroying fish ladder by any body other than the authorized officer is prohibited by the Act (Section 4). It also further empowers the government to prohibit catching, killing and harming certain kind of aquatic animals in a specified season and condition (Section 4 (b)). The Act further empowers the government to publish the notice in the Nepal Gazette to prohibit catching, killing and harming aquatic animals in a specified water bodies (Section 5). The Government shall have sole right over the aquatic animals in such water body. This Section gives overriding right to Government over aquatic animals in such water bodies, which is likely to curtail livelihood opportunity and traditional practices of local people. A notification published by the Ministry of Agriculture and Cooperatives on 5 August 2002 in Section 52 Number 17 of Nepal Gazette prohibits to:

- capture, kill or harm three species of *Schizothorax*, 12 species of turtles, 2 species of crocodiles, river dolphin and 2 species of otter,
- capture, kill or harm 4 species of *Schizothorax* , 2 species of *Tor* and 1 species of *Neolissochilus* from any of the water bodies in specific months of the seasons,
- with respect to the aforementioned fish species, besides restricted months of the season, restriction is imposed to catch, kill or harm fish species in other months below the prescribed length (for *Schizothorax* <15 cm, Tor sps. <30 cm, *Neolissochilus* <20 cm). Fish species trapped smaller than the prescribed length in the net or hook should be released into the water,
- kill, capture or harm smaller size of 46 recommended species of fish; any species trapped or captured in the net or hook below the recommended size should be released into the water,
- allow to trap or kill smaller fishes than the prescribed size for research purpose after approval of the government or local authority,
- capture or kill any types of aquatic life in the following places:
    - 1 km downstream and upstream of water body area in Koshi Barrage
    - 1 km downstream and upstream of water body in Gandak Barrage
    - 100 m downstream and 200 m upstream from the inlet in public lakes (from Barahi Temple to Ratna Mandir of Phewa Tal
    - 100m downstream and upstream of permanent dams of water resources project, and
    - At other side of the whole river or stream from the diversion.

Such stringent provisions of the Act are good for conservation of aquatic life and biodiversity. However, they may not be in the best inetrest of wetland dependent indigenous community and is contradictory with the letter and spirit of the National Wetlands Policy which emphasizes

9 Gorkha Patra Daily (in Nepali), 14 January 1995, 12. A doctor commented that 11 people had recently been treated for wounds due to the practice of catching fish through the use of explosives.
10 Sudarshan Pradhan (2010) “Dhilai Nahos Jalachar Sanrachanma” 11 June 2010. Annapurna Post 6.

encouragement and promotion of people's participation and involvement in management and conservation of wetlands. This violates the rights of indigenous and local people, particularly those who depend on fishing and aquatic resources.

Pasture Land Nationalisation Act 1974

Pasture land means land which has been used only for pasturing animals with or without registering in a government office (Section 2 (a)). The Act nationalizes all pasture land within the country and vests ownership of such land on the government of Nepal from the commencement of the Act and ends the rights of owners of such land prior to the enactment of the Act (Section 3). However, the land owner can keep the land which has been used for pasture land if it is under the land ceiling prescribed by the prevailing law (Section 3 (a)). The Act provides that the Government of Nepal must determine judicious amount of compensation for owners of pasture land whose pasture land has been nationalized on the recommendation of the Committee set in accordance with the Regulations under the Act.

The Government of Nepal is required to keep separate records of pasture land nationalized in accordance with Section 3 of the Act at the Land Revenue Office and give the land under the responsibility of relevant VDC for protection and utilization of such land for grazing animals (Section 5(1)). VDC is required to protect and improve pasture land which has come under its responsibility and it is prohibited from utilizing the land for any purpose other than grazing animals (Section 5 (2)).

VDC must allow all people including those who have been grazing their animals from time immemorial by charging a fee up to Rs 3 each annually for big animals such as yak, cow, buffalo, horse and mule and up to Rs 1 each annually for small animals such as goat, sheep, mountain goat (Section 6(1)). The amount collected from grazing fee must be deposited in Village Development Council Fund. Although the Act was enacted in 1974, it entered into force only in three districts namely Kabhrepalanchowk, Sindhupalchowk and Rasuwa from 1976.

Seed Act 1988

The objective of the Seed Act 1988 is quality seed production and distribution in order to increase the yields of agricultural crops. This Act has helped maintain crop diversification[11]. The Act establishes a National Seed Committee to give advice to the government in order to formulate and implement a seed policy (Section 3). The powers and functions of the Board include:

- to give advice to the Government on a national seed policy,
- to maintain coordination between the private sector and the Government in relation to production and distribution of seeds,
- to regulate and control quality of seeds produced within Nepal or imported from outside and sold in Nepal,
- to approve, release and register new seed species as prescribed,
- to provide ownership rights to breeders after testing specialty, uniformity and stability of new seed species,
- to determine quality standard of seeds,
- to determine and approve seed standards determined by national or foreign agencies, as required,
- to give advice the government on listing of species and variety of seed, and
- to cancel license of a person who has been operating a laboratory without renewing the license (Section 5 (1)- (8D)).

Unfortunately the powers and functions of the National Seed Committee do not allow it to play a role in protecting the rights of indigenous people or local communities with respect to seeds preserved and refined by them for generations.

The Government is empowered to establish a Seed Standard Control Center in order to perform works relating to controlling seed standards and functioning as the Secretariat of the National Seed Committee (Section7). The functions, duties and powers of the Seed Standard Control Center are to

[11] Nepal Agriculture Association (1999), Plant Genetic Resources profiles Study 1995, 63.

prepare essential infrastructure relating to controlling quality of seed and certification of seed and to submit it to the National Seed Committee; and to issue certificates as required in accordance with methods, standards and criteria approved by the Committee.

Section 11 of the Act empowers the Government to regulate and control the standard of any class or species of seed to be used for agricultural works, prescribing seeds of particular classes or species as scheduled seed by a notification published in the Nepal Gazette. Seed can be prescribed as seed of a class or species suitable for different areas.

Section 13 of the SA prohibits the sale, holding with the intention of selling, giving, exchange or provision by any other means to another, scheduled seed:

1. for which a class or species cannot be identified
2. which does not comply with the minimum requirement of germination and purity
3. which has been kept in a container without a label specifying the particulars, and
4. which does not comply with other conditions as prescribed. For example, seed of a specified class or species which has been prescribed as being suitable for a particular area must not be sold in other areas.

A person who desire to export or import scheduled seed of any class or species must obtain permission from the prescribed authority (Aection 15). However, an industry which has been established with an objective of exporting or importing seed may export or import the relevant seed by giving the prescribed particulars to the prescribed authority (Section 15 (3)). This provision is too generous to import or export companies. The Government should make sure that this generosity does not impact adversely on farmers. The maximum penalty under the SA is only Rs 300, which is unlikely to deter any potential offenders.

It is surprising to learn that the Government which is prepared to go so far to protect seed breeders' rights completely ignores indigenous and local communities' rights to the seed which they have been improving, modifying and conserving for generations. The only provision which has been included in the Act by the amendment made to the Act in 2007 states that the ownership over local varieties of seed which has been used in Nepal traditionally shall be as prescribed (Section 18A). It is ironic that government officials who proposed amendment to the Act in 2007 could not clearly spell out those farmers shall have right over the seeds which they have been utilizing. To strike a balance between plant breeders' rights and farmers rights, the Government needs to either make appropriate changes to the SA, or enact a new Act protecting indigenous and traditional communities' rights.

This Act entered into force in Bhaktapur, Kathmandu and Lalitpur District in 1989 and all of Nepal from June 2008.

National Agriculture Policy 2004

The policy has provisions for leasing marginal, pasture, degraded forest and unused common lands to poor and marginalized population for cultivation of cash crops and horticulture—grass, forage, fodder, agroforestry, medicinal plants, sericulture and other perennial tree crops, which would contribute to land improvement and poverty alleviation. It also calls for improvement of degraded forests and natural water bodies for biodiversity conservation, as well as utilization and development of agro-forestry system. Besides, this policy stresses the importance of conservation farming through local participation in watershed management and control of riverbank-cutting. However, it does not specify any coordinated effort with other policies or agencies for achieving stipulated provisions.

7.1.3 Settlement, Demographic Patterns, Livelihood and Poverty

Lands Act 1964

Until the 1960s, land was held under various forms of tenure, such as *raikar*[12], *birta*[13] and *guthi*,[14] or under the customary *kipat* system[15] (Takahatake 2001: 18). Formal administration was carried out by local-level state officials (*tharis* and *subbas*).[16]

Beginning in 1960, the then political administration began to replace the traditional system of land administration with laws such as the Birta Abolition Act 1960, followed by the promulgation of the New Civil Code 1964 and the Land Administration Act 1967.

The Lands Act aims to divert "inactive" capital and labor from land to other economic sectors, bring about an equitable distribution of cultivable land, improve the standard of living of "actual tillers" who depend on land for their livelihood, and maximize agricultural production (preamble)[17].

This Act abolishes the *zamindari* system of land ownership (Section 3)[18]. The term *zamindari* (or "jimidari", as it appears in the Act) is defined as "any system of collecting land taxes according to law and depositing the proceeds thereof with His Majesty's Government" and includes the *kipat* system (Section 2(h)). Land previously held under the *zamindari* system is to be registered in the name of the *zamindar*, in keeping with prescribed ceilings.

Ceilings on ownership are specified in Section 7, and vary according to geographical location. The maximum size of an agricultural holding is 6.6 hectares, while the largest homestead may cover 0.66 hectares (Section 7). Land in excess of these ceilings is to be acquired by the "prescribed authority" (Section 15) upon payment of compensation (Section 19). The land so acquired may be sold or reallotted (Section 21) and, until the sale or reallotment is finalized, may be "given away" for cultivation on "any terms" to the former landowner or tenant, or any other person (Section 21A). Such land is to be distributed among Dalits, members of ethnic communities and bonded laborers who have been freed, with priority to people from the VDC or municipality from where the land has been confiscated (Section 21 as amended in 2002).

Exemptions on these ceilings may be granted in the case of land held by the government itself, or by industries, or educational and medical institutions (Section 12). Other types of holdings that may also be exempted from ceilings include land held by "panchayat and class organizations of different tiers" (Section 12(b)), land used "under prescribed conditions for agricultural purposes prescribed by HMG" (Section 12(e)), land under jurisdiction of the *guthi* corporation (Section 12(f)), and land held by cooperative agricultural societies (Section 12(g)).

Tenancy in land was abolished from 1996 by means of the Fourth Amendment to the Act (Section 25(1))[19]. The amendment allows tenants to retain 50% of land they were previously farming or

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12 The *raikar* system of tenure has been described as a system of 'state landlordism' under which the rights of an individual to use the land are recognised by the state as long as taxes are paid (Regmi, 1965).

13 Birta was land granted to a noble as a reward for services rendered to the state. B*irta* holdings were free of taxes and could be inherited (Chapagain et. al, 1999: 5–6).

14 Under *guthi* tenure, land was held in trust by communities for the upkeep of religious or welfare institutions (IUCN RELPA, 2006: 95–128).

15 Kipat is an ancient form of tenure under which a community was granted land by the king in recognition of traditional communal tenure (Chapagain et. al, 1999: 5). Rights under *kipat* tenure emerged not because of a royal grant, but because the owner, as a member of a particular ethnic community, was in customary occupation of lands situated in a particular geographical area (Regmi, 1999: 87). The *kipat* system was abolished in 1968, following the Second Amendment to the Land Act 1964 (Takahatake, 2001: 18).

16 The *subba* was a headman or chieftain (Takahatake, 2001: 8), while the *thari* was a sub-headman (Jones, 1976: 63–75).

17 The Lands Act 1964 (section 64) repeals the Land and Cultivators' Records Compilation Act 1956, Lands Act 1957, Land Rules 1960 and Agricultural (New Arrangements) Act 1963.

18 Zamindars (literally, 'land owners') are large landlords. They serve as local functionaries for the government, and are empowered to collect land revenue and maintain law and order in the areas under their control.

19 Prior to this amendment, tenancy rights could be inherited by family members upon the death of a tenant.

occupying or to accept a cash payment at the current value of the land to which the tenant is entitled (Section 26D).

A unique feature of the Lands Act is its chapter on compulsory savings. All landowners and tenants are required to "save" a specified portion of the crop, which is to be deposited in a fund (Section 40). The cash equivalent may be deposited in certain cases, and in the case of cash crops other than food grains (Section 40(b)). The amount of the grain to be deposited is fixed either by committee, or by an organization or government official (Section 40). The fund so established is to be used for agricultural development and agricultural activities, giving priority to local needs (Section 40(c)). Funds are disbursed during the cropping period and realized with nominal interest during the harvesting season (Section 40(c)).

Land Administration Act 1967
The Land Administration Act prohibits cultivation of any land area which has been used since time immemorial as a road, highway, grazing land, waterhole, public resting hut, cemetery or graveyard, and any other land area or "servitude land" which has been used for public purposes (Section 20).

The Land Acquisition Act 1977
The Land Acquisition Act 1977 authorises the government to acquire any land, and as much land as it determines to be necessary, for public purposes (Section 3). The government is required to pay compensation and the amount awarded is to be decided by a four-member committee (Section 13(2). There is, however, no requirement that this amount be determined according to market value, nor that compensation be disbursed within a specified time (Section 16(2)(a)).

The acquisition itself may not be appealed. Appeals concerning the amount of compensation are to be submitted to the Ministry of Home with in 15 days of the notification issued by the committee, and the decision of the Ministry is final (Section 25(7)).

Once land has been acquired, the government is not required to use the land for the purpose for which it was originally acquired (Section 33). The land may subsequently be sold (Section 35).

New Civil Code 1964
Chapter 8 of the New Civil Code 1964 prohibits cultivation on any land which has been used since time immemorial for grazing or watering cattle, or for roads, streets, graveyards or other public uses, (Chapter 8, Section 4).

Land (Survey and Measurement) Act 1963
The Land (Survey Measurement) Act (LSMA) 1963 stipulates that land can be registered on the basis of an unofficial deed if it has been in the uninterrupted possession of an individual for 15 years (Section 6(5a)). This provision is only enforceable in the case of individual practice or possession.

Public Roads Act 1974
The Public Roads Act 1974 empowers the government to acquire any land for the construction, development and improvement of public roads, in accordance with prevailing law related to land acquisition (Section 4). Similar provisions are also made in the Water Resources Act 1992 and the Electricity Act 1992, as well as other development-related legislation.

7.1.4 Cultural and Religious Heritage Sites

Local Self Governance Act 1999
The Local Self Governance Act (LSGA) 1999 was enacted as part of Nepal's efforts to support decentralization[20]. Under this law, local government bodies including the DDCs and VDCs hold the right to manage specified natural resources.

[20] The Local Self-Governance Act 1999 (section 268(1)) repeals the Decentralisation Act 1982, District Development Committee Act 1991, Municipality Act 1991 and Village Development Committee Act 1991.

A VDC[21], whose members are elected by qualified voters in the village development area (Section 12), is an autonomous body (Section 13), and performs functions in a variety of areas including agriculture, rural drinking water, irrigation, river control, the prevention of soil erosion, health, tourism and cottage industry (Section 28). Under the rubric of 'forest and environment', VDCs are empowered to prepare and implement programs with regard to forests, vegetation, biodiversity, soil conservation, and environmental conservation in the village development area (section 28(h)). A VDC has "full title" over certain property situated within the village development area, including "public properties" not owned by an individual or by the government or a DDC, including public drainage and sewerage; roads and bridges; ponds, water spouts, taps, wells and ghats; temples, inns, houses; and grazing fields (Section 68(1)(b)). "Natural heritage" is also included in this list of assets (Section 68(1)(d)), as are "forests according to existing forest laws or handed over by His Majesty's Government" (Section 68(1)(c)). This provision concerning forests is often mistakenly taken to mean that all forest areas in a VDC are the property of that VDC when in fact it is specifically stated that only forests granted under existing law, or forests handed over by the government, become VDC property. The LSGA provides that a VDC is permitted to sell its assets (Section 58(c)), but only with the prior approval of the government (Section 68(2)).

VDCs may impose a variety of taxes and fees. These include land revenue or land tax, rent and tenancy tax, and a tax on "natural resources utilization" within the village development area (Ssection 55). It may impose service charges for drainage (Section 56) and collect various fees (Section 57). A VDC may also sell a variety of resources occurring in its area, including dried timber, fuel wood, twigs, branches, straw and grass from lands situated within its jurisdiction (Sections 58(d) and 58(e)), in addition to soil on "government barren land" located in the VDC area (Section 58(a)). A VDC is also permitted to sell "assets of the Village Development Committee" (Section 58(c)).

VDCs exercise certain judicial powers. A VDC is authorised to hear and settle at first instance cases relating to land boundaries, public land, canals, dams and ditches, the allocation of water, and encroachment on roads (Section 33(a)); disputes over the use of a river bank or the "security" of public property (Section 33(j)); and cases concerning pasture, grass and fuel wood within its area (Section 33(l)).

The DDC is an autonomous body (Section 177), with functions related to agriculture, land reform and land management, rural drinking water, irrigation, soil erosion, river control, health services, cottage industry, and tourism, among others (Section 189). It is also required to promote environmental conservation, and to develop and implement a plans to conserve soil, vegetation, forests and biological diversity (Section 189(1)(g)). A DDC has "title" over immovable property built or bought with funds allocated to it, and may not sell such property without the prior approval of the government (Section 231).

At the same time, however, the DDC may impose levies on a variety of services, resources and resource-based activities, including taxes on bridges, irrigation, herbs, stone, slate, sand, bone and horns (Section 215); service charges on ditches and embankments (Section 216); and licence fees for fishing (Section 217). The DDC may also sell sand from rivers and canals, stones, soil and driftwood in its area, but is required to pay 35–50 per cent of the proceeds so collected to the VDC concerned (Section 218).

7.1.5 Tourism

Ancient Monument Protection Act, 1956

Conservation of cultural heritage is mainly provided for by the Ancient Monuments Protection Act, 1956. The Act is one of the oldest pieces of legislation which is administered by the Department of Archaeology (DoA). It was promulgated with the explicit objective to "protect ancient monuments, restrict trade in archaeological objects as well as excavation in places where ancient monuments and archaeological and historical or artistic objects in order to maintain tranquillity and order"

[21] The VDC is the lowest tier of local government. At present, Nepal has 3,915 VDCs.

(Preamble). It provides a detailed definition of ancient monuments, which include any monument, building, temple, monastery, stupa of historical, artistic, scientific, or architectural importance which is more than 100 years old (Section 2 (a)). It empowers the government to declare any area or place where an ancient monument is located as a protected monument area (Section 3). Ancient monuments have been divided on the basis of their ownership into two categories namely private ancient property and public ancient property, and on the basis of importance into three categories: international, national and local (Section 3A).

Ownership of public ancient monuments has been vested on the Department of Archaeology and it is the duty of the DoA to protect, maintain and renovate public ancient monuments (Section 3B). Similarly, it is the duty of individual owner to protect, maintain and renovate private ancient monument located within protect ancient monument area (Section 3C (1)). If the private ancient property is located outside protected ancient monument area, the local authority or the individual owner is under the duty to protect, maintain and renovate private ancient property in accordance the directives of the DoA (Section 3C (3). The Act requires the Directors or trustees of religious temples of monasteries to invest up to 50 percent of the amount offered in such temples and monasteries for the protection of the temple or monastery and its environment (Section 3E). The government may purchase any ancient monuments for the purpose of ensuring its protection (Section 4). Further, the Act stipulates that any proposed developmental works which may impact upon heritage sites are to be done only pursuant to approval from the DoA, in accordance with prescribed designs and standards (Section 3(5)-(8)).

Chief District Officer is required to find out the archaeological items in her/his area and write to Principal Archaeological Officer with all the details for the conservation of such items. Ancient monuments and archaeological items located on private property may be confiscated by the government, without compensation, where the proprietor has allowed such items to fall into a state of disrepair (Section 7). In relation to moveable cultural property, the Act requires compulsory registration of private collections of archaeological objects when the objects are more than 100 years old. In addition, it prohibits the transfer and trade of such objects (Section 13(2)). The Act establishes an Ancient Monument Fund for the protection of ancient monuments of historical and artistic importance.

Tourism Act 1978

The main piece of legislation dealing with tourist activities is the Tourism Act of 1978. The object of this statute is to prescribe controls upon the operations of tourism industry, such as hotels, restaurants, and trekking industries. The only environmental code of conduct which has been provided by the Act is that a mountaineering expedition team is required to comply with the prescribed conditions in order not to pollute the environment at the time of mountaineering (Section 30(1)). In case, any loss or damage to the life of any person or governmental or non-governmental property is caused by reason of non-complying with the prescribed conditions mentioned above, the concerned mountaineering expedition team must pay the compensation as determined by Government of Nepal and if such team fails to pay them, the agency which has recommended such mountaineering expedition team must have to pay such compensation (Section 30 (2)). Similar, provision needs to be included for other tourism activities such as trekking and rafting. There is no reason to limit it to mountaineering expeditions only.

The Government of Nepal is empowered to take deposit as prescribed from mountaineering expedition teams of prescribed Himalayan peak for garbage management (Section 31 (1)). The Government is required to return the deposit so taken to the concerned mountaineering expedition team after such team deposits the prescribed goods in the place determined by the Government upon completion of such expedition (Section 31(2)). The deposit amount must be transferred to the government account if the concerned mountaineering expedition team does not deposit the goods in the determined place and such goods may be sent back to the concerned place (Section 31(2)). It would have been useful for cleaning the mess created by mountaineering team which does not manage the garbage as required by the Act, if it had clearly mentioned that the deposit amount from mountaineering team who do not bring the garbage back must be utilized in collecting and disposing of the garbage.

In case, a leader or any member of a mountaineering expedition team violates this Act, Rules framed hereunder or any matter prescribed in conditions of the permit for mountaineering, the Government has the authority to revoke permit issued under this Act at any time (Section 34(1)). If any special situation arises in order to revoke the permission for mountaineering issued under this Act, the Government may revoke such permission with or without showing reasons thereof at any time (Section 34(2)). It is surprising why this discretionary power of the government is only limited to mountaineering activities. Such powers should also be given to the government for regulating other kinds of tourism activities and enterprise for conservation of environment and biodiversity.

Nepal Tourism Board Act 1997

One of the objectives of Nepal Tourism Board is to develop, expand and promote tourism business while conserving and promoting natural and cultural heritage and environment of the country (Section 5 (b)). In line with the aforementioned objectives of the Board, powers and functions of the Board include:

- formulating and implementing necessary programs for infrastructure development, tourism service, facility expansion, human re source development, conservation of ecology of tourism sites and other programs in tourist destinations in order for establishment, improvement, development, extension, promotion and protection of tourism business (Section 6 (b));
- motivating private sector for showing country's religious and culturally important places/sites, high mountains and panoramic natural beauty to tourists by managing and effectively utilizing existing tourism related physical infrastructure (Section 6 (g));
- developing Nepal as an adventurous and attractive tourist destination and operating in various parts of Nepal recreational and adventurous tourism activities based on water, land and air without causing adverse effect on original culture and tradition and encouraging the private sector to carry out such adventurous tourism activities (Section 6 (h));
- encouraging participation of the local community in various activities related to protection of historically important places, temples and stupas (Section 6 (j));
- giving priority to strengthen tourism infrastructures and facilities for rural tourist destinations by developing new tourist destinations and motivating local community to run various rural tourism developments programs;
- in order for developing religious tourism, protecting and promoting religious pilgrimage places, expanding facilities and servicess in such places of religious and cultural importance to attract more tourists, and developing such places as international religious centers (Section 6 (m)).

The objectives and powers and functions of the Tourism Board would be useful for developing KSL area as a tourism center for cultural, natural, recreational and religious destinations which could contribute to conservation of biodiversity and poverty reduction in the area provided that the objectives and powers and functions of the Board are taken seriously by all the actors involved in tourism. As the Board is required to take both the private sector and local community along, it is very likely that their initiative will be successful in such areas. The Board has already made its presence felt in different parts of Nepal in promoting tourism.

7.1.6 Transboundary Movement of Animals/Diseases

Livestock Health and Livestock Services Act 1998

The Act defines livestock as any kind of domestic or wild animals and includes birds and fish. Livestock products includes meat, blood, fat, gall bladder, milk, egg, bone, skin, horns, hooves, feathers, wool, hair, embryo, sperm, gland, urine, faeces and any unprocessed commodity made from them (Section 2 (b)). The Government of Nepal is obliged to establish temporary or permanent quarantine check post in any area of Nepal by publishing a notification in Nepal Gazette (Section 3). On the one hand, Section 3 obliges the government to establish quarantine check posts in different

areas of Nepal, on the other it gives discretionary power by not specifying that such check posts must be established in at least 10 or 12 entry or exit points of Nepal.

Livestock, livestock products and livestock production equipment/inputs imported by importers must be kept in quarantine for certain period (Section 6 (1)). It is the duty of the importer to provide necessary feed, water and security for animals kept in quarantine post. Quarantine officer must issue an order to the importer for disposing of the animal after examination in case the animal kept dies during examination period in quarantine. The importer is not entitled to claim any compensation, in case an animal dies while in quarantine (Section 6 (4)). While importing animals, animal products and animal production equipment, the importer must import such things through quarantine check post (Section 9). The maximum fine for importing livestock, animal/livestock products and livestock production equipment/inputs from other areas is a maximum of Rs 25,000 and in case the livestock, animal/livestock products or livestock production equipment/inputs so imported are infected with contagious diseases the fine is double (Section 20 (1). The Government of Nepal may prohibit import of animals which are suffering from certain diseases.

Quarantine Officer may prohibit livestock, animal/livestock products and livestock production equipment/input imported by the importer from bringing into the country in following conditions:

a) there is epidemic of contagious disease in the place from where livestock, animal/livestock products or livestock production equipment.
b) importer is unable to furnish certificate stating that the livestock, animal/livestock products or livestock production equipment/inputs which s/he is about the import are free from contagious disease and certificate of health,
c) although certificates have been furnished as mentioned above, some animals are found dead due to contagious disease, and
d) the vehicle which has been used for carrying animals is found to be infected with contagious diseases (Section 11 (a) to (d).

Quarantine Officer is further empowered to order the importer to take livestock, animal/livestock products and livestock production equipment/inputs which have been prohibited in accordance with Section 11 above back to the country from where they were imported. If the Quarantine Officer finds that while keeping the livestock, animal/livestock products and livestock production equipment/inputs or while sending them back to the country from where they were imported, there is likelihood of spreading of contagious disease s/he may order the importer to dispose of or destroy such livestock, animal/livestock products and livestock production equipment/inputs.

The Act requires the person who wishes to establish an industry for biologics, fingerlings hatchery, chicks, animal feed, or meat processing to obtain a recommendation letter from prescribed agency for the same. Similarly, export or import of biologics, fingerlings, chicks, animal feed also requires a recommendation letter from prescribed agency.

7.1.7 Bilateral Agreements within the Region

There have been two recent agreements in the field of biodiversity conservation between Nepal and China, and between Nepal and India (DNPWC 2010). These two bilateral cooperation initiatives provide basis for regional landscape cooperation in the future.

The *Memorandum of Understanding on Cooperation in the Field of Forestry and Biodiversity Conservation* between Ministry of Forests and Soil Conservation, GoN, and the State Forestry Administration, People's Republic of China (PRC), signed on 3 June 2010, mentions commitment to implement the obligations of multilateral agreements and conventions to protect the environment and conserve biodiversity. Major areas of cooperation include formulating forestry policies and strategies, forest management and addressing adverse effects on forests, wildlife conservation including illegal hunting of animals and illegal trade of their body parts, scientific research, and public awareness.

Similarly, a resolution was signed between National Parks and Wildlife Conservation, and National Tiger Conservation Authority, Government of Nepal, and the Ministry of Environment and Forests,

GoI, on 29 July 2010, on transboundary conservation, as an outcome of the Fourth Nepal-India Consultative Meeting. The resolution focused on areas of, *inter alia*, conservation of endangered species including tiger, rhino and elephant, capacity building, joint monitoring arrangements, and cooperation on recognized priority landscapes.

7.1.8 Inconsistencies in the Statutory Regime

Inconsistencies in the statutory framework create loopholes which in turn create the potential for environmental injustice in the rural and natural resource context. The extent of the rights allocated by different laws to various user groups differs substantially (Table 3). Of the two types of users groups established under the Forest Act, only CFUGs are recognized as legal entities. Registered water user groups established under the Water Resources Act 1992 also are recognized as legal entities.

The LSGA empowers VDCs to sell specified natural resources and products, and stipulates that the proceeds of such sales are to be deposited to the VDC fund (Sections 58(d) and 58(e), while the Forest Act empowers CFUGs to sell the same products (Sections 2(c) and 25(1)). Religious forest user groups established under the Forest Act do not have the right to sell forest products, nor do user committees established under the National Parks and Wildlife Conservation Act 1973. While there may be overlaps in the membership of a VDC and a user group or committee, these contradictory provisions concerning rights to use natural resources create the potential for conflict between local government and user groups (Joshi 1997).

Table 7.1 Legal provisions governing natural resources

Resource	**Legal Provisions**			
	Equitable access	Participation in decision-making and management	Equitable benefit-sharing	Rights
Land	-	WRA	LA	LA
Timber	FA, WRA	FA, LSGA, WRA	FA	FA
Firewood	FA, WRA	FA, LSGA, WRA	FA	FA
NTFPs	FA, WRA	FA, LSGA, WRA	FA	FA
Grass/fodder	FA, WRA	FA, LSGA, WRA	FA, LSGA	FA
Drinking water	WRA	LSGA, WRA	WRA	WRA
Irrigation water	WRA	LSGA, WRA	WRA	WRA

FA = Forest Act 1993 LA = Lands Act 1964 LSGA = Local Self Governance Act 1999, WRA = Water Resources Act 1992; *Source*: Belbase and Thapa 2007.

Next step

Although Nepal's forestry and protected area legislation is considered as one of the best pieces of legislation, there is hardly any mention of transboundary landscape management. In spite of that, if any initiative is to be developed and implemented in KSL-Nepal, such initiative needs to take into account different pieces of legislation and policies which range from forestry to protected areas to seeds and tourism.

Periodic plans do provide for scientific management of forest and protected areas. As one of the strategies of the Interim Plan is to adopt scientific management system for conservation of biodiversity and genetic resources, it creates enabling policy environment for MFSC to promote transboundary landscape management which implies using an integrated approach in the management of extended landscapes, defined by ecosystems rather than boundaries, in which both conservation and sustainable use of components of biodiversity are considered. Thus it could be inferred that the most recent Interim Plan supports such transboundary landscape management. In 2002, the Nepal Biodiversity Strategy adopted the landscape planning approach to protect and manage biodiversity on a sustainable, long-term basis. Nepal favors such transboundary initiative for conservation and sustainable development goals. However, the various legislations reviewed above are silent about transboundary conservation initiative.

It would be useful to take the local bodies and indigenous and local communities along in the KSL Conservation Initiative as the success of such initiative would also depend upon involvement of local bodies and local communities. Therefore, the first priority should be to involve these actors and stakeholders in the KSL Conservation Initiative. As there are different user groups such as community forest user groups in the proposed KSL area, it would be important to get their confidence and support. The more they are informed, consulted and involved in the Initiative, the less there will be chances for hindrances during development of the Regional Cooperation Framework and its implementation.

As China, India and Nepal have their own different legal system, and also to err on the side of caution, it would be useful to first go for non-legally binding policy instrument which could be easily adopted by all three countries. As the countries start implementing the different components of the Initiative, they may prefer to develop a legally binding instrument. There might be more reception and cooperation from these country's governments for an informal Regional Cooperation Framework. Some of the components could be later incorporated by individual countries in the selected policies and plans.

There has been widespread appreciation and support for conservation area designated in accordance with the National Parks and Wildlife Conservation Act. It could be one of the most viable management options for KSL Conservation Initiative.

As MFSC has in the past launched and provided legal basis for innovative model of forest and protected area management – community forestry, leasehold forestry, conservation area and buffer zone management- it again needs to take lead in transboundary landscape management for KSL.

8. Needs Assessment Framework

This chapter draws upon information in previous chapters of the report. A needs assessment of the thematic areas has been made which is followed by objectives/activities and means of implementation with the aim to meet conservation and sustainable development goals (Table 8.1). The assessment serves as a guiding framework for development of a Regional Conservation Framework. The focal/thematic areas of KSL-Nepal are guided by international conservation agreements including the Convention on Biological Diversity, Millennium Development Goals, and UNFCCC agreements on adaptation and mitigation.

Table 8.1 Framework of needs assessment and means of implementation

Focal areas/Objectives	Means of Implementation	Target Area
Focal area: Biodiversity		
Promote conservation of biodiversity, ecosystems, habitats and biomes	• Incorporate provisions of biodiversity conservation in district plan of all districts	All districts
	• Effectively manage protected areas including recently declared Api-Nampa Conservation Area	Bajhang, Rara and Darchula
	• Prepare Khaptad Daha for declaration of Ramsar Site	Khaptad NP
	• Conserve important plant and bird areas	All districts
	• Manage important biological corridors	All districts including Karnali and Mahakali Rivers
Promote conservation and documentation of species diversity	• Implement actions plans and improve population of threatened fauna (including snow leopard, musk deer, etc.) and flora (including medicinal plant species)	All districts
	• Exploration and documentation of flora and fauna	All districts
Promote conservation of crop genetic diversity	• Effectively implement conservation of traditional crop varieties	All districts
	• Develop community gene bank	Humla
Promote sustainable use and consumption	• Regulate and monitor forest products through community participation	All districts
	• Implement forest certification mechanism in community forests for major NTFPs	All districts
Control potential invasive alien species (IAS)	• Develop general methodology to monitor and control IAS	Baitadi and lower altitudes
Improve and maintain ecosystem services	• Maintain diverse ecosystems (forest, rangelands, wetlands) to deliver goods and services for food security	All districts
Focal area: Socio-economy and Poverty		
Develop basic infrastructure and services in environment-friendly manner	• Integrate all construction activities, road, building, and industry following environment guidelines	All districts
	• Maintain urbanization and settlement growth in harmony with social, environmental and cultural integrity	All districts
	• Promote development of renewable energy resources	All districts
	• Improve access to potable water and sanitation	All districts
	• Manage solid waste and other types of pollution	All districts
Improve socio-economic conditions of local residents	• Develop sustainable plan for food security	All districts with focus on Humla
	• Improve access to livelihood options	All districts
	• Promote sustainable harvesting of wild species	All districts
	• Promote productivity of crops	All districts
	• Regulate trade in sustainable manner	All districts
	• Establish plant based industries for processing	All districts
Focal area: Cultural identity and Traditional Knowledge		
Protect and promote cultural identity of KSL-Nepal	• Support religious, cultural and community institutions	All districts with focus on Humla and Darchula
	• Phase-wise restoration and management of important historical, cultural and religious monuments	
Protect traditional knowledge	• Document traditional knowledge and ensure IPRs through *sui generis* IPR system	All districts

Focal area: Tourism		
Promote sustainable tourism	• Identify and develop trekking routes • Build infrastructure and encourage local-private sector and community groups to invest • Improve awareness • Monitor changes in society, economy, and environment	All districts with focus on Humla and all protected areas
Focal area: Capacity Building		
Build capacity of local organizations and partners	• Improve coordination and monitoring capacity among all government and non-government organizations in district • Integrate NGOs and other organizations • Support NGOs that are working in remote areas in the district	All districts
Focal area: Climate Change		
Maintain and enhance resilience of components of biodiversity to adapt to climate change	• Initiate climate change research and monitoring with focus on impacts on the livelihoods of communities, and glacier changes	All districts with focus on high altitudes
Focal area: Pollution		
Reduce pollution	• Establish baseline information to monitor different types of pollution	All districts with focus on rivers
Focal area: Capacity Building		
Improve financial, human, technical and technological capacity	• Ensure financial, human, technical and technological resources by coordinating all stakeholders working at various levels	All districts

Way Forward

Conservation and sustainable development of the KSL-Nepal region needs implementation of programs at different levels.

Global Level

- Nepal has to purposefully improve financial, human, scientific, technical and technological capacity to implement Kailash Sacred Landscape Conservation Initiative in KSL-Nepal with the help of global assistance.

Regional Level

- Further regional collaboration with respect to conservation and sustainable development is essential to resolve transboundary issues.
- A regional level approach should be undertaken to study the impact of climate change on biological resources, livelihoods, cultural integrity, and environmental issues related to upward-downward ecosystem services.

National Level

- Landscape level planning and monitoring should be strongly implemented for conservation and sustainable development.

Local Level

- It is essential to build the capacity of local institutions and involve community participation for successful implementation of the program.

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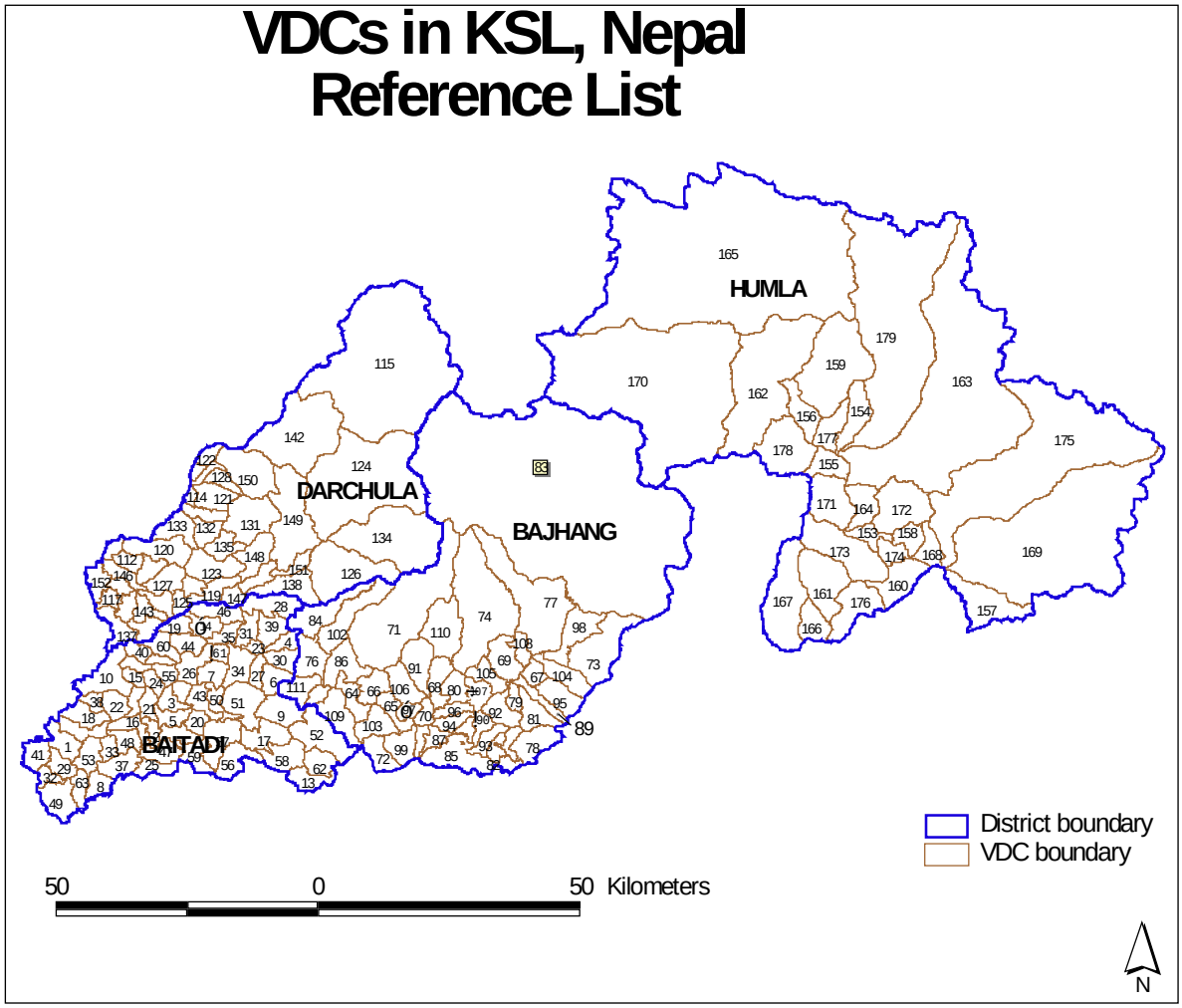
Annexes



Annex 1a VDCs in KSL Nepal

Annex 1b VDC identification

District	VDC/municipality	Reference Number	District	VDC/municipality	Reference Number
Baitadi	Amchaur	1	Baitadi	Shankarpur	50
Baitadi	Basantapur	2	Baitadi	Shikharpur	51
Baitadi	Basulinga	3	Baitadi	Shivalinga	52
Baitadi	Bhatana	4	Baitadi	Shivanath	53
Baitadi	Bhumeshwar	5	Baitadi	Shree Kedar	54
Baitadi	Bhumiraj	6	Baitadi	Shrikot	55
Baitadi	Bijayapur	7	Baitadi	Siddhapur	56
Baitadi	Bishalpur	8	Baitadi	Siddheshwar	57
Baitadi	Chaukham	9	Baitadi	Sigas	58
Baitadi	Dasharathchand Municipality	10	Baitadi	Silanga	59
Baitadi	Dehimandaun	11	Baitadi	Sitad	60
Baitadi	Deulek	12	Baitadi	Talladehi	61
Baitadi	Dhungad	13	Baitadi	Thalakanda	62
Baitadi	Dilasaini	14	Baitadi	Udayadev	63
Baitadi	Durgabhawani	15	Bajhang	Banjh	64
Baitadi	Durgasthan	16	Bajhang	Bhairavnath	65
Baitadi	Gajari	17	Bajhang	Bhamchaur	66
Baitadi	Giregada	18	Bajhang	Bhatekhola	67
Baitadi	Gokuleshwar	19	Bajhang	Byasi	68
Baitadi	Gujar	20	Bajhang	Chainpur	69
Baitadi	Gurukhola	21	Bajhang	Chaudhari	70
Baitadi	Gwalek	22	Bajhang	Dahabagar	71
Baitadi	Hat	23	Bajhang	Dangaji	72
Baitadi	Hatairaj	24	Bajhang	Datola	73
Baitadi	Kailpal	25	Bajhang	Daulichaur	74
Baitadi	Kataujpani	26	Bajhang	Deulek	75
Baitadi	Kotila	27	Bajhang	Deulikot	76
Baitadi	Kotpetara	28	Bajhang	Dhamena	77
Baitadi	Kulaun	29	Bajhang	Gadaraya	78
Baitadi	Kuwakot	30	Bajhang	Hemantawada	79
Baitadi	Mahadevsthan	31	Bajhang	Kadel	80
Baitadi	Mahakali	32	Bajhang	Kailash	81
Baitadi	Maharudra	33	Bajhang	Kalukheti	82
Baitadi	Malladehi	34	Bajhang	Kanda	83
Baitadi	Mathairaj	35	Bajhang	Kaphalseri	84
Baitadi	Mauneli	36	Bajhang	Khaptad National Park	85
Baitadi	Melauli	37	Bajhang	Khiratadi	86
Baitadi	Nagarjun	38	Bajhang	Koiralakot	87
Baitadi	Nwadeu	39	Bajhang	Kotbhairab	88
Baitadi	Nwali	40	Bajhang	Kotdewal	89
Baitadi	Pancheshwar	41	Bajhang	Lamatola	90
Baitadi	Patan	42	Bajhang	Lekgaun	91
Baitadi	Rauleshwar	43	Bajhang	Luyata	92
Baitadi	Rim	44	Bajhang	Majhigaun	93
Baitadi	Rodidewal	45	Bajhang	Malumela	94
Baitadi	Rudreshwar	46	Bajhang	Mastadev	95
Baitadi	Sakar	47	Bajhang	Matela	96
Baitadi	Salena	48	Bajhang	Maulali	97
Baitadi	Sarmali	49	Bajhang	Melbisauni	98

District	VDC/municipality	Reference Number	District	VDC/municipality	Reference Number
Bajhang	Parakatne	99	Darchula	Pipalchauri	140
Bajhang	Patadebal	100	Darchula	Ranishikhar	141
Bajhang	Pauwagadhi	101	Darchula	Rapla	142
Bajhang	Pipalkot	102	Darchula	Riththa Chaupata	143
Bajhang	Rayal	103	Darchula	Sarmauli	144
Bajhang	Rilu	104	Darchula	Seri	145
Bajhang	Rithapata	105	Darchula	Shankarpur	146
Bajhang	Senpasela	106	Darchula	Shikhar	147
Bajhang	Subeda	107	Darchula	Sipti	148
Bajhang	Sunikot	108	Darchula	Sitaula	149
Bajhang	Sunkuda	109	Darchula	Sunsera	150
Bajhang	Surma	110	Darchula	Tapoban	151
Bajhang	Syadi	111	Darchaula	Uku	152
Darchula	Bhagawati	112	Humla	Baraigaun	153
Darchula	Boharigaun	113	Humla	Bargaun	154
Darchula	Bramhadev	114	Humla	Chhipra	155
Darchula	Byas	115	Humla	Dandaphaya	156
Darchula	Chhapari	116	Humla	Darma	157
Darchula	Dandakot	117	Humla	Gothi	158
Darchula	Dattu	118	Humla	Hepka	159
Darchula	Dethala	119	Humla	Jair	160
Darchula	Dhap	120	Humla	Kalika	161
Darchula	Dhari	121	Humla	Khagalgaun	162
Darchula	Dhaulakot	122	Humla	Kharpunath	163
Darchula	Dhuligada	123	Humla	Lali	164
Darchula	Ghunsa	124	Humla	Limi	165
Darchula	Gokuleshwar	125	Humla	Madana	166
Darchula	Guljar	126	Humla	Maila	167
Darchula	Gwani	127	Humla	Melchham	168
Darchula	Hikila	128	Humla	Mimi	169
Darchula	Hunainath	129	Humla	Muchu	170
Darchula	Huti	130	Humla	Raya	171
Darchula	Iyarkot	131	Humla	Rodikot	172
Darchula	Katai	132	Humla	Sarkideu	173
Darchula	Khalanga	133	Humla	Saya	174
Darchula	Khandeshwari	134	Humla	Shrimasta	175
Darchula	Khar	135	Humla	Shrinagar	176
Darchula	Kharkanda	136	Humla	Simikot	177
Darchula	Lali	137	Humla	Syada	178
Darchula	Latinath	138	Humla	Thehe	179
Darchula	Malikarjun	139			

Annex 2. Breeds and productivity of animal species

SN	Animal species	Animal categories		Production level Milk, meat, fiber		Production zone
		Local	Improved	Local	Improved	
1	Cattle					
		Khaila	Jersey cross	Milk: 2.5 l/d	1631 l/lac	High hills
		Pahadi	Jersey cross	4.5 l/d	1631 l/lac	High hills
2	Buffalo					
		Gaddi	Murrah	Milk:		High hills
		Lime	M x L	Milk:	Milk:	High hills
3	Yak, chauri	Yak	-	Milk: 720 l /lac Fiber: 0.3 kg/yr (fine)	-	Mountain
		Chauri	-	Milk:1495 l/ lac Fiber: 2-3 kg coarse/yr	-	Mountain
4	Goats					
		Khari	K x Jam	Milk 0.25 l/d Meat* 18 kg at 18 month age		hills
		Sinhal		Meat:*		High hills
		Chyangra		Pashmina: 0.25 kg Meat:* 18 kg at 18 month age		Mountain
5	Sheep					
		Baruwal	Br x Polw	Wool:0.8 kg Meat:	Wool: 1.5 kg	Hills, mountain
		Bhyanglung	-	Wool:1.4 kg Meat: 18 kg at 18 month age		Mountain
6	Pig	Local		Meat		Hills, mountain
7	Poultry	Shakhini		Meat:0.8 dress meat kg/bird Eggs: 16/280d		Hills & mountain
8	Horse, Donkey	Local		Power: 80 kg/trip		Mountain

Annex 3 Botanical explorations in KSL-Nepal (Humla, Bajhang, Darchula and Baitadi districts) from 1952 to 2009

Year	Collectors	Areas
1952	O. Polunin, W. R. Sykes & L. H. J. Williams	Humla
1965	J. D. A. Stainton	Bajhang
1965	T. B. Shrestha	Bajhang
1968	S. B. Malla	Humla
1972	M. S. Bista & D. P. Joshi	Baitadi
1973	J. F. Dobremez	Bajhang
1976	H. Tabata, K. R. Rajbhandari and K. Tsuchiya	Bajhang
1979	K. R. Rajbhandari & B. Roy	Humla
1980	K. R. Rajbhandari & K. J. Malla	Baitadi, Darchula
1981	P. R. Shakya, L. R. Sharma & K. R. Amatya	Bajhang
1981	S. B. Malla & H. K. Saiju	Baitadi
1981	I. Sharma, R. Joshi, R. Uprety & I. Pandey	Baitadi
1982	M. M. Amatya & P. M. Regmi	Darchula
1982	L. P. Kattel	Bajhang
1983	H. Tabata, D. P. Joshi, K. Tsuchiya, N. Fujita, E. Suzuki, Y. Shimizu, F. Koike, M. Matsui & T. Yumoto	Humla
1984	P. Pradhan, R. K. Uprety, N. Pradhan & N. Dabadi	Bajhang
1984	P. R. Shakya, M. K. Adhikari & M. N. Subedi	Baitadi, Bajhang
1985	P. R. Shakya, M. N. Subedi & R. Uprety	Humla
1990	N. K. Bhattarai	Bajhang
1991	K. R. Rajbhandari	Bajhang
1991	M. Suzuki, H. Hatta, N. Kurosaki, M. Mikage, F. Miyamoto, K. R. Rajbhandari, H. Takayama & K. Terada	Bajhang
2008	C. A. Pendry, S. R. Baral, S. Noshiro, S. Rajbhandari, P. P. Kurmi, B. Dell & B. Adhikari	Humla
2009	H. Ikeda, C. Pendry, A. P. Bhattarai, G. D. Bhatt, S. Noshiro, M. Amano, T. Tanaka, Y. J. Wang, B. I. Dell & N. Yamamoto	Bajhang

Annex 4. Endemic Plants in Kailash Sacred Landscape - Nepal (Shrestha & Watson 2008, unpubl.)

SN	Latin name	Family	Elevation ranges m	Bai	Baj	Dar	Hum	Other districts	Vouchers
1.	**Delphinium himalayai** Munz	Ranunculaceae	2400-4500		+			Jum, Dol, Mug, Mus, Mya, Kas, Ras	PSW 264 (BM) Doutful
2.	**Draba poluniana** Al-Shehbaz	Brassicaceae	Ca. 3800				+		PSW 4247 (TI, BM)
3.	**Eskemukerjea megacarpum** (Malick & Sengupta) Hara	Polygonaceae	Ca. 2800				+		
4.	**Galium saipalense** Ehrend. & Schonb.-Tem.	Rubiaceae	Ca. 4700m		+				JEM Arnold 124 (BM!)
5.	**Lomatogonium graciliflorum** H. Sm.	Gentianaceae	3000-4500		+			Ruk, Mus, Man, Bag, Ram, San	JEM Arnold 325B (BM)
6.	**Meconopsis simikotensis** Grey-Wilson	Papaveraceae	3500-4000				+		SSW 4270 (BM)
7.	**Noccaea nepalensis** Al-Shehbaz	Brassicaceae	Ca. 3200				+		PSW 4199 (BM, E)
8.	**Oreocome depauperata** Pimenov & Kljuykov	Apiaceae	1700-3500				+	Ras	Shakya, Subedi & Uprety 8701 (KATH).
9.	**Ranunculus himalaicus** Tamura	Ranunculaceae	Ca. 4600				+	E. Nepal	PSW 257 (BM).
10.	**Rhodiola himalensis** (D. Don) S.H. Fu subsp. **bouvieri** (Raym.-Hamet) H. Ohba	Crassulaceae	3600-3900			+		Dol, Man, Mug, Mus, Bag, Ram, San	JF Duthie 5565 (DD, BM, K).
11.	**Scrophularia laportiifolia** T. Yamaz.	Scrophulariaceae	2700-2900			+			Stainton 4928 (BM, BM).
12.	**Taraxacum nepalense** Soest	Asteraceae	2700-3400	+					Bis Ram 505 (BM).
13.	**Vicatia nepalensis** Kljuykov	Apiaceae	Ca. 2800			+			JDA Stainton 4929 (BM).

KSL- Nepal districts: Bai= Baitadi, Baj = Bajhang, Dar = Darchula, and Hum = Humla.
Other districts of occurrence:
Bag = Baglung, Baju = Bajura, Dol = Dolpa, Jum = Jumla, Kas = Kaski, Man = Manang, Mug = Mugu district, Mus = Mustang, Mya = Myagdi, Ram = Ramechhap, Ras = Rasuwa, San = Sankhuwasabha, and Tap = Taplejung district

Annex 5. Enumeration of the Flowering (and non-flowering) plants in Kailash Sacred Landscape/Nepal (with emphasis on Humla district)

Family	Species	Locality	Elevation	Habit	Local Name	Use value
FUNGI						
Ophiocordycipitaceae	Ophiocordyceps sinensis (Berk.) G.H. Sung et al.	Near Saipal (Khagalgaun VDC), Humla	4000-4500	Herb	Yarsagumba	Plant: medicinal
Morchellaceae	Morchella conica (L.) Pers.	Mekhala, Tugling, Humla	3500-3900	Herb	Guchchi chyau	Edible mushroom
PTERIDOPHYTES (FERNS)						
Adiantaceae	Adiantum sp.	Dandafaya, Humla	2900	Herb		
Adiantaceae	Adiantum sp.	Near Jabkung, Humla	3200	Herb		
Athyriaceae	Diplazium stoliczae	Mekhala, Humla		Herb	Kalo neuro	Vegetable
Dryopteridaceae	Dryopteris barbigera	Humla		Herb		
Dryopteridaceae	Dryopteris cochleata (D. Don) C. Chr.	Humla		Herb		
Dryopteridaceae	Dryopteris sp. 1	Salli Khola to Kermi, Humla	2950	Herb		
Dryopteridaceae	Dryopteris sp. 2	Salli Khola to Yablang, Humla	2800	Herb	Talakpa	roofing material
Ophioglossaceae	Ophioglossum sp.	Lower Jabkung, Humla	3000	Herb		
Polypodiaceae	Lepisorus sp	Upper Jabkung, Humla	3300	Herb		
GYMNOSPERMS						
Cupressaceae	Cupressus torulosa D. Don	Sunchera, Darchula	1800	Tree	Dhupi	
Cupressaceae	Juniperus indica Bertol.	Yari to Khagalgaun, Humla	2400-4000	Tree	Sukpa (K)	Firewood, incense
Cupressaceae	Juniperus pseudosabina Fisch. & Mey.	Dipukang - Api, Darchula	3200	Shrub	Dhupi	
Ephedraceae	Ephedra gerardiana Wall. ex Stapf	Muchu, Humla; Naya Odar, Bajhang	2900-3200	Shrub	Somlata	
Pinaceae	Abies spectabilis (D. Don) Mirb.	Salle khola, Humla	2800-3200	Tree	Thinge salla (N)	firewood, timber
Pinaceae	Abies pindrow Royle	Manal, Humla	2700	Tree		
Pinaceae	Cedrus deodara (Roxb. ex D. Don) G. Don	Chipra, Humla	2100	Tree		
Pinaceae	Picea smithiana (Wall.) Boiss.	Chipra, Humla	2300-3600	Tree		
Pinaceae	Pinus involucrata Wall.	Dhansera - Nilkatti, Bajhang	4090	Tree		
Pinaceae	Pinus macrophylla D. Don	Mechhra - Kalagad, Darchula	4020	Tree		
Pinaceae	Pinus petiolaris Wall.	Chainpur, Bajhang	3100	Tree		
Pinaceae	Pinus roxburghii Sarg.	Humla	1100-2100	Tree		
Pinaceae	Pinus wallichiana A.B. Jackson	Yari, Humla	2500-3500	Tree	Thansing (K)	Timber
Pinaceae	Taxus wallichiana Zucc.	Dandafaya, Humla	3100-3200	Tree	Lauth Salla	
Taxaceae	Tsuga dumosa (D. Don) Eichler	Humla	2100-3600	Tree		
ANGIOSPERMS (DICOTS)						
Acanthaceae	Goldfussia capitata Ness.	Sunchera, Darchula	1800			
Acanthaceae	Justicia adhatoda L.	Mekhala, Mimi VDC, Humla	500-1600	Shrub	Asuro	Ritual
Aceraceae	Acer acuminatum Wall. ex D.Don	Khaptad, Bajhang	2200-3200	Tree		
Aceraceae	Acer caesium Wall. ex Brandis	Yangar, Humla	2900	Tree	Tilailo	making FURU (wooden bowl)

Aceraceae	Acer cappadocicum Gled.	Jabkung, Humla	3100	Tree		
Aceraceae	Acer caudatum Wall.	Khaptad, Bajhang	3000-4000	Tree		
Aceraceae	A. oblongum Wall. ex DC.	Chainpur, Bajhang	1200	Tree	Firfire	
Aceraceae	Acer pectinatum Wall.	Khaptad, Bajhang	2700-3800	Tree		
Aceraceae	A. sterculiaceum Wall.	Bajhang	2600	Tree		
Amaranthaceae	Achyranthes aspera L.	Upper Dojam; Pujarigaon, Bajhang	2700-2900	Herb	Apamarg	
Amaranthaceae	A. bidentata Bl.	Khaptad - Lokhada, Bajhang	2400	Herb	Datiwan	
Amaranthaceae	Amranthus caudatus L.	Mekhala, Humla	1000-2300	Herb	Rato Latte	Vegetable
Amaranthaceae	A. spinosus L.	Khalanga, Darchula	840	Herb	Van lude	
Amaranthaceae	Cyathula capitata Moq.	Kermi, Humla	2700	Herb		
Amaranthaceae	Cyathula tomentosa (Roth) Moq	Niglad, Baitadi	1720	Herb	Kapase kuro	
Anacardiaceae	Mangifera indica L.	Mekhala, Humla	300-700	Tree	Amp	Ritual
Anacardiaceae	Pistasia chinensis Bunge subsp. integerrima (J.L. Stewart) Rech. f.	Humla	2100	Tree		
Anacardiaceae	Rhus javanica L.	Humla	1300-2400	Tree		
Apiaceae	Chaerophyllum reflexum Lindl.	Kande - Dhalaune, Bajhang	2400	Herb		
Apiaceae	Heracleum candicans Wall.	Near Jabkung, Humla	3200	Herb		
Apiaceae	Heracleum sp.	Near Dandafaya, Humla	2700	Herb	Chhetare	fodder
Apiaceae	Oreocome depauperata Pimenov & Kljuykov	Humla	1700-3500	Herb		Endemic to Nepal
Apiaceae	Pleurospermum benthamii (DC.) C.B. Clarke	Humla	3500-4000	Herb		
Apiaceae	Pleurospermum dentatum (DC.) C.B. Clarke	Mekhala, Humla	3200-4500	Herb	Gannaino	Pickle
Apiaceae	Sanicula elata Buch.-Ham. ex D. Don	Thin, Darchula	2390			
Apiaceae	Selinum candoilei DC.	Humla	3000-3800	Herb		
Apiaceae	Selinum wallichianum (DC.) Raizada & Saxena	Mekhala, Humla	3600-4200	Herb		
Apiaceae	Vicatia coniifolia DC.	Chankheli Lekh, Humla	3350			
Apiaceae	Vicatia nepalensis Kljuykov	Darchula	2800	Herb		Endemic to Nepal
Aquifoliaceae	Ilex dipyrena Wall.	Humla; opakhe - Thin, Darchula	2300	Tree	Seto Kharsu	
Araliaceae	Hedera nepalensis K.Koch.	Chipra, Humla	2200	Climber		
Araliaceae	Panax pseudo-ginseng Wall.	Humla	2100-2500	Shrub		
Asclepiadaceae	Asclepias curassavica L.	Satbanjh, Baitadi	1900		Khorsani phool	
Asclepiadaceae	Cryptolepis buchananii Roem. & Schult.	Chainpur, Bajhang	2000			
Asclepiadaceae	Cynanchum auriculatum Royle ex Wight	Humla	2000-3700	Climber		
Asclepiadaceae	Cynanchum canescens (Willd.) K. Schum.	Humla		Herb		
Asclepiadaceae	Vincetoxicum hirudinaria Medicus	Upper Jabkung, Humla	3400	Herb		
Asteraceae	Adenocaulon himalaicum Edgew.	Sat Thaple - Remi, Humla	3200	Herb		

Asteraceae	Anaphalis busua (D. Don) DC.	Chankheli - Rimi, Humla	3100	Herb		
Asteraceae	Anaphalis contorta (D.Don) Hook.f.	Yari-Muchu, Humla	3400	Herb		
Asteraceae	Anaphalis margaritacea (L.) Benth.	Mechhra, Darchula	3600	Herb		
Asteraceae	Anaphalis monocephala DC.	Upper Jabkung, Herb	3300	Herb		
Asteraceae	Anaphalis royleana DC.	Tapaun - Dhansera, Bajhang	4020	Herb		
Asteraceae	Anaphalis triplinervis (Sims) C.B. Clarke	Lower Dojam; Thin, Darchula	2300-2900	Herb	Phosrosan	
Asteraceae	Anaphalis triplinervis var. Intermedia (DC.) Airy Shaw	Near Saipal, Bajhang	3939	Herb		
Asteraceae	Anaphalis triplinervis var. Monocephala (DC.) Airy Shaw	Kariganga - Aletsoura, Bajhang	4090	Herb		
Asteraceae	Artemisia dubia Wall. ex Besser	Muchu; Dhansera, Bajhang	2950-3100	Herb	Titepati	
Asteraceae	Artemisia gmelinii Weber ex. Stechm.	Khagalgaun, Humla ; ThinDandap, Darchula	2500-3900	Herb	Pasan	
Asteraceae	Artemisia indica Willd.	Mekhala, Mimi VDC	300-2400	Herb	Titepati	Ritual
Asteraceae	Anaphalis roxburghiana Wall. ex Besser	Munya Lagna - Palsa, Humla	3200	Herb		
Asteraceae	Artemisia sieversiana Willd.	Humla	2100-4300	Herb	Damana	
Asteraceae	Aster albescens (DC.) Hand.-Mazz.	Dandafaya, Humla; Dhuli - Inuldar, Bajhang	2500-3500	Herb		
Asteraceae	Aster falconeri ssp. Nepalensis Grierson	Dubai pass - Sunigad, Bajhang	4100	Herb		
Asteraceae	Aster flaccidus Bunge	Dandafaya, Humla	2900	Herb		
Asteraceae	Aster peduncularis ssp. Nepalensis Grierson	Ripa - Sunakhada, Humla	2000	Herb		
Asteraceae	Aster stracheyi Hook. f.	Nilkatti - Naya Odar, Bajhang	3850	Herb		
Asteraceae	Bidens bipinnata L.	Niglad, Baitadi	1720	Herb	Kurro	
Asteraceae	Bidens pilosa L.	Niglad - Chirkitte, Baitadi	1720-1910	Herb	Kalo kurro	
Asteraceae	Carpesium nepalense Less.	Chheti - Mechhra, Darchula	2840	Herb	Padke Ghans	
Asteraceae	Cicerbita cynea (D. Don) Beauv.	Dhansera - Nilkatti, Bajhang	3780	Herb		
Asteraceae	Cicerbita macrorhiza (Royle) Beauv.	Upper Jabkung, Humla	2900-3400	Herb		
Asteraceae	Cirsium wallichii DC.	Khaptad, Bajhang	1400-3500	Herb		
Asteraceae	Cirsium sp.	Hilsa, Humla	3900	Herb		
Asteraceae	Crassocephalum crepidioides (Benth.) S. Moore	Sailek, Baitadi	1700		Anikale Jhar	
Asteraceae	Cremanthodium arnicoides (DC. ex Royle) R. Good	Dubai pass - Sunigad, Bajhang	4080	Herb		
Asteraceae	Cremanthodium ellisii (Hook.f.) Kitam.	Upper Seding, Humla	3600	Herb		
Asteraceae	Cremanthodium sp.	Upper Seding, Humla	3900	Herb		
Asteraceae	Crepis sp.	Dharapori, Humla	2400	Herb		
Asteraceae	Doronicum roylei DC.	Chheti - Mechhra, Darchula	3120			
Asteraceae	Echinops niveus Wall. ex Royle	Dadeldhura - Silinga, Baitadi	1500-1700			
Asteraceae	Erigeron bellidioides (Buch.-Ham. ex	Khaptad, Bajhang	1400-4300	Herb		

	D.Don) Benth. ex C.B. Clarke					
Asteraceae	Erigeron karvinskianus DC.	Chir, Bajhang	1100	Herb		
Asteraceae	Erigeron karvinskianus var. Mucronatus (DC.) Asch.	Baitadi	1500	Herb		
Asteraceae	Galinsoga parviflora Cav.	Darma - Sali Salla, Humla	2270		Chitlange jhar	
Asteraceae	Gerbera nivea Sch.-Bip	Humla; Kuntisau, Darchula	2800-4500	Herb	Panda	
Asteraceae	Gnaphalium affine D. Don	Baaskatne - Dilbagar, Bajhang	1160	Herb	Bokre phool	
Asteraceae	Gnaphalium hypoleucum DC.	Chhangru, Darchula	2900	Herb		
Asteraceae	Gnaphalium luteo-album L.	Dandafaya, Humla	2900	Herb		
Asteraceae	Inula cappa (Buch.-Ham. ex D. Don) DC.	Humla	150-2500	Herb		
Asteraceae	Jurinea dolomiaea Boiss.	Humla	3200-4300	Herb		
Asteraceae	Leontopodium himalayanum DC.	Mechhra - Kalagad, Darchula	3900	Herb		
Asteraceae	Ligularia fischeri (Ledeb.) Turcz.	Chheti - Mechhra, Darchula	2200-4600	Herb		
Asteraceae	Ligularia sp.	Humla		Herb		
Asteraceae	Myriactis nepalensis Less.	Dopakhe, Darchula	2200			
Asteraceae	Saussurea gossipiphora D. Don	Mechhra - Kalagad, Darchula	4140	Herb	Kapase Phool	
Asteraceae	Saussurea graminifolia Wall. ex DC.	Dhansera - Nilkatti, Bajhang	4100	Herb		
Asteraceae	Saussurea obvallata (DC.) Sch.Bip	Mechhra - Kalagad, Darchula	4080	Herb		
Asteraceae	Saussurea roylei (DC.) Sch.Bip	Gurel Lekh, Bajhang	3350	Herb		
Asteraceae	Saussurea uniflora Wall. ex Sch.Bip.	Dhansera - Nilkatti, Bajhang	3900	Herb		
Asteraceae	Saussurea sp.	Humla		Herb		
Asteraceae	Senecio chrysanthemoides DC.	Chauganfaya; Kuntisau, Darchula	2500	Herb		
Asteraceae	Senecio graciliflorus DC.	Nilkatti - Naya Odar, Bajhang	3450			
Asteraceae	Siegesbeckia orientalis L.	Gogan - Niglad, Baitadi	1420-1720			
Asteraceae	Soroseris sp	Tugling, Humla	3400	Herb		
Asteraceae	Tanacetum dolichophyllum (Kitam.) Kitam.	Upper Seding; Ghodilekh, Bajhang	3900-4000	Herb		
Asteraceae	Taraxacum nepalense Soest	Baitadi	2700-3400	Herb		Endemic to Nepal
Asteraceae	Taraxacum officinale F.H. Wigg.	Salle khola, Simkot	2600-2900	Herb	Gobejhar	
Asteraceae	Taraxacum tibetanum Hand.-Mazz.	Nara Pass, Humla	3900	Herb		
Asteraceae	Vernonia cinerea (L.) Less.	Khateda - Patan, Baitadi	1880-1200	Herb	Jhurjhure	
Asteraceae	Waldheimia glabra (Decne.) Regel	Surma Sarovar, Bajhang	4150			
Balsaminaceae	Impatiens sulcata Wall.	Humla	1700-4100	Herb		
Berberidaceae	Berberis aristata DC.	Yablang, Chipra, humla	2200-2800	Shrub	Chutro	
Berberidaceae	Berberis asiatica Roxb. ex DC.	Muchu, Chipra, Humla	2200-2900	Shrub		
Berberidaceae	Berberis chitria Lindl.	Kermi, Humla	2650	Shrub	Tilkhuro	
Berberidaceae	Berberis erythroclada Ahrendt	Yari, Humla	3800	Shrub		
Berberidaceae	B. glaucocarpa Stapf	Lipra Khola, Humla	2880	Shrub		

Berberidaceae	Berberis lycium Royle	Way from They to Chipra, Humla	2700	Shrub		
Berberidaceae	Berberis ulcina Hook.f. et Thomson	Dandafaya, Kalaune - Laune, Bajhang	2500-2800	Shrub		
Berberidaceae	Podophyllum hexandrum Royle	Near Saipal	3000-3500	Herb	Laghupatra	Fruit: medicinal
Betulaceae	Alnus nepalensis D.Don	Salli Khola, near Chipra; Satbanjh, Baitadi	1900-2800	Tree	Utis	firewood
Betulaceae	Betula alnoides Buch.-Ham. ex D. Don	Chainpur, Bajhang	2400	Tree	Saur	
Betulaceae	Betula utilis D. Don	Near Seding, Humla; Tinkar - Tipulchyakti, Darchula	3000-3700	Tree	Bhuj	
Betulaceae	Alnus nitida (Spach) Endl.	Near Dojam, Humla	2400-2700	Tree		
Betulaceae	Carpinus viminea Lindl.	Ghatte Khola - Agra, Bajhang	2100	Tree	Khadik	
Betulaceae	Corylus jacquemontii Decne.	Dhuli, Bajhang	3000	Tree	Dante okhar	
Bignoniaceae	Incarvillea arguta Royle	Kermi, Humla	2700	Herb	Doli phool	root in diarrhoea
Boraginaceae	Arnebia benthamii (Wall ex G. Don) I.M. Johnst.	Jabkung, Humla	3200	Herb		
Boraginaceae	Cynoglossum furcatum Wall.	Khalanga, Darchula	840	Herb		
Boraginaceae	Cynoglossum glochidiatum Wall. ex Benth.	Khalanga, Darchula	840	Herb	Tejraj	
Boraginaceae	Cynoglossum lanceolatum Forssk.	Kallas, Humla	2700	Herb		
Boraginaceae	Eritrichium sp. (or Myosotis alpestris F.W. Schmidt)	Pani Palbang	3300	Herb		
Boraginaceae	Hackelia uncinata (Royle ex Benth.) C.E. C. Fisch.	Khaptad; Mechhra, Darchula	2700-4200	Herb		
Boraginaceae	Lindelofia longiflora (Benth.) Baill.	Jabkung, Humla	3200	Herb		
Boraginaceae	Maharanga bicolor (Wall. ex G.Don) A.DC.	Khaptad, Bajhang	2100-3000	Herb		
Boraginaceae	Maharanga emodi (Wall.) A.DC.	Humla	2200-4500	Herb		
Boraginaceae	Onosma bracteata Wall.	Rapla - Tangbang, Darchula	1800			
Boraginaceae	Trigonotis multicaulis (DC.) Benth. ex Clarke	Mechhra, Darchula	3600			
Boraginaceae	Trigonotis ovalifolia (Wall.) Clarke	Chainpur, Bajhang	3100			
Boraginaceae	Trigonotis rotundifolia (Benth) Clarke	Khalagad - Dubaipas, Baitadi	4100			
Brassicaceae	Arabidopsis himalaica (Edgw.) O.E. Schulz	Near Jabkung, Humla	3200	Herb		
Brassicaceae	Arabis pterosperma Edgew.	Near Seding, Humla	3400	Herb		
Brassicaceae	Barbarea intermedia Boreau	Khaptad, Bajhang	3000-3600	Herb		
Brassicaceae	Capsella bursa-pastoris (L.) Medik.	Salle khola, Upper Dojam; Dopakhe, Darchula	2200-3100	Herb	Chalne	
Brassicaceae	Cardamine hirsuta Hook.f. & Andres	Simkot, way to Seding, Humla	2950-3700	Herb		
Brassicaceae	Cardamine impatiens L.	Way to Seding, Bajhang	3600	Herb		
Brassicaceae	Cardamine violacea (D.Don) Wall.	Khaptad, Bajhang	2500-3600	Herb		
Brassicaceae	Draba poluniana Al-Shehbaz	Humla	3800	Herb		Endemic to Nepal

Brassicaceae	Draba sp.	Yari, Humla	3400	Herb		
Brassicaceae	Erysimum sp.	Yari, Humla	3400	Herb		
Brassicaceae	Megacarpea polyandra Benth.	Jabkung, Humla	3200	Herb		
Brassicaceae	Noccaea nepalensis Al-Shehbaz	Humla	3200	Herb		Endemic to Nepal
Brassicaceae	Rorippa sp.	Yari to Muchu, Humla	3300	Herb		
Brassicaceae	Sisymbrium sp.	Simkot, Humla	2950	Herb		
Brassicaceae	Thlaspi arvense L.	Way to Seding, Humla	3400	Herb		
Buxaceae	Buxus wallichiana Baill.	Melchham Khola - Lepra, Humla	2500			
Buxaceae	Sarcococca hookeriana Wall.	Sribhabar - Dhole, Baitadi	2330	Shrub	Telparo	
Campanulaceae	Campanula pallida Wall.	Melchham, Humla	2700	Herb	Nepali bish	
Campanulaceae	Codonopsis rotundifolia Benth.	Tapaun - Dhansera, Bajhang	3740			
Campanulaceae	Cyananthus lobatus Wall. ex Benth.	Surma Sarovar, Bajhang	4150	Herb		
Cannabaceae	Cannabis sativa L.	Chipra, Muchu; Baskatne- Dilbagar, Bajhang	1200-2200	Herb	Bhang	Pickle
Caprifoliaceae	Abelia triflora R. Br. ex Wall.	Muchu, Humla	2600-3500	Shrub		
Caprifoliaceae	Leycesteria formosa Wall.	Way to Darma, Humla	2700-3300			
Caprifoliaceae	Lonicera angustifolia Wall. ex DC.	Humla	2600-3800	Shrub		
Caprifoliaceae	Lonicera hispida Pall. ex Willd.	Humla; East of Chhety, Bajhang	2900-4500	Shrub		
Caprifoliaceae	Lonicera obovata Royle	Humla	3500-4400	Shrub		
Caprifoliaceae	L. purpurascens Walp.	East of Chhety, Bajhang	3200	Shrub		
Caprifoliaceae	Lonicera quinquelocularis Hardw.	Yablang, Yari to Muchu	2800-3400	Shrub		
Caprifoliaceae	Lonicera spinosa (Jaquem. ex Decne.) Walp	Hilsa to Yari, Humla	3500-3800	Shrub		
Caprifoliaceae	Lonicera webbiana Wall. ex DC.	Humla	2600-4300	Shrub		
Caprifoliaceae	Lonicera sp.	Yablang to Yangar, Humla	2900	Shrub	Kalo bhedkuri	
Caprifoliaceae	Triosteum himalayanum Wall.	Kuntisau, Darchula	3100			
Caryophyllaceae	Silene baccifera (L.) Roth	Humla; Makarigad-Khandewori, Darchula	2100	Herb		
Celastraceae	Euonymus pendulus Wall.	Chainpur - Dhuli, Bajhang	1900	Tree		
Chenopodiaceae	Chenopodium album L.	Dojam, Simkot; Bajhang	1800-2950	Herb	Betu, Bethu	Vegetable
Chenopodiaceae	Chenopodium ambrosioides L.	Aagar - Dhalaun, Bajhang	1800-2400	Herb	Rato Latte	
Commelinaceae	Cyanotis vaga (Lour.) Schult. & Schult.	Dhuli, Bajhang	2360	Herb		
Commelinaceae	Murdannia nudiflora (L.) Brenan	Aagar - Dhalaun, Bajhang	1840			
Convolvulaceae	Convolvus arvensis L.	Near Dojam, Yari to Muchu	2900-3400	Herb		
Convolvulaceae	Cuscuta reflexa Roxb.	Bithad, Bajhang	2000	Climber		
Convolvulaceae	Evolvulus alsinoides L.	Khateda - Patan, Baitadi	1880-1200	Herb		
Convolvulaceae	Porana paniculata Roxb.	Sunchera, Darchula	1800			
Coriariaceae	Coriaria nepalensis Wall.	Nalna, Chipra, Humla	2400	Tree		

Cornaceae	Benthamidia capitata (Wall.) H. Hara	Satbanjh, Baitadi	1800		Damaru	
Cornaceae	Swida macrophylla (Wall.) Sojak	Dhalaun, Bajhang	2300			
Corylaceae	Corylus jacquemontii Decne.	Salli Pass to Kermi, Humla	3000	Tree		
Crassulaceae	Rhodiola himalensis (D. Don) S.H. Fu subsp. bouvieri (Raym.-Hamet) H. Ohba	Darchula	3600-3900	Herb		Endemic to Nepal
Crassulaceae	Rhodiola sp.	Humla	3200-3800	Herb		
Crassulaceae	Rhodiola crenulata (Hk. f. & Th.) H. Ohba	Surma Sarovar, Bajhang	4150	Herb		
Crassulaceae	Rhodiola wallichiana (Hook.) Fu	Ghodilekh, Bajhang	4000	Herb		
Crassulaceae	Sedum multicaule Wall.	Humla	1500-3200	Herb		
Cucurbitaceae	Bryonia sp.	Dharapori, Humla	2500	Herb		
Cucurbitaceae	Solena heterophylla Lour	Humla	1600-3200	Climber		
Cucurbitaceae	Trichosanthes lepiniana (Naud.) Cog.	Lipne - Chhare, Humla	1810			
Dipsacaceae	Dipsacus inermis Wall.	Humla	1400-4100	Herb	Mupapat	
Dipsacaceae	Morina longifolia Wall.	Khaptad (Baitadi)	3000-4200	Herb		
Dipsacaceae	Morina nepalensis D.Don	Khaptad (Baitadi)	3000-4500	Herb		
Dipsacaceae	Morina polyphylla Wall.	Humla	3000-4300	Herb		
Dipsacaceae	Pterocephalus hookeri (Clarke) Diels	Tinkar, Darchula	3500 m	Herb		
Elaeagnaceae	Elaeagnus parvifolia Wall. ex Royle	Humla	1300-3000	Tree	Guyali	
Elaeagnaceae	Hippophae salicifolia D. Don	Near Dojam, Humla; Kuntisau, Darchula	2850	Tree		
Elaeagnaceae	Hippophae tibetana Schltr.	Way to Lagerma, Humla	3800	Shrub		
Elaeagnaceae	Populus ciliata Wall. ex Royle	Kermi, Humla	2850	Tree		
Ericaceae	Cassiope fastigiata (Wall.) D.Don	Upper Seding, Humla; Gural Lekh, Bajhang	3500-4000	Shrub		
Ericaceae	Gaultheria fragrantissima Wall.	Chir, Bajhang	1700	Tree	Dhasingare	
Ericaceae	Gaultheria nummularioides D. Don	Bajhang	2600	Tree		
Ericaceae	Gaultheria Royle	Chainpur, Bajhang	3600	Tree		
Ericaceae	Gaultheria trichophylla Royle	Khaptad (Baitadi)	2700-4500	Shrub		
Ericaceae	Lyonia ovalifolia (Wall.) Drude	Humla; Kharilo Lekh, Bajhang	1300-4300	Tree	Angeri	
Ericaceae	Lyonia villosa (Hook. f.) Hand.-Mazz.	Khaptad - Lokhada, Bajhang	2800	Tree	Angeri	
Ericaceae	Rhododendron anthopogon D. Don	Near Nara Pass	3400-3900	Shrub	Sunpati	
Ericaceae	Rhododendron anthopogon ssp. Hypenanthum (Balf. f.) Cullen	Nampa valley, Darchula	3500	Shrub		
Ericaceae	Rhododendron arboreum Smith	Humla; Dopakhe - Thin, Darchula	1500-3300	Tree	Lali gurans	
Ericaceae	Rhododendron barbatum Wall.	Chankheli - Rimi, Humla; Khaptad (Baitadi)	2700-3600	Tree	Chimal	
Ericaceae	Rhododendron campanulatum D. Don	Humla; Kuntisau, Darchula	2800-4400	Shrub	Nilo chimal	
Ericaceae	Rhododendron cowanianum var. new?	Yari, Nara Pass, Humla	3800	Shrub		

Ericaceae	Rhododendron lepidotum Wall. ex G. Don	Dandafaya; Api Khola, Darchula	3000	Shrub	Bhale sunpate	leaves for incense
Euphorbiaceae	Euphorbia cognata (Klotzsch & Garcke) Boiss.	Kermi to Dhandkermi, Humla	2600	Herb		Probably new to Nepal (?)
Euphorbiaceae	Euphorbia longifolia D.Don	Humla	1700-2900	Herb		
Euphorbiaceae	Euphorbia royleana Boiss.	Jhota, Bajhang	1000		Siudi	
Euphorbiaceae	Euphorbia sikkimensis Boiss.	Thin - Dandap, Darchula	2500			
Euphorbiaceae	Euphorbia wallichii Hook. f.	Ghodilekh, Bajhang	4000		Dhuk	
Euphorbiaceae	Excoecaria acerifolia F. Didr.	Sera village, Bajhang	1700		Uttus	
Euphorbiaceae	Glochidion velutinum Wight	Makarigad, Darchula	1540			
Euphorbiaceae	Phyllanthus emblica L.	Khateda - Patan, Baitadi	1880-1200		Amala	
Euphorbiaceae	Phyllanthus urinaria L.	Baitadi	1000	Shrub	Ajata	
Fabaceae	Astragalus grahamianus Royle ex Benth.	Hilsa to Yari, Humla	3500-4000	Shrub		Probably new to Nepal (?)
Fabaceae	Caragana brevifolia Kom.	Upper Seding, Humla	4100	Shrub		
Fabaceae	Caragana brevispina Royle	Lower Jabkung, Humla	2900-3100	Shrub		
Fabaceae	Caragana versicolor (Wall.) Benth.	Nara Pass, Hilsa, Humla	3300-4200	Shrub		
Fabaceae	Chamaecrista mimosoides (L.) Greene	Darchula - Huti, Darchula	1100			
Fabaceae	Chesneya nubigena (D.Don) Ali	Nara pass to Yari, upper Seding, Humla	3800-3900	Shrub		
Fabaceae	Cyclobalanopsis lamellosa (Sm.) Oersted	Humla	1500-3100	Tree		
Fabaceae	Desmodium elegans DC.	Yablang to Dharapori; Nalna, Chipra, Humla	2600-3000	Shrub	Rishing	
Fabaceae	Gueldenstaedtia himalaica Baker	Humla	3300-4600	Herb		good fodder
Fabaceae	Hedysarum kumaonensis Benth. ex Baker	Muchu, Humla	3000	Herb		
Fabaceae	Indigofera exilis Grierson & D.G. Long	Dharapori, Humla	2700	Shrub	Sakino	fodder
Fabaceae	Indigofera sp. 1	Salli Pass, Humla	3000	Shrub		
Fabaceae	Indigofera sp.2	Dharapori, humla	2700	Shrub	Sakino	fodder
Fabaceae	Lablab purpureus (L.) Sweet	Simkot, Yablang, Humla	2500-3000	Climber	Simi	Pulse
Fabaceae	Lespedeza sp.	Dharapori, Humla	2500	Herb		
Fabaceae	Mucuna nigricans (Lour.) Steud.	Pangsera - Bagadi, Baitadi	770		Kauso	
Fabaceae	Oxytropis sp.	Humla		Herb		
Fabaceae	Piptanthus nepalensis (Hook.) D.Don	Humla	2000-3800	Shrub		
Fabaceae	Trifolium repens L.	Simkot	2950	Herb	Tinpate	
Fagaceae	Quercus glauca Thunb.	Talkot, Bajhang	1670	Tree	Phalant	
Fagaceae	Quercus leucotrichophora A. Camus	Kanda - Dhuli, Bajhang	2180	Tree	Tikhe banjh	
Fagaceae	Quercus floribunda A. Camus	Thuli Gad, Baitadi	2300	Tree	Moru	
Fagaceae	Quercus lanata Sm.	Yapka khola to Dandafaya, Humla	2400-2700	Tree	Banjh	
Fagaceae	Quercus semecarpifolia Sm.	Humla	1700-3800	Tree		fodder, firewood
Gentianaceae	Gentiana robusta King ex Hook.f.	Humla	3500	Herb		

Gentianaceae	Halenia elliptica D.Don	Humla	2000-4500	Herb		
Gentianaceae	Lomatogonium graciliflorum H. Sm.	Humla, Bajhang	3000-4500	Herb		Endemic to Nepal
Gentianaceae	Swertia angustifolia Buch.-Ham. ex D.Don	Khaptad, Bajhang		Herb		
Gentianaceae	Swertia chirayita (Roxb. ex Fleming) Karstrn	Khaptad, Bajhang	1500-2500	Herb		
Gentianaceae	Swertia ciliata (D. Don ex G. Don) B.L. Burtt	Humla	2800-4000	Herb		
Geraniaceae	Geranium donianum Sweet	Humla	3200-4800	Herb		
Geraniaceae	Geranium pratense L.	Dandafaya, Humla	2900	Herb		
Gesneriaceae	Chirita biflora D. Don	Pari Bagar - Makarigad, Darchula	1160			
Gesneriaceae	Corallodiscus lanuginosus (DC.) Burtt.	Patpakha, Bajhang	1500			
Gesneriaceae	Rhynchoglossum obliquum Blume	Satbanjh, Baitadi	1900-1500			
Grossulariaceae	Ribes acuminatum Wall. ex G. Don	Chheti - Mechhra, Darchula	2950	Shrub		
Grossulariaceae	Ribes alpestre Wall. ex Decne.	Muchu, Humla	2900	Shrub		
Grossulariaceae	Ribes himalense Royle ex G. Don	Nilkatti - Naya Odar, Bajhang	3620	Shrub		
Grossulariaceae	Ribes sp.	Hilsa, Humla	3600	Shrub		
Grossulariaceae	Ribes takare D. Don	Humla	2200-3300	Shrub		
Hippocastanaceae	Aesculus indica (Cambess.) Hook.	Satbanjh, Baitadi	1700	Tree	Pangro	
Hydrangeaceae	Deutzia staminea R.Br. ex Wall.	Yablang to Kermi, Humla	2600-2900	Shrub		
Hypericaceae	Hypericum dyeri Rehder	Talkot - Aagar, Bajhang	2100	Herb		
Juglandaceae	Juglans regia L.	Near Sribhabar, Baitadi	2370	Tree	Okhar	
Juglandaceae	Juglans regia L. var kamaonia L..	Yablang to Dharapori, Humla	2400-2900	Tree	Okhar	fruit edible
Lamiaceae	Ajuga bracteosa Wall. ex Benth.	Kasoti - Chheti, Darchula	2550	Herb		
Lamiaceae	Clinopodium umbrosum (M. Bieb.) C. Koch	Baitadi; Dojam, Humla	1500-2800	Shrub	Bilajor	
Lamiaceae	Colebrookea oppositifolia Sm.	Majhigaon, Bajhang	1200	Shrub	Dhusure	
Lamiaceae	Coleus forskohlii Briq.	Humla		Herb		
Lamiaceae	Colquhounia coccinea Wall.	Tangbang, Darchula; Khagalgaun, Humla	1800-2500	Shrub	Dhuchchu	
Lamiaceae	Craniotome furcata (Link) Kuntze	Satbangh, Baitadi	1900-1500		Batule silam	
Lamiaceae	Dracocephalum wallichii Sealy	Dhansera - Nilkatti, Bajhang	4090	Herb		
Lamiaceae	Elsholtzia eriostachya (Benth.) Benth.	Nayaodar - Topu, Bajhang	3220		Lenja	
Lamiaceae	Elsholtzia flava (Benth.) Benth.	Niglad - Chirkitte, Baitadi	1720-1910		Ban silam	
Lamiaceae	Elsholtzia fruticosa (D. Don) Rehder	Dhuli, Bajhang; Humla	100-4200	Shrub		
Lamiaceae	Elsholtzia ciliata (Thunb.) Hyland.	Niglad - Chirkitte, Baitadi	1720-1910	Herb		
Lamiaceae	Geniosporum coloratum (D. Don) O. Kuntze	Dadeldhura - Silinga, Baitadi	1730-1490			
Lamiaceae	Isodon ternifolius (D. Don) Kudo	Baitadi	1500	Herb		
Lamiaceae	Lamium album L.	Mt. Roshia, Bajhang	2780	Herb		

Lamiaceae	Lamium sp.	Humla		Herb		
Lamiaceae	Leonurus cardiaca L.	Tologaon, Darchula	2800			
Lamiaceae	Leucas lanata Benth.	Satbangh, Baitadi; Humla	1900	Shrub		
Lamiaceae	Melissa axillaris (Benth.) Bakh. f.	Ganai Gad, Bajhang	1575			
Lamiaceae	Micromeria biflora (D. Don) Benth.	Dhole - Baitadi; Yangar, Humla	2250-2900	Herb		
Lamiaceae	Origanum vulgare L.	Churani - Lambagar, Darchula	1050-3400	Herb	Sajiwan	
Lamiaceae	Phlomis setigera Falc. ex Benth.	Khaptad, Bajhang	3050	Herb		
Lamiaceae	Phlomis bracteosa Royle ex Benth.	Dhansera, Bajhang	3640	Herb		fodder
Lamiaceae	Salvia sericea Wall. ex Benth.	Nayaodar - Topu, Bajhang	3220	Herb		
Lamiaceae	Salvia hians Royle ex Benth.	Tapaun - Dhansera, Bajhang	3650	Herb	Ape	
Lamiaceae	Salvia lanata Roxb.	Yablang to Chaugafaya	2400-2800	Herb		
Lamiaceae	Scutellaria scandens Buch.-Ham. ex D. Don	Satbangh, Baitadi	1900	Herb	Kankarne	
Lamiaceae	Stachys melissaefolia Benth.	Melchham Khola, Humla	2520			
Lamiaceae	Thymus linearis Benth. ex Benth.	Nayaodar, Bajhang; Yari to Kermi, Humla	2600-3700	Herb	Ghodamarcha	Herbal tea
Lauraceae	Lindera neesiana (Wall. ex Nees) Kurz	Mekhala, Humla	1800-2700	Tree	Sil timmur	Pickle
Loganiaceae	Buddleja asiatica Lour.	Mekhala, Humla	350-2000	Shrub	Bhimsenpati	Ritual
Loganiaceae	Buddleja tibetica W. W. Sm.	Budhkhori, Bajhang	3100	Shrub		
Loranthaceae	Loranthus sp.	Humla		Epiphyte		
Malvaceae	Malva verticillata L.	Dozam, Humla	2800	Herb	Laphe sag	
Malvaceae	Sida acuta Burm. f.	Chamelia river, Baitadi	1350			
Meliaceae	Toona ciliata (Endl.) M. Roem.	Darchula - Huti, Darchula	900	Tree	Tuni	
Meliaceae	Toona serrata (Royle) M. Roem.	Nalna, Chipra, Humla	2400	Tree		
Menispermaceae	Cocculus laurifolius DC.	Khalanga, Darchula	1100		Tilphora	
Moraceae	Ficus benghalensis L.	Dharapori, Mekhala, Humla	2300	Tree	Bar	Ritual
Moraceae	Ficus hispida L.f.	Mekhala, Humla	450-1100	Tree		Fodder
Moraceae	Ficus palmata Roxb.	Humla	600-2300	Tree		
Moraceae	Ficus racemosa L.	Mekhala, Humla	350-1000	Tree		Fodder
Moraceae	Ficus religiosa L.	Mekhala, Humla	150-1500	Tree	Pipal	Ritual
Moraceae	Ficus semicordata Buch.-Ham ex Sm.	Mekhala, Humla	200-1700	Tree		
Moraceae	Ficus auriculata Lour.	Patharkot, Baitadi	1500	Tree	Timila	
Moraceae	Ficus sarmentosa Buch.-Ham. ex Sm.	Gadsera - Sawaradigad, Baitadi	1700	Tree	Ban timila	
Moraceae	Morus sp.	Humla		Shrub		
Myricaceae	Myrica esculenta Buch.-Ham ex D.Don	Humla	1200-2300	Tree		
Myrsinaceae	Myrsine africana L.	Near Barail, Baitadi	1420	Tree	Sete kath	
Nyctaginaceae	Boerhaavia diffusa L.	Thota, Bajhang	1000		Punarnava	
Oleaceae	Fraxinus floribunda Wall.	Deoli - Deolekh, Bajhang	1740	Climber	Lankuri	

Oleaceae	Jasminum humile Lour.	Thin, Darchula	2300	Climber	Jai	
Oleaceae	Jasminum humile L.	Yablang to Kermi, Humla	2700-2800	Shrub		
Oleaceae	Jasminum officinale L.	Yablang, Humla	2600-2800	Shrub		
Oleaceae	Jasminum sp.	Humla		Climber		
Oleaceae	Olea cuspidata Wall.	Darma - Lothi Khola, Humla	1800			
Oleaceae	Olea glandulifera Wall.	Chainpur, Bajhang	1400			
Oleaceae	Osmanthus fragrans Lour.	Patan, Baitadi	1400		Silingi	
Oleaceae	Syringa emodi Wall.	Chankheli - Rimi, Humla	2900	Tree		
Oleaceae	Syringa emodi Wall. ex Royle	Humla	2500-3600	Tree		
Onagraceae	Circaea alpina L.	Surma Sarovar, Bajhang	4150			
Onagraceae	Circaea repens Wall.	Shing Danda, Humla	2850			
Onagraceae	Epilobium sikkimense Hausskn.	Ghodi Lekh, Baitadi	4000	Herb		
Onagraceae	Oenothera rosea L'Herit ex Ait.	Chainpur, Bajhang	1650	Herb		
Oxalidaceae	Oxalis corniculata L.	Near Salli Pass, Humla	3000	Herb		
Papaveraceae	Corydalis govaniana Wall.	Seding, Humla; Surma Sarovar, Bajhang	3500	Herb	Bhutkesh	
Papaveraceae	Corydalis chaerophylla DC.	Pategaon - Badigaon, Bajhang	2190-3350	Herb		
Papaveraceae	Corydalis cornuta Royle	Near Chhety, Bajhang	2800	Herb		
Papaveraceae	Corydalis elegans Hook. f. & Thomson	Surma Sarovar, Bajhang	4150	Herb		
Papaveraceae	Corydalis filiformis Royle	Ghodi Lekh, Baitadi	4000	Herb		
Papaveraceae	Corydalis meifolia Wall.	Surma Sarovar, Bajhang	4400	Herb		
Papaveraceae	Papaver dubium var. Glabrum Koch	Ganger, Baitadi	3100	Herb		
Papaveraceae	Meconopsis horridula Hook.f. & Thoms.	Humla		Herb		
Papaveraceae	Meconopsis simikotensis Grey-Wilson	Humla	3500-4000	Herb		Endemic to Nepal
Parnassiaceae	Parnassia nubicola Wall. ex Royle	Nara pass to Yari, Humla	3900	Herb		
Pedaliaceae	Martynia annua L.	Simalgad, Bajhang	1000		Gridhamki	
Phytolaccaceae	Phytolacca acinosa Roxb.	Humla	2200-3200	Herb		
Plantaginaceae	Plantago erosa Wall.	Muchu, Simkot, Humla	2900-3000	Herb	Dable	
Plantaginaceae	Plantago himalaica Pilger	Humla	2900	Herb		
Polygalaceae	Polygala persicarifolia DC.	Khagalgaun, Humla	2500	Herb		
Polygonaceae	Aconogonum molle (D. Don) H. Hara	Mekhala, Mimi VDC	2100-4000	Herb	Thotne	Bud: vegetable
Polygonaceae	Aconogonum molle (D. Don) Hara var. frondosum (Meisn.) H. Hara	Seding, Humla	3600	Herb		
Polygonaceae	Aconogonum rumicifolium (Royle ex Bab.) H. Hara	Seding, Humla	3800	Herb		
Polygonaceae	Bistorta affinis (D.Don) Greene	Upper Seding, Humla	4100	Herb		
Polygonaceae	Bistorta amplexicaulis (D. Don) Greene	Khaptad, Bajhang	3500-4800	Herb		
Polygonaceae	Bistorta macrophylla (D. Don) Sojak	Upper Jabkung, Humla	3400	Herb		

Polygonaceae	Eskemukerjea megacarpum (H. Hara) H. Hara	Chauganfaya to Dandafaya, Humla	2600	Herb		Endemic to Nepal
Polygonaceae	Fagopyrum esculentum Moench	Khagalgaun, Humla	2500 m	Herb	Phapar	Cereal grain
Polygonaceae	Fagopyrum tartaricum (L.) Gaertn.	Yablang, Humla; Khaptad region	2800	Herb	Tite phapar	
Polygonaceae	Oxyria digyna (L.) Hill	Yari, Humla	3700	Herb		
Polygonaceae	Rheum australe D. Don	Mekhala, Humla	3600-4200	Herb	Padamchal	Rhizome:medicinal
Polygonaceae	Rheum moorcroftianum Royle	Humla	3600-4400	Herb		
Polygonaceae	Rumex hastatus D.Don.	Kermi, Humla	2700	Herb		
Polygonaceae	Rumex nepalensis Spreng	Simkot to Yari, Humla	2900-3800	Herb	Hale	
Polygonaceae	Rumex sp.	Humla		Herb		
Primulaceae	Androsace muscoidea Duby	Khaptad, Bajhang	3300-5600	Herb		
Primulaceae	Androsace primuloides D.Don	Kermi, Humla	2800	Herb		
Primulaceae	Androsace robusta (Kunth) Hand.-Mazz.	Near Tugling, Humla	3400	Herb		
Primulaceae	Androsace sarmentosa Wall.	Nara Pass, Jabkung, Humla	3200-3600	Herb		
Primulaceae	Androsace strigillosa Franch.	Upper Seding, Humla	4200	Herb		
Primulaceae	Primula atrodentata W.W. Sm.	Nara to Yari, Humla	4000	Herb		
Primulaceae	Primula drummondiana Craib	Khaptad, Bajhang	3400-3800	Herb		
Primulaceae	Primula macrophylla D.Don	Humla	3400-5600	Herb		
Primulaceae	Primula sp.	Humla		Tree		
Punicaceae	Punica granatum L.	Dhandkermi, Humla	2500	Herb	Darim	
Ranunculaceae	Aconitum bisma (Buch.-Ham) Rapaics	Mekhala, Humla	3600-4200	Herb		Root: medicinal
Ranunculaceae	Aconitum ferox Wall. ex Ser.	Mekhala, Humla	3600-4200	Herb		Root: medicinal
Ranunculaceae	Aconitum heterophyllum Wall.	Above Khagalgaun, near Tugling, Humla	3000-3400	Herb	Atis	Roots: medicinal
Ranunculaceae	Aconitum spicatum (Bruhl) Stapf	Tugling, Humla; Mechhra - Kalagad, Darchula	3500-3900	Herb		
Ranunculaceae	Aconitum violaceum Jacquem. ex Stapf	Surma Sarovar, Bajhang	4400	Herb		
Ranunculaceae	Actaea spicata L.	Upper Jabkung, Humla	3400	Herb		
Ranunculaceae	Adonis aestivalis L.	Khanglagaon - Pahung, Humla	2900			
Ranunculaceae	Adonis chrysocyathus Hook.f. et Thomson	Dozam Khola, Humla	3900			
Ranunculaceae	Anemone biflora	Dandafaya, Humla	2950	Herb		
Ranunculaceae	Anemone elongata D.Don	Khaptad, Humla	1800-3700	Herb		
Ranunculaceae	Anemone obtusiloba D.Don	Kalagad - Dubaipass, Bajhang	2900-3500	Herb		
Ranunculaceae	Anemone polyanthes D. Don	Surma Sarovar, Bajhang	2700-4400	Herb		
Ranunculaceae	Anemone rivularis Buch.-Ham. ex DC.	Patha - Chetti, Darchula; Khaptad, Humla	1600-4000	Herb	Kangarate	
Ranunculaceae	Anemone rupestris Wall.	Humla	3000-4800	Herb		
Ranunculaceae	Anemone rupicola Cambess.	Way to Seding; Chhetti, Bajhang	3000-3600	Herb		
Ranunculaceae	Anemone tetracephala	Near Seding, Humla	3700-4500	Herb		

Ranunculaceae	Anemone vitifolia Buch.-Ham. ex DC.	Dore Pani - Bagadi, Baitadi	1540-580	Herb	Kaptase	
Ranunculaceae	Aquilegia pubiflora Wall. ex Royle	Chhetti - Marma, Bajhang	2900	Herb		
Ranunculaceae	Caltha palustris L.	Lawne - Saingaon, Bajhang	2900-3600	Herb		
Ranunculaceae	Clematis barbellata Edgew.	Khaptad, Bajhang	3000-3200	Climber		
Ranunculaceae	Clematis buchananiana DC.	Kermi, Humla	2700	Climber		
Ranunculaceae	Clematis montana Buch.-Ham. ex DC.	Upper Jabkung, Humla	3400	Climber		
Ranunculaceae	Clematis sp.	Upper Jabkung, Humla	3600	Climber		
Ranunculaceae	Delphinium brunonianum Royle	Upper Seding, Humla	4500	Herb		
Ranunculaceae	Delphinium densiflorum Duthie ex Huth	Surma Sarovar, Bajhang	4400	Herb		
Ranunculaceae	Delphinium himalayai Munz	Upper Seding; Mekhala, Mimi VDC; Bajhang	3600-4200	Herb		Root: medicinal
Ranunculaceae	Ranunculus adoxifolius Hand.-Mazz.	Kalagad - Dubaipass, Bajhang	4100	Herb		
Ranunculaceae	Ranunculus brotherusii Freyn	Way to Lagerma, Humla	3700	Herb		
Ranunculaceae	Ranunculus himalaicus Tamura	Humla	4600	Herb		Endemic to Nepal
Ranunculaceae	Ranunculus hirtellus Royle ex D.Don	Near Ingaldwar, Bajhang; Seding, Humla	3650-4100	Herb		
Ranunculaceae	Ranunculus munroanus J. R. Drumm. Ex Dunn	Saipal - Aletsoura, Bajhang	4212	Herb		
Ranunculaceae	Ranunculus tricuspis Maxim.	Dozam Khola, Humla	3900	Herb		
Ranunculaceae	Thalictrum alpinum L.	Seding, Humla	3650	Herb		
Ranunculaceae	Thalictrum chelidonii DC.	Chheti - Lukhani, Darchula		Herb		
Ranunculaceae	Thalictrum cultratum Wall.	Muchu, Humla; Dhansera - Nilkatti, Bajhang	3400-3800	Herb		
Ranunculaceae	Thalictrum dalzellii Hook.	Malikhola, Spiti, Darchula	1810-1660	Herb		
Ranunculaceae	Thalictrum elegans Wall. ex Royle	Saipal, Bajhang	3878	Herb		
Ranunculaceae	Thalictrum foliolosum DC.	Humla	1300-3400	Herb		
Ranunculaceae	Thalictrum rostellatum Hook. f. & Thomson	Chankheli, Humla	3200	Herb		
Ranunculaceae	Thalictrum saniculiforme DC.	Dhuli - Kanda, Bajhang	2272	Herb		
Ranunculaceae	Trollius pumilus D. Don	Saipal, Bajhang	3700			
Rhamnaceae	Sageretia thea var. Bornmuelleri (Schneid.) H. Hara	Kumlim - Dozam, Humla	2600			
Rosaceae	Cotoneaster affinis Lindl.	Chipra, Humla	2600	Shrub		
Rosaceae	Cotoneaster frigidus Wall. ex Lindl	Kermi, Humla; Khandeswori , Darchula	2250-3200	Shrub	Ruis	
Rosaceae	Cotoneaster microphyllus Wall. ex Lindl.	Hilsa to Dandafaya, Lower Jablung, Humla	2500-4000	Shrub		
Rosaceae	Cotoneaster sp.	Yari to Muchu, Humla	2900-3700	Shrub		
Rosaceae	Cotonesater nitidus Jacques	Chhangru, Darchula	2900	Shrub		
Rosaceae	Cotonesater acuminatus Lindl.	Thogundanda - Surmasarovar, Humla	2800	Shrub		

Rosaceae	Cotonesater affinis Lindl.	Dozam, Humla	2800	Shrub		
Rosaceae	Duchesnea indica (Andr.) Focke	Muchu to Kermi, Herb	2600-2900	Herb		
Rosaceae	Fragaria nubicola Lindl. ex Lacaita	Dandafaya, Herb	2900	Herb		
Rosaceae	Geum elatum Wall. ex G. Don	Khaptad, Kalagad - Dubaipass, Bajhang	2500-4400	Herb		
Rosaceae	Geum roylei Wall.	Dhuli – Chainpur, Bajhang	2400	Herb		
Rosaceae	Malus pumila Mill.	Kermi, Simkot	2600-3200	Tree	Syau	Fruit edible
Rosaceae	Potentilla argyrophylla var. Atrosanguinea (Lodd.) Hook. f.	Mechhra, Darchula	3600	Herb		
Rosaceae	Potentilla argyrophylla Wall. ex Lehm.	Chaurpani, Bajhang	3787	Herb		
Rosaceae	Potentilla atrosanguinea (Lodd.) Hook.f.	Seding, Herb	3700	Herb		
Rosaceae	Potentilla commutata Lehm.	Mechhra - Kalagad, Darchula	3970	Herb		
Rosaceae	Potentilla cuneata Wall. ex Lehm	Hilsa, Herb	3500	Herb		
Rosaceae	Potentilla curviseta?	Yari, Herb	3800	Herb		
Rosaceae	Potentilla eriocarpa Wall. ex Lehm.	Mechhra, Darchula	3640	Herb		
Rosaceae	Potentilla fructicosa L.	Yari to Muchu, Humla; Tinkar, Darchula	3100-3500	Shrub	Chiniya phal	
Rosaceae	Potentilla indica (Andrews) Wolf	Baitadi	1500	Herb		
Rosaceae	Potentilla josephiana H. Ikeda & H. Ohba	Khaptad, Humla	2400-4150	Herb		
Rosaceae	Potentilla kleiniana Wight & Arn.	Khalanga, Darchula	1100	Herb		
Rosaceae	Potentilla leuconota D. Don	Chankheli Lekh, Humla	3360	Herb		
Rosaceae	Potentilla microphylla D.Don	Humla	3780	Herb		
Rosaceae	Potentilla saundersiana Royle	Lower Jabkung, Humla	2950	Herb		
Rosaceae	Potentilla sp.	Simkot, Humla	2950	Herb	Banchoti	
Rosaceae	Prinsepia utilis Royle	Kermi, Dandafaya, Humla	2600-2900	Shrub	Dhutilo	edible oil
Rosaceae	Prunus cornuta (Wall. ex Royle) Steud.	Khaptad, Humla	2100-3500	Tree		
Rosaceae	Prunus davidiana (Carriere) Franchet	Kermi, Yari to Muchu, Humla	2400-3400	Tree	Khamo,Khampu	fruit edible
Rosaceae	Prunus napaulensis (Seringe) Steud.	Salle khola, Humla	2800	Tree	Aare	fruit edible
Rosaceae	Prunus persica (L.) Batsch	Kermi, Yalbang, Humla	2600-3000	Tree	Chuli, Aaru	Fruit edible
Rosaceae	Prunus rufa Hook f.	Upper Jabkung, Humla	3400	Tree		
Rosaceae	Pyrus pashia Buch.-Ham. ex D. Don	Dharapori, Humla	2300	Tree	Mel	fruit edible
Rosaceae	Pyrus sp	Chipra, Humla	2400	Tree		
Rosaceae	Rosa brunonii Lindl.	Humla; Tipulchyakti - Dopakhe, Darchula	1500-2500	Shrun		
Rosaceae	Rosa microphylla Lindl.	Muchu, Humla; Chheti - Nechhra, Darchula	2800-3000	Shrub		
Rosaceae	Rosa moschata J. Herrmann	Dandafaya, Khagalgaun, Humla	2400	Herb		
Rosaceae	Rosa sericea Lindl.	Yari to Yablang, Humla	3000-3800	Shrub		
Rosaceae	Rosa sp.	Dhandkermi, Humla	2800	Shrub	Aarai	

Rosaceae	Rubus ellipticus Sm.	Humla	1700-2300	Shrub		
Rosaceae	Rubus foliolosus D.Don	Salli Pass, Humla	3000	Shrub	Rato Aishelu	
Rosaceae	Rubus hoffmeisterianus Kunth & Bouche	Humla	2300	Shrub		
Rosaceae	Rubus hypargyrus Edgew.	Khaptad, Humla	2600	Shrub		
Rosaceae	Rubus nepalensis (Hook.f.) Kuntze	Khaptad, Humla; Rapla - Tangbang, Darchula	1800-3200	Herb		
Rosaceae	Rubus paniculatus Sm.	Chipra, Humla	2600	Climber		
Rosaceae	Sibbaldia cuneata Hornem. ex Kuntze	Khaptad, Bajhang	3400-4500	Herb		
Rosaceae	Sibbaldia parviflora Willd.	Aletsoura, Bajhang	4333	Herb		
Rosaceae	Sibbaldia purpurea Royle	Surma Sarovar, Bajhang	4140	Hern		
Rosaceae	Sorbaria tomentosa (Lindl.) Rehder	Kuntisau, Darchula; Yablang, Humla	2400-3000	Shrub	Thebleti	firewood
Rosaceae	Sorbus cuspidata (Spach) Hedlund	Upper Seding, Humla	3800	Shrub		
Rosaceae	Sorbus foliolosa (Wall.) Spach.	Chheti - Nechhra, Darchula	3200	Shrub		
Rosaceae	Sorbus lanata (D. Don) Schauer	Chheti - Nechhra, Darchula; Khaptad, Bajhang	2500-3400	Shrub		
Rosaceae	Sorbus microphylla Wenzing	Kuntisau, Darchula; Khaptad, Bajhang	3000-4500	Shrub	Bajhar	
Rosaceae	Sorbus vestita (G. Don) Hedlung	Dandap, Darchula	2600	Shrub		
Rosaceae	Spiraea arcuata Hook. f.	Dhansera - Nilkatti, Bajhang	3770	Shrub		
Rosaceae	Spiraea micrantha Hook. f.	Melchham Khola, Humla	2450	Shrub		
Rosaceae	Spirea sp.	Humla		Shrub		
Rubiaceae	Galium asperifolium Wall.	Upper Jabkung, Humla	3300	Herb		
Rubiaceae	Galium hirtiflorum Req. ex DC.	Muchu, Humla	2900	Herb		
Rubiaceae	Galium paradoxum Maxim.	Lower Jabkung, Humla	3000	Herb		
Rubiaceae	Galium saipalense Ehrend. & Schonb.-Tem.	Bajhang	4700	Herb		Endemic to Nepal
Rubiaceae	Galium sp.	Humla		Herb		
Rubiaceae	Leptodermis lanceolata Wall.	Talkot, Bajhang	2230-1660			
Rubiaceae	Rubia manjith Roxb. ex Fleming	Dhandkermi, Humla	2400	Climber	Mujeto	Dye
Rutaceae	Skimmia anquetilia N.P. Taylor & Airy Shaw	Khaptad, Bajhang	2600-3000	Shrub		
Salicaceae	Populus ciliata Wall. ex Royle	Muchu to Yablang, Humla	2800 - 3000	Tree	Bhotepipal	Firewood
Salicaceae	Salix babylonica L.	Dharapori, Humla	2400	Tree		
Salicaceae	Salix calyculata Hook.f. ex Andersson	Upper Seding, Humla	4000	Shrub		
Salicaceae	Salix denticulata Andersson	Khaptad, Bajhang	2400-3000	Tree		
Salicaceae	Salix hylematica Schneid.	Khaptad, ajhang	2500-4500	Tree		
Salicaceae	Salix lindleyana Anderss.	Near Saipal, Bajhang	4363			
Salicaceae	Salix sp.	Humla		Tree		

Sambucaceae	Sambucus adnata Wall. ex DC.	Baitadi	1500		Chari bhango	
Sambucaceae	Viburnum cotinifolium D.Don	Jabkung, Humla	3100	Tree		
Sambucaceae	Viburnum sp.	Dandafaya, Humla	2800	Shrub		
Santalaceae	Thesium himalense Royle	Upper Jabkung, Humla	3600	Herb		
Sapotaceae	Bassia butyracea Roxb.	Khateda - Patan, Baitadi	880-1200	Tree	Chiuri	
Saxifragaceae	Saxifraga filicaulis Wall. ex Ser.	Lipra Khola – Melcham, Humla	2980			
Saxifragaceae	Astilbe rivularis Buch.-Ham. ex D. Don	Rimi, Humla	2500		Thulo aushadhi	
Saxifragaceae	Astilbe rivularis Buch.-Ham. ex D.Don	Lower jabkung, Humla	3000	Herb		
Saxifragaceae	Bergenia ciliata (Haw.) Sternb.	Dandafaya, Upper Dojam, Humla	2900-3000	Herb	Simpade Paat	
Saxifragaceae	Bergenia ligulata (Wall.) Engl.	Jabkung, Humla	3200	Herb		
Saxifragaceae	Saxifraga andersonii Engl.	Nara Pass, Humla	4300	Herb		
Saxifragaceae	Saxifraga diversifolia Wall. ex Ser.	Thogundanda, Bajhang	3500			
Saxifragaceae	Saxifraga kumaunnsis Engl.	Kalagad - Dubaipass, Bajhang	4200			
Saxifragaceae	Saxifraga mucronulata Royle	Dhansera - Nilkatti, Bajhang	4100			
Saxifragaceae	Saxifraga pallida Wall. ex Ser.	Marghor, Humla	4100			
Saxifragaceae	Saxifraga sibirica L.	Surma Sarovar, Bajhang	4150			
Schisandraceae	Schisandra grandiflora (Wall.) Hk. f. & Th.	Dhuli - Inuldar, Bajhang; Humla	2100-3300	Climber	Singate	
Scrophulariaceae	Buchnera hispida Buch.-Ham.	Khateda - Patan, Baitadi	1880-1200			
Scrophulariaceae	Centranthera nepalensis D. Don	Gauna, Baitadi	890			
Scrophulariaceae	Euphrasia himalaiyica Wett.	Simikot, Humla	3100			
Scrophulariaceae	Hemiphragma heterophyllum Wall.	Near Jabkung, Humla	3300	Herb		
Scrophulariaceae	Lancea tibetica Hook. f. et Thoms.	Talkot - Nayaodar, Bajhang; Seding, Humla	3700	Herb		
Scrophulariaceae	Mazus surculosus D.Don	Dandafaya, Humla	2900	Herb		
Scrophulariaceae	Mimulus nepalensis Benth.	Baitadi	1500 m			
Scrophulariaceae	Neopcrorhiza scrophulariiflora (Pennell) Hong.	Mekhala, Humla	3600-4200	Herb	Katuki	Rhizome: medicinal
Scrophulariaceae	Pedicularis gracilis Wall. ex Benth.	Khaptad Lekh, Bajhang	2900	Herb		
Scrophulariaceae	Pedicularis hookeriana Wall. ex Benth.	Munya Lagna - Palsa, Humla	3500	Herb		
Scrophulariaceae	Pedicularis bifida (D. Don) Pennell	Silinga - Khateda, Baitadi	1490-1880	Herb		
Scrophulariaceae	Pedicularis hoffmeisteri Klotzsch	Seding, Humla	3600	Herb		
Scrophulariaceae	Pedicularis sp.	Humla		Herb		
Scrophulariaceae	Picrorhiza scrophulariiflora Pennell	Gorkhali Lekh, Bajhang	3570	Herb		
Scrophulariaceae	Scrophularia edgeworthii Benth.	Munya Lagna - Palsa, Humla	3500			
Scrophulariaceae	Scrophularia elatiior Benth.	Niglad - Chirkitte, Baitadi	1720-1910			
Scrophulariaceae	Scrophularia decomposita Royle	Saipal, Bajhang				
Scrophulariaceae	Scrophularia laportiifolia T. Yamaz.	Darchula	2700-2900	Herb		Endemic to Nepal
Scrophulariaceae	Sopubia trifida Buch.-Ham. ex D. Don	Rasa - Roshiadanda, Bajhang;	2260-2540			

		Humla				
Scrophulariaceae	Vandellia crustacea Benth.	Darchula	840			
Scrophulariaceae	Verbascum thapsus L.	Yari to Muchu, Baitadi	1500-3400	Herb		
Scrophulariaceae	Veronica persica Poir.	Nara Pass to Yari, Humla	3700	Herb		
Scrophulariaceae	Wulfenia amherstiana Benth.	Dhalaun - Rasa, Bajhang	2400-2260			
Simaroubaceae	Picrasma quassioides (D. Don) Benn.	Khalangagaon - Pahung, Humla	3300			
Solanaceae	Datura stramonium L.	Baitadi	1500	Shrub	Dhaturo	
Solanaceae	Datura suaveolens Humb. et Willd.	Gadsera, Baitadi	1550	Shrub	Dhaturo	
Solanaceae	Hyoscyamus niger L.	Yari to Muchu, Humla	3400	Herb		
Solanaceae	Mandragora caulescence C.B. Clarke	Humla	3500	Herb		
Solanaceae	Nicandra physalodes Gaertn.	Khalanga, Darchula	840	Shrub	Ishmagoli	
Solanaceae	Physochlaina praealta (Decne.) Miers	Yari to Muchu	3200	Herb		
Solanaceae	Solanum nigrum L.	Bajhang	2000	Herb	Jangali bihi	
Solanaceae	Solanum erianthum D. Don	Huti, Darchula	1100	Herb	Dursul	
Solanaceae	Solanum tuberosum L.	Simkot-Yari, Humla	2900-3700	Herb	Aalu	
Staphyleaceae	Staphylea emodi Wall. ex Brandis	Chainpur, Bajhang	2600			
Symplocaceae	Symplocos crataegoides Buch.-Ham. ex D. Don	Satthaple - Remi, Humla		Tree		
Tamaricaceae	Myricaria rosea W.W.Sm.	Muchu, Humla	2850	Shrub	Dambu, Hambu	Leaf medicinal
Thymelaeaceae	Daphne bholua Buch.-Ham ex D.Don	Khaptad, Bajhang	2000-2900	Shrub		
Thymelaeaceae	Daphne retusa Hemsl.	Chhangru, Darchula	3300	Shrub		
Thymelaeceae	Stellera chamaejasme L.	Near Yari, Humla	3500-4000	Herb		
Thymelaeceae	Wikstroemia canescens Meisn.	Yapka khola to Dandafaya, Humla	2700-2900	Shrub	Lek Buins	fodder
Tiliaceae	Grewia sp.	Yablang to Salli Khola, Humla	2800	Tree	Riga	
Toricelliaceae	Torricellia tiliifolia DC.	Sunchera, Darchula	1750			
Ulmaceae	Celtis australis L.	Yablang, Humla	2800	Tree	Khadik	fruit edible
Ulmaceae	Ulmus brandisiana Schneid.	Near Dhuli, Bajhang	2650	Tree		
Ulmaceae	Ulmus wallichiana Planch.	Upper Dojam, Humla	2900	Tree		
Urticaceae	Boehmeria platyphylla D. Don	Gadsera - Sawaradigad, Baitadi	1700	Shrub		
Urticaceae	Boehmeria rugulosa Wedd.	Kinara = Chainpur, Bajhang	1390-1310	Shrub	Getha	
Urticaceae	Girardinia diversifolia (Link) Friis	Upper Dojam, Humla	2900	Herb		
Urticaceae	Girardinia heterophylla Decne.	Niglad, Baitadi	1720	Herb	Allo	
Urticaceae	Gonostegia hirta (Blume) Miq.	Baitadi	1500		Chiple ghans	
Urticaceae	Laportea bulbifera (Sieb. et Tucc.) Wedd.	Mt. Roshia, Bajhang	2515		Patle sisnu	
Urticaceae	Lecanthus peduncularis (Royle) Wedd.	Rimi, Humla	2500		Khole jhar	
Urticaceae	Pilea cordifolia Hook. f.	Near Thogundanda, Bajhang	2800	Herb		
Urticaceae	Pilea symmeria Wedd.	Niglad,.Baitadi	1720	Herb		

Urticaceae	Urtica dioica L.	Chhanna, Bajhang; Dharapori, Humla	1650-3300	Herb		
Urticaceae	Urtica hyperborea Jacquem. ex Wedd.	Humla	4100-5100	Herb		
Valerianaceae	Nardostachys grandiflora DC.	Mekhala, Humla	3650-4300	Herb	Bhulte, Jatamasi	Medicinal
Valerianaceae	Valeriana hardwickii Wall.	Humla	1200-4000	Herb		
Valerianaceae	Valeriana jatamansii Jones	Simkot, Chipra, Humla	2900	Herb	Samayo,	Root: medicinal
Verbenaceae	Caryopteris wallichiana Schan.	Baaskatne - Dilbagar, Bajhang	1160			
Verbenaceae	Holmskioldia sanguinea Retz.	Simal Bagar, Bajhang	1000		Jure phool	
Verbenaceae	Lippia nodiflora (L.) L. C. Richg. ex Mich.	Jodar, Bajhang	1000		Kurkure jhar	
Verbenaceae	Vitex negundo L.	Khalanga, Darchula	840		Simali	
Violaceae	Viola biflora L.	Dandafaya, Humla	3000	Herb		
Violaceae	Viola betonicifolia Sm.	Wangri, Humla	3100	Herb		
Violaceae	Viola pilosa Blume	Dyola, Baitadi	2350	Herb		
Viscaceae	Viscum album L.	Dharapori, Humla	2300	Shrub		
Vitaceae	Ampelocissus rugosa (Wall.) Planch.	Near Dojam, Humla	3100	Climber		
Vitaceae	Vitis heyneana Roem. & Schult.	Bokche Gauda - Yanchu, Humla	2100	Climber		
Vitaceae	Tetrastigma serrulatum (Roxb.) Planch.	Salli Pass to Kermi, Humla	3000	Climber		
ANGIOSPERMAE (MONOCOTS)						
Alliaceae	Allium hypsistum Steam	Mekhala, Humla	5500	Herb	Jimbu	Pickle
Alliaceae	Allium wallichii Kunth	Mekhala, Seding, Humla	2400-4650	Herb	Ban lasun	Pickle
Araliaceae	Aralia cachemirica Decne.	Khandeswori-Kautalgad, Darchula	2210		Dal kabro	
Araliaceae	Eleutherococcus cissifolius (Seem.) Harms.	Talkot - Naya Odar, Bajhang				
Araliaceae	Hedera nepalensis K. Koch	Tipulchyakti - Dopakhe, Darchula	2400	Climber	Dudhelo	
Araliaceae	Panax pseudo-ginseng Wall.	Marghor Lekh, Humla	3100	Shrub	Mangan	
Araceae	Arisaema consanguineum Schott	Aagar - Dhalaun, Bajhang	1700-2400	Herb	Tinchu	
Araceae	Arisaema flavum (Forsk.) Schott	Near Dojam, Humla	2900	Herb		Twig: vegetable
Araceae	Arisaema flavum ssp. Abbreviatum (Schott) J. Murata	Yanchui Khola - Kharpunath, Humla	2150	Herb		
Araceae	Arisaema griffithii Schott	Chipra, Humla	2300	Herb		
Araceae	Arisaema jacquemontii Blume	Kallas, Humla	2700	Herb	Banko	
Araceae	Arisaema propinquum Schott	Khaptad, Bajhang	2500-3800	Herb		
Araceae	Arisaema tortuosum (Wall.) Schott	Kaligad valley, Bajhang	2400	Herb	Banko	
Araceae	Arisaema utile Hook. f. ex Schott	Kaligad valley, Bajhang	2900	Herb		
Asparagaceae	Asparagus filicinus Buch.-Ham. ex D. Don	Jabkung, Humla	3100	Herb		
Asparagaceae	Asparagus racemosus Willd.	Mekhala,; Chipra, Humla	2300	Herb	Kurilo	
Convallariaceae (Liliaceae)	Smilacina purpurea Wall.	Humla	2500-3800	Herb		

Cyperaceae	Carex atrofusca Schkuhr	Khaptad, Bajhang	4000-5500	Herb		
Cyperaceae	Carex inanis Clarke	Dhuli - Inuldar, Bajhang	2450	Herb		
Cyperaceae	Carex lehmannii Drejer	Chankheli Lagna, Humla	3450	Herb		
Cyperaceae	Carex myosurus Nees	Thin, Darchula	2300	Herb		
Cyperaceae	Carex nivalis Boott	Surma Sarovar, Bajhang	4150	Herb		
Cyperaceae	Carex nubigena Tilloch & Taylor	Chankheli Lagna, Humla	3450	Herb		
Cyperaceae	Cyperus niveus Retz.	Dilbagar, Bajhang	1150	Herb		
Cyperaceae	Cyperus rotundus L.	Lothi Khola, Humla	1680	Herb		
Cyperaceae	Cyperus squarrosus L.	Rapla - Tangbang, Darchula	2000	Herb		
Cyperaceae	Eleocharis palustris (L.) Roemer & Schultes	Khaptad, Bajhang	2000-3800	Herb		
Cyperaceae	Eriophorum comosum (Wall.) Clarke	Darchula - Huti, Darchula	900	Herb		
Cyperaceae	Kobresia duthiei Clarke	Saipal, Bajhang	3878	Herb		
Cyperaceae	Kobresia nepalensis (Nees) Kuek.	Saipal, Bajhang	3878	Herb		
Cyperaceae	Kobresia royleana (Nees) Kuek.	Saipal, Bajhang	3878	Herb		
Cyperaceae	Kobresia sp 1	Humla		Herb		
Cyperaceae	Kobresia sp 2	Humla		Herb		
Dioscoreaceae	Dioscorea bulbifera L.	Chipra, Yapka khola to Dandafaya, Humla	2100-2400	Climber	Khinkhine	
Dioscoreaceae	Dioscorea deltoidea Wall. ex.Griseb	Humla	450-3100	Climber		
Dioscoreaceae	Dioscorea sp.	Humla	2500-3300	Climber		
Iridaceae	Iris kemaonensis D.Don ex Royle	Seding, Humla	3700	Herb		
Iridaceae	Iris sp.	Dandafaya, Humla	3000	Herb		
Juncaceae	Juncus articulatus L.	Khaptad, Bajhang	3000	Herb		
Juncaceae	Juncus benghalensis Kunth	Marghor Lekh, Humla	3200	Herb		
Juncaceae	Juncus chrysocarpus Buchenau	Khaptad, Bajhang	3000	Herb		
Juncaceae	Juncus concinnus D. Don	Talkot - Aagar, Bajhang	2000	Herb		
Juncaceae	Juncus effusus L.	Dhalaun - Rasa, Bajhang	2700	Herb		
Juncaceae	Juncus himalensis Klotzsch	Chankheli Lagna, Humla; Khaptad	3200-5200	Herb		medicinal
Juncaceae	Juncus inflexus L.	Kanda, Bajhang	2270	Herb		
Juncaceae	Juncus himalensis Klotzsch	Baitadi	3200-5200	Herb		
Juncaceae	Juncus membranaceous Royle ex D.Don	Khaptad, Bajhang	3000-3700	Herb		
Juncaceae	Juncus thomsonii Buchenau	Khaptad, Bajhang	2700-5200	Herb		
Juncaceae	Juncus sphacelatus Decne	Aletsoura, Bajhang	4348	Herb		
Juncaginaceae	Triglochin palustris L.	Chhangru, Darchula	2900	Herb		
Liliaceae	Allium wallichii Kunth	Pategaon - Badigaon, Bajhang	2190-2300	Herb	Ban lasun	
Liliaceae	Aletris pauciflora Klotzsch) Hand.Mazz.	Kariganga - Aletsoura, Bajhang	4090	Herb		
Liliaceae	Allium prattii C. H. Wright	Chheti – Mechhra, Darchula	3500	Herb		

Liliaceae	Asparagus curillus Buch.-Ham. ex Roxb.	Bangh, Bajhang	1000	Herb		
Liliaceae	Cardiocrinum giganteum (Wall.) Makino	Dhuli - Inuldar, Bajhang	2510			
Liliaceae	Clintonia udensis Trautv. & Meyer	Khaptad, Bajhang	3200-4000	Herb		
Liliaceae	Clintonia udensis var. Alpina (Baker) H. Hara	Dhuli, Bajhang	3000			
Liliaceae	Fritillaria cirrhosa D. Don	Surma Sarovar, Bajhang	3500	Herb	Kokili	
Liliaceae	Fritillaria cirrhosa D. Don	Near Saipal, Khagal Gaun VDC, Humla	3300-3700	Herb	Podya	
Liliaceae	Lilium nepalense D. Don	Kasoti - Chheti, Darchula	2550	Herb	Khiraule	
Liliaceae	Lloydia longiscapa Hook.	Upper Seding, Humla	3900	Herb		
Liliaceae	Lloydia serotina (L.) Reichenb.	Aletsoura, Bajhang	4363	Herb		
Liliaceae	Lloydia sp.	Nara to Yari, Humla	3800	Herb		
Liliaceae	Ophiopogon wallichianus (Kunth) Hook. f.	Way to Darma, Humla	3300	Herb		
Liliaceae	Paris verticillatum (L.) All.	Ghodilekh, Bajhang	4000	Herb	Khiranglo	
Liliaceae	Paris polyphylla Sm.	Rimi - Chankheli, Humla	2600	Herb	Satuwa	
Liliaceae	Polygonatum cirrhifolium (Wall.) Royle	Salle khola to Kermi, Humla	2800	Herb	Khiraulo	
Liliaceae	Polygonatum hookeri Baker	Upper Seding, Humla	4000	Herb		
Liliaceae	Polygonatum singalilense H. Hara	Dhungadanda, Bajhang	3386	Herb		
Liliaceae	Polygonatum verticilatum (L.) All.	Jabkung, Humla	3300	Herb		
Liliaceae	Streptopus simplex D. Don	Ghodilekh, Bajhang	3333	Herb		
Liliaceae	Trillidium govanianum (Royle) Kunth	Khaptad, Bajhang	3090	Herb		
Orchidaceae	Aerides multiflorum Roxb.	Sundi Khola, Bajhang	960	Herb		
Orchidaceae	Aorchis spathulata (L.) Vermeulen	Manane Lekh, Bajhang	4000	Herb		
Orchidaceae	Cephalanthera longifolia (L.) Fritsch	Surma Sarovar, Bajhang	2800	Herb		
Orchidaceae	Chusua pauciflora (Lindl.) P. F. Hunt	Kalla - Poom gaon, Humla	2700	Herb		
Orchidaceae	Coelogyne cristata Lindl.	Chir, Bajhang	1650	Herb		
Orchidaceae	Dactylorhiza hatagirea (D. Don) Soo	Mekhala, Mimi VDC, Humla	3500-4200	Herb	Panchaunle	
Orchidaceae	Epipactis helleborine (L.) Crantz	Phucha, Humla	2600	Herb		
Orchidaceae	Epipactis veratrifolia	North of Chainpur, Bajhang	1900	Herb		
Orchidaceae	Epipactis royleana Lindl. Boiss. & Hohen.	Upper Seding, Humla	3800	Herb		Ritual
Orchidaceae	Eria lasiopetala (Willd.) Ormerod	Rupal, Bajhang	1000	Herb		
Orchidaceae	Goodyera repens (L.) R. Br.	Ghodi Lekh, Baitadi	3030	Herb		
Orchidaceae	Habenaria arietina Hook. f.	Kasoti, Darchula	2430	Herb		
Orchidaceae	Habenaria stenopetala Lindl. Lindl.	Dhalaun, Bajhang	2300	Herb		
Orchidaceae	Herminium duthiei Hook. f.	Chankheli, Humla	3500			
Orchidaceae	Herminium josephii Rchb. f.	Chheti - Mechchra, Darchula	3400			
Orchidaceae	Herminium lanceum (Sw.) J. Vuijk	Talkot - Aagar, Bajhang	1660-1840			
Orchidaceae	Herminium monophyllum (D. Don) Hunt &	Ganna - Nalabagar, Baitadi	1000			

	Summer.					
Orchidaceae	Luisia zeylanica Lindl.	Pangsera - Bagadi, Baitadi	770			
Orchidaceae	Malaxis acuminata D. Don	Pasela - Banjh, Bajhang	2372			
Orchidaceae	Malaxis cylindrostachya (Lindl.) Kuntze	Dopakhe - Thin, Darchula	2700			
Orchidaceae	Neottia listeroides Lindl.	Marghor Lekh, Humla	3100			
Orchidaceae	Neottianthe cucullata var. Calcicola (W. W. Sm.) Soo	Above Suma Kharka, Humla	3850			
Orchidaceae	Oberonia falconeri Hook. f.	Chir, Bajhang	1100	Herb		
Orchidaceae	Peristylus constrictus (Lindl.) Lindl.	Dhik Gad - Gokule, Baitadi	600	Herb		
Orchidaceae	Peristylus elizabethae (Duthie) R. K. Gupta	Tipulchyakti, Darchula District	2850	Herb		
Orchidaceae	Peristylus fallax Lindl.	Pategaon - Badigaon, Bajhang	2190-2230	Herb		
Orchidaceae	Pholidota articulata Lindl.	Paribagar - Makarigad, Darchula	1250	Herb		
Orchidaceae	Platanthera clavigera Lindl.	Thin, Darchula	2300			
Orchidaceae	Platanthera edgeworthii (Collett) R. K. Gupta	Dhalaun, Bajhang	1940			
Orchidaceae	Platanthera latilabris Lindl. Lindl.	Durpa, Humla	2900			
Orchidaceae	Satyrium nepalense D. Don	Thin, Darchula	2300			
Orchidaceae	Spiranthes sinensis (Pers.) Ames	Chhangru, Darchula	2900	Herb		
Orchidaceae	Trudelia alpina (Lindl.) L. A. Garay	Chir, Bajhang	1100	Herb		
Orchidaceae	Eulophia dabia (D. Don) Hochr.	Humla	2000	Herb		Vegetable
Poaceae	Agrostis micrantha Steud.	Talkot - Setibagar, Bajhang	1450	Herb		
Poaceae	Agrostis munroana Aitch. & Hemsl.	Kuntisau, Darchula	2550	Herb		
Poaceae	Agrostis pilosula Trin.	Kuntisau, Darchula	1550	Herb		
Poaceae	Apluda mutica L.	Aagar - Dhalaun, Bajhang	2100	Herb		
Poaceae	Aristida adscensionis L.	Aagar - Dhalaun, Bajhang	2100	Herb		
Poaceae	Arundinella setosa Trin.	Kharpu, Humla; Roshia Danda, Bajhang	2100-2300	Herb		
Poaceae	Arundo donax L.	Rasa - Roshia Danda, Bajhang	2100	Herb	Thulo narkat	
Poaceae	Avena sativa L.	Yari to Yablang, Humla	2500-3400	Herb	Jau	Vegetable
Poaceae	Bothriochloa ischaemum (L.) Keng	Phucha, Humla	2650	Herb		
Poaceae	Bothriochloa pertusa (L.) A. Camus	Rimi Gaon, Humla	2400	Herb		
Poaceae	Briza media L.	Chankheli Lagna, Humla	3500	Herb		
Poaceae	Calamagrostis lahulensis G. Singh	Nampa Gad, Darchula	3000	herb		
Poaceae	Calamagrostis pseudophragmites (Haller f.) Koeler	Kuntisau, Darchula	2550	herb		
Poaceae	Capillipedium assimile Stapf	Dumli - Rapla, Darchula	1800	herb		
Poaceae	Capillipedium parviflorum (R. Br.) Stapf	Aagar - Dhalaun, Bajhang	2200	herb		
Poaceae	Chrysopogon gryllus (L.) Trin.	Talkot - Aagar, Bajhang	2000	herb		

Poaceae	Cymbopogon distans (Steud.) W. Watson	Talkot - Aagar, Bajhang	2000	herb		
Poaceae	Cynodon dactylon (L.) Pers.	Mekhala, Humla	100-3000	herb	Dubo	
Poaceae	Dactylis glomerata L.	Dhalaun - Rasa, Bajhang	2500	herb		
Poaceae	Danthonia cumminsii Hook. f.	Khaptad, Bajhang	2930	herb		
Poaceae	Dendrocalamus hamiltonii Nees & Arn. ex Munro	Mekhala, Humla	1000-2000	Bamboo	Tama bans	
Poaceae	Deyeuxia pulchella (Griseb.) Hook.f.	Humla	2900-4600	Herb		
Poaceae	Drepanostachyum falcatum (Nees) Keng f.	Mekhala, Humla	1500-2000	Herb	Nigalo tusa	
Poaceae	Drepanostachyum intermedium (Nees) Keng f.	Humla		Herb		grains as cereal
Poaceae	Deschampsia caespitosa (L.) P. Beauv.	Chankheli - Rimi, Humla	2900	Herb		
Poaceae	Digitaria abludens (Roem. & Sch.) Veldkamp	Lothi Khola, Humla	1680	Herb		
Poaceae	Digitaria ciliaris (Retz.) Koeler	Lothi Khola, Humla	1680	Herb		
Poaceae	Digitaria cruciata (Steud.) A. Camus	Dumli - Rapla, Darchula	1800	Herb		
Poaceae	D. Digitaria ternata (A. Rich.) Stapf	Ruga - Luma gaon, Humla	1900	Herb		
Poaceae	Echinochloa crusgalli (L.) P. Beauv.	Rapla, Darchula	1800	Herb		
Poaceae	Eleusine indica (L.) Gaertn.	Darchula - Huti, Darchula	900	Herb		
Poaceae	Elymus nutans Griseb.	Kaliganga, Bajhang	3939	Herb		
Poaceae	Eragrostis nigra Nees ex Steud.	Rasa - Roshia Danda, Bajhang	2100	Herb		
Poaceae	Eulalia mollis (Griseb.) Kuntze	Dhalaun - Rasa, Bajhang	2050	Herb		
Poaceae	Eulalia trispicata (Schult.) Henrard	Aagar – Dhalaun, Bajhang	2000	Herb		
Poaceae	Eulaliopsis binata (Retz.) C. E. Hubb.	Badigaon - Dantola, Bajhang	1800	Herb		
Poaceae	Festuca gigantea (L.) Vill.	Khaptad - Talkot, Bajhang		Herb		
Poaceae	Festuca ovina L.	Khaptad; Saipal, Bajhang	3600-5600	Herb		Cereal grain
Poaceae	Festuca rubra L.	Saipal, Bajhang	2900-3900	Herb		
Poaceae	Helictotrichon junghuhnii (Buse) Henrard	Dhalaun - Rasa, Bajhang	2300	Herb		
Poaceae	Heteropogon contortus (L.) Roem. & Schult.	Talkot - Aagar, Bajhang	2000	Herb		
Poaceae	Melica onoei Franch. & Sav.	Dandap, Darchula	2500	Herb		
Poaceae	Microstegium nudum (Trin.) A. Camus	Jimkot - Khaptad, Bajhang	2100	Herb		
Poaceae	Miscanthus nepalensis (Trin.) Hack.	Dhalaun - Rasa, Bajhang	2250	Herb		
Poaceae	Muhlenbergia himalayensis Hook. f.	Rapla - Tangbang, Darchula	1800	Herb		
Poaceae	Muhlenbergia huegelii Trin.	Dhalaun - Rasa, Bajhang	2500	Herb		
Poaceae	Oplismenus compositus (L.) P. Beauv.	Talkot - Aagar, Bajhang	2000	Herb		
Poaceae	Oplismenus hirtellus ssp. Undulatifolius (Ard.) U. Scholz	Talkot - Aagar, Bajhang	2000	Herb		
Poaceae	Oryzopsis aequiglumis Duthie ex Hook. f.	Thin - Dandap, Darchula	2500	Herb		
Poaceae	Oryzopsis munroi Stapf ex Hook. f.	Lothi Khola - Melchham, Humla	2120	Herb		

Poaceae	Pennisetum flaccidum Griseb.	Tinkar, Darchula	3500	Herb		
Poaceae	Pennisetum orientale Rich.	Chainpur, Bajhang	1350	Herb		
Poaceae	Phacelurus speciosus (Steud.) C. E. Hubb.	Dandap, Darchula	2500	Herb		
Poaceae	Phleum alpinum L.	Kariganga, Bajhang	3939	Herb		
Poaceae	Poa calliopsis Litv. ex Ovcz.	Allechaur, Bajhang	4363	Herb		
Poaceae	Pogonatherum crinitum (Thunb.) Kunth	Kinada - Chainpur, Bajhang	1400	Herb		
Poaceae	Rottboellia cochinchinensis (Lour.) Clayton	Darchula - Huti, Darchula	1200	Herb		
Poaceae	Saccharum rufipilum Steud.	Pala - Kuntisau, Darchula	2300	Herb		
Poaceae	Saccharum spontaneum L.	Talkot - Aagar, Bajhang	1900	Herb		
Poaceae	Sacciolepis indica (L.) Chase	Jimkot - Khaptad, Bajhang	1600	Herb		
Poaceae	Setaria pumila (Poir.) Roem. & Schult.	Badigaon, Bajhang	2100	Herb		
Poaceae	Setaria verticillata (L.) P. Beauv.	Darchula - Huti, Darchula	900	Herb		
Poaceae	Sporobolus piliferus (Trin.) Kunth	Dumli - Rapla, Darchula	1800	Herb		
Poaceae	Stipa staintonii Bor	Chankheli Lagna, Humla	3500	Herb		
Poaceae	Themeda anathera Nees ex Steud.) Hack.	Talkot - Aagar, Bajhang	2000	Herb		
Poaceae	Themeda triandra Forssk.	Rasa - Roshia Danda, Bajhang	2100	Herb		
Poaceae	Tripogon filiformis Nees ex Steud.	Dhalaun - Rasa, Bajhang	2500	Herb		
Poaceae	Trisetum spicatum (L.) K. Richt.	Khaptad, Bajhang	2930	Herb		
Poaceae	Glyceria tonglensis C.B.Clarke	Humla	2300-3500	Herb		
Poaceae	Hordeum vulgare L.	Kermi to yari, Humla	2800-3600	Herb	Uwa	
Poaceae	Oryza sativa L.	Dharapori (Cultivated), Humla	2400	Herb	Dhan	
Poaceae	Panicum miliaceum L.	Khagalgaun, Dharapori, Humla	2500	Herb	Chino	
Poaceae	Paspalum sp.	Dharapori	2500	Herb		
Poaceae	Poa annuna L.	Khaptad (Baitadi)	2300-3500	Herb		
Poaceae	Poa pagophila Bor	Khaptad (Baitadi)	3600-5200	Herb		
Poaceae	Poa sikkimensis (Stapf) Bor	Humla	3200-4400	Herb		
Poaceae	Polypogon fugax Nees ex Steud.	Humla	1500-3600	Herb		Vegetable
Poaceae	Stipa sibirica (L.) Lam.	Humla	2600-3200	Herb		
Poaceae	Thamnocalamus spathiflorus (Trin.) Munro	Khaptad, Bajhang		Herb		
Ruscaceae	Ophiopogon intermedius D.Don	Khaptad, Bajhang	1200-3000	Herb		
Smilacaceae	Smilax aspera L.	Mekhala, Humla	1200-2600	Herb	Kukurdaino	
Trilliaceae (Liliaceae)	Trillidium govanianum (D.Don) Kunth	Khaptad, Bajhang		Herb		
Zingiberaceae	Roscoea purpurea Smith	Khaptad, Bajhang	1500-3000	Herb		

Annex 6. Useful species of plants recorded in Thehe and Chhipra VDCs (the table consists of selected species of plants having medicinal, food and socio-cultural importance only).

Sn	Species	Family	Local name	Locality	Altitude	Parts use*	Use
1	*Abies pindrow* Royle	Pinaceae	Gobre (N)	Manal	2700 m	Tr	As a flag pole
2	*Abies spectabilis* (D.Don) Mirb.	Pinaceae	Gobrya (N)	Jabkung-Seding	3400-3800 m	Tr	As a flag pole
3	*Acer caesium* Wallich ex Brandis	Aceraceae	Tilaailo (N), Dalaba (D)	Manal	2700 m	Wd	Knotty burs of trunk in the preparation of drinking cups
4	*Acer cappadocicum* Gled.	Aceraceae	Tilaailo (N), Chajat (D)	Jabkung	3100 m	Wd	Knotty burs in the preparation of drinking cups; best preferred than *A. caesium*
5	*Aconitum spicatum* (Bruhl) Stapf	Ranunculaceae	Bish (N), Dhuk (D)	Tugling	3400 m	Rt	Poison; traded
6	*Aconogonum molle* (D. Don) Hara var. *frondosum* (Meisn.) H. Hara	Polygonaceae	Nyalu (D)	Tugling	3350 m	Pt, Lf	Petiole in pickle, tender leaves as vegetable
7	*Aconogonum rumicifolium* (Royle ex Bab.) Hara	Polygonaceae	Bhuj (D)	Seding	3700 m	Rt, St	Root in dycentry, stomach trouble; stem eaten raw
8	*Allium wallichii* Kunth	Amaryllidaceae	Gokpa	above Phwaso	3640 m	Wp	Cooked as vegetable or used as condiment
9	*Alnus nitida* (Spach) Endl.	Betulaceae	Utis (N), Ning (D)	Chhipra	2300 m	Bk,Rn	Bark paste in injuy; resin to treat internal injuries
10	*Arisaema flavum* (Forsk.) Schott	Araceae	Banko (N), Dhol (D)	Manal	2700 m	Wp	Cooked as vegetable
11	*Arisaema griffithii* Schott	Araceae	Dhoka (N), Dhwaki (D)	Jabkung	3100 m	Lf,Rt	Cooked as vegetable; also useful to treat malaria
12	*Arnebia benthamii* (Wall ex G Don) IM	Boraginaceae	Maharangi (N), Kumrti (D)	Seding	3800 m	Rt	Rootstock yield red dye to color woolen commodities
13	*Asparagus filicinus* Buch.-Ham. ex D. Don	Liliaceae	Tikpa (D)	Manal	2700 m	Rt	Tubers to treat toothache.
14	*Berberis aristata* DC.	Berberidaceae	Chotto (N)	Hildum chhada	2450 m	Fr, Bk	Ripe fruits eaten raw; inner bark to extract yellow dye
15	*Berberis asiatica* Roxb. ex DC.	Berberidaceae	Tilkhudo (N)	Dozam	2600 m	Fr, Bk	Ripe fruits eaten raw; inner bark to extract yellow dye
16	*Berberis lycium* Royle	Berberidaceae	Chotto (N)	Hildum chhada	2450 m	Fr, Bk	Ripe fruits eaten raw; inner bark to extract yellow dye
17	*Berginia ciliata* (Haw.) Sternb	Saxifragaceae	Tanki medok	Dozam	2600 m	Rh	In fever
18	*Betula utilis* D. Don	Betulaceae	Bhuj (N), Takpa (D)	Manal	2700 m	Wd, Rn, Lf	Wood for the preparation of plough and churning stick known as 'Baldwa'; resin as a substitute of tea ('takchya')
19	*Bistorta macrophylla* (D. Don) Sojak	Polygonaceae	Ranbu (D)	above Phwaso	3640 m	Sd	Seeds eaten raw, also taken to treat blood dycentry
20	*Capsella bursa-pastoris* (L.) Medik.	Brassicaceae	Chalne saag	Jabkung	3100 m	Lf	Tender leaves cooked as vegetable
21	*Cardamine impatiens* L.	Brassicaceae	Khaplongma (D)	Jabkung	3100 m	Lf	Tender leaves cooked as vegetable
22	*Cedrus deodara* (Roxb. ex D. Don) G. Don	Pinaceae	Diyar (N)	Chhipra	2300 m	Wp	Plant is considered as sacred and planted in the temple area
23	*Chenopodium album* L.	Chenopodiaceae	New, Betu	Jabkung	3000 m	Lf,Sh	Cooked as vegetable
24	*Coleus forskohlii* Briq.	Lamiaceae	Sujauno (N)	Chhipra	2250 m	Rt	To treat diarrohea, indigestion, dysentery; also as condiment and in pickle
25	*Corylus jacquemontii* Decne.	Corylaceae	Rigo (N), Ruj (D)	Manal	2700 m	Sd	Nuts are eaten as food; nut are also given to treat sore throat
26	*Cotoneaster frigidus* Wall.	Rosaceae	Rains (N), Chhabra (D)	Manal	2700 m	Wd	To prepare blade (locally 'Phaal') of plough ('Pangba')
27	*Cynanchum auriculatum* Wight	Asclepiadaceae		Jabak	2650 m	Rn	White sap of the plant to heal wounds

28	*Cynanchum canescens* (Willd.) K. Schum.	Asclepiadaceae	Medok serbo (D)	above Jabkung	3200 m	Rt	In asthma
29	*Dactylorhiza hatagirea* (D. Don) Soo	Orchidaceae	Hattajadi (N), Wanbolakpa (D)	Tugling	3550 m	Rt	In cuts and wounds; roasted tubers eaten as potato; traded.
30	*Delphinium brunonianum* Royle	Ranunculaceae	Mangromulo	above Seding	4300 m	Rt	Insectiside; traded
31	*Delphinium himalayai* Munz	Ranunculaceae	Atis (N), Alusi (D)	Manal	2700 m	Rt	In cough and cold, fever, headache, vomitting; traded
32	*Desmodium elegans* DC.	Fabaceae	Chamla (N), Thinga (D)	Manal	2700 m	St	As cordage to hang bee hives on rocks
33	*Dipsacus inermis* Wall.	Dipsacaceae	Khanikol (D)	above Jabkung	3200 m	Lf, Sh	Tender shoots cooked as vegetable
34	*Drepanostachym intermedium* (Nees) Keng f.	Poaceae	Nigalo (N)	Chhipra	2400 m	St	To prepare different articles; also used to prepare outer frame of 'chalni' (a meshed utensil consisting of a round frame surrounding a mesh made up of goat leather with large pore size and used to sieve wheat, barley, etc.)
35	*Dryopteris cochleata* (D. Don) C. Chr.	Dryopteridaceae	Neuro, Lingudo	Dozam	2600 m	Lf	Tender shoots cooked as vegetable
36	*Eskemukerjea megagacarpum* (H. Hara) H. Hara	Polygonaceae	Kima-lang-lang, Kyun-lang-lang (D), Bhote khair (N)	Jabkung	3000 m	Rh	Craks/ Sprains, stem eaten raw (sour in taste)
37	*Eulophia dabia* (D. Don) Hochr.	Orchidaceae	Kala dana	Dozam area	2600 m	Wp	Tender shoots in medicine; tubers are traded
38	*Ficus palmata* Forssk.	Moraceae	Bedu (N)	Baijubara	2500 m	Fr	Ripe fruits eaten; planted as shade and fodder tree
39	*Fragaria nubicola* Lindl. ex Lacaita	Rosaceae	Kappu	above Phwaso	3640 m	Fr	Ripe fruits eaten
40	*Fritillaria cirrhosa* D. Don	Liliaceae	Podya (D)	Tugling	3500 m	Rt	Root extrat given to livestock as antidote; traded
41	*Girardinia diversifolia* (Link) Friis	Urticaceae	Allo (D)	above Dozam	2700 m	Lf,Rt	Vegetable, fibre
42	*Hippophae salicifolia* D. Don	Elaeagnaceae	Dalechuk (N)	Thehe	2500 m	Fr	Ripe fruits are eaten raw, also taken to cure stomachache, cough and and cholera and as anthelmintic; also used to make fresh pickle
43	*Hippophae tibetana* Schltr.	Elaeagnaceae	Tarechuk, Bhuinchuk (N)	Rakarbu	3900 m	Fr	Ripe fruits are eaten to cure work infestation and cholera; also used to make pickle
44	*Inula cappa* (Buch.-Ham. ex D. Don) DC.	Asteraceae	Lande joba (D)	Naksupa	2700	Wp	Plant is used for spititual treatment of a persion by a shaman
45	*Juglans regia* L. var kamaonica C. DC.	Juglandaceae	Okhar	Dozam-Jabkung	2600-3300 m	Fr, Wd	Edible oil, dye; nuts eaten fresh; also planted
46	*Juniperus indica* Bertol.	Cupressaceae	Sukpa	above Phwaso	3640 m	Lf,Wd	Leaves in incense; wood to make two types of vessels: (i) a big vessel or churn (locally known as 'twadam') for keeping curd, in which curd is stirred vigorously to produce butter; and (b) a small vessel locally known as 'Pari' for milking.
47	*Jurinea dolomaea* Boiss.	Asteraceae	Dhupjadi	Rakarbu	4000 m	Rt	Medicne; traded
48	*Leucas lanata* Benth.	Lamiaceae	Ganaune Bhad (N)	Chhipra	2200 m	Lf.St	Poison to bed bug and lice; juice is applied to treat lice on goats
49	*Lonicera* sp.	Caprifoliaceae	Ghyaghar	Jabak	2700 m	Pith	Intact stem pith is used to prepare different shaped decorative objects; during festivals a rounded object prepared from the pith is kept on the top of religious effigy in place of butter

50	*Megacarpia polyandra* Benth.	Brassicaceae	Rugi (D)	Tugling	3500 m	Lf	Cooked as vegetable; it is believed that its consumption is useful to treat malaria
51	*Morchella conica*	Morchallaceae	Guchhi chyau (N) Puyam (D)	Tugling	3500 m	Wp	Whole mushroom is either roasted or cooked as vegetable; slightly toxic in empty stomach; highly traded.
52	*Morus* sp.	Moraceae	Kimu (N)	Chhipra	2300 m	Fr	Ripe fruits are eaten
53	*Nardostachys grandiflora* DC.	Valerianaceae	Bhulte/Jatamasi	Chhuda longbo	4300 m	Rh	Insence; traded
54	*Neopcrorhiza scrophulaiifolia* (Peennell) Hong.	Scrophulariaceae	Katuki	Chhuda longbo	3900 m	Rh,Rt	Headache, cold, fever; traded
55	*Origanum vulgare* L.	Lamiaceae	Ghodamorcha, Tulasi	above Chhipra	2500 m	Lf,Fl	A herbal tea prepared from its leaves are given to treat asthma, cold and cough
56	*Oxyria digyyna* (L.) Hill	Polygonaceae	boke, bojo (N)	Seding	3700 m	Lf,Pt	As cooling agent, often eaten when thirst; also used in bloody dysentery
57	*Paris polyphylla* Smith	Liliaceae	Sato, Satuwa	Chhipra	3200 m	Rt	Medicine; traded
58	*Parnassia nubicola* Wallich ex Royle	Parnassiaceae	Nirbisi (N, D)	Phwaso	3550 m	Rt	To treat cuts and wounds, and eye infection (eye ripening)
59	*Phytolacca acenosa* Roxb.	Phytolaccaceae	Jarko, Jarkung (N)	Jabak	2700 m	St,Lf	Young stem and leaves are cooked as vegetable
60	*Picea smithiana* (Wallich) Boiss.	Pinaceae	Jam (D), Thingo (N)	Manal	2700 m	Wd	As a flag pole
61	*Pinus wallichiana* A.B. Jackson	Pinaceae	Khote sallo, Paphe sallo (N); Thesing (D)	Phwaso	3500 m	Wd	As a flag pole
62	*Pistasia chinensis* Bunge subsp. integerrima (J.L. Stewart) Rech. f.	Anacardiaceae	Kakarsilo (N)	Chhipra	2300 m	Insect gall	Medicine; traded
63	*Pleurospermum benthamii* (DC.) C.B. Clarke	Apiaceae	Haroma	Jabkung	3100 m	St	Eaten raw, it is beneficial for stomach, indegestion; also prepared pickle from the young stem
64	*Podophyllum hexandrum* Royle	Berberidaceae	Tito kankro (N)	above Jabkung	3200 m	Fr	Fruit eaten raw, also used in cold
65	*Polygonatum cirrhifolium* (Wall.) Royle	Liliaceae	Nigali sag (D)	above Jabkung	3200 m	Lf, Rt	Tender shoot and leaves cooked as vegetable; tubers as medicine
66	*Polygonatum verticilatum* (L.) All.	Liliaceae	Nigali sag, Khilaudo (D)	Jabkung-Tugling	3100-3500 m	Lf	Tender shoot and leaves cooked as vegetable
67	*Prinsepia utilis* Royle	Rosaceae	Dhutelo (N)	Hildum chhada	2450 m	Sd	Edible oil highly preferred by most of the people; oil is also traded in small extent
68	*Prunus davidiana* (Carriere) Franchet	Rosaceae	Khambu (N), Khabu (D)	Dozam area	2650 m	Fr,Sd	Ripe fruits eaten; seeds yield edible oil; oil is applied to treat joint pains
69	*Prunus napaulensis* (Seringe) Steud.	Rosaceae	Aryaa (N); Are (D)	Gyal dorje	2900 m	Fr, Wd	Ripe fruits are edible
70	*Prunus rufa* Hook f.	Rosaceae	Aryaa (N); Are (D)	above Jabkung	3300 m	Fr	Ripe fruits are edible
71	*Pyrus pashia* Buch.-Ham. ex D. Don	Rosaceae	Mel (N)	Chhipra	2300 m	Fr	Ripe fruits eaten, fruit pulp also mixed with tobacco and smoked for taste and aroma; fruits are also eaten as cooling agent, fruit pulp is to treat heart pain
72	*Rheum australe* D. Don	Polygonaceae	Padamchalno (N), Aarthakpa, Kangmara (D)	above Jabkung	3300 m	Rh,Pt	Dye (yellow/red); petiole in pickle; traded
73	*Rheum moorcroftianum* Royle	Polygonaceae	Padamchalno (D,N)	above Phwaso	3640 m	Rh,Pt	Dye (yellow/red); petiole in pickle; traded
74	*Rhododendron anthopogon* D. Don	Ericaceae	Lek dhupi (N), Balu (D)	above Phwaso	3640 m	Lf	Incense

75	*Rhododendron campanulatum* D. Don	Ericaceae	Ratokpa (D)	above Phwaso	3640 m	Wd	To prepare kitchen utensils, such as ladle (a spoon with a long handle and a deep bowl, used to serve soup and other liquids)
76	*Rhododendron lepidotum* Wallich ex G. Don	Ericaceae	Rato balu	above Jabkung	3300 m	Lf	Incense
77	*Rhus chinensis* Miller	Anacardiaceae	Bhange chuk (N)	Chhipra	2300 m	Fr	Ripe fruits are dried and make powder which is used as pickle
78	*Rosa sericea* Lindl.	Rosaceae	Sebling (D)	Jabak	2850 m	Fl, Rt	Root as substitute of tea; flower juice in eye pain
79	*Rubia manjith* Roxb. ex Fleming	Rubiaceae	Mujetho (N)	Chhipra	2400 m	Rt	Roots yield red or brown dye used to color cloth
80	*Rubus ellipticus* Sm.	Rosaceae	Aainselu	Dozam	2600 m	Fr	Ripe fruits eaten
81	*Rubus paniculatus* Sm.	Rosaceae	Kalo aainselu	above Dozam	2700 m	Fr	Ripe fruits eaten
82	*Rumex nepalensis* Spreng	Polygonaceae	Hale (N), Suyokpa (D)	Phwaso	3550 m	Rh	Rootstock to treat fractured and injuries; also to extract dye to color goat hair
83	*Rumex* sp.	Polygonaceae	Kirmothakthak	Tugling	3500 m	Lf	leaves are sour in taste and used in pickle or cooked as vegetable
84	*Silene* sp.	Caryophyllaceae	Naro (N, D)	Jabkung	3100 m	Rt	As detergenet; roots are chopped, dried and crushed to make powder, which is stored as used when needed
85	*Smilicina purpurea* Wallich	Liliaceae	Thaing (D), Salli saag (N)	Jabkung	3300 m	Lf	Cooked as vegetable
86	*Sorbus lanata* (D. Don) Schauer	Rosaceae	Laha Tambal	Naksupa, near Namul khola	2800 m	Fr	Ripe fruits are eaten, the plant is used as an wild stock for apple grafting
87	*Stellera chamaejasme* L.	Thymeliaceae	Jharan (N)	above Jabkung	3500 m	Rt	In swellings and fracture
88	*Swertia ciliata* (D. Don ex G. Don) B.L. Burtt	Gentianaceae	Chiraiyto (N), Gaytik (D)	above Phwaso	3640 m	Wp	In cough, cold, fever
89	*Syringa emodi* Wallich ex Royle	Oleaceae	Aadi	Methe	3150 m	Lf	As herbal tea
90	*Tanacetum dolichophyllum* (Kitam.) Kitam	Asteraceae	Bayojadi (D)	Seding	3900 m	Rt	In indigestion
91	*Taxus wallichiana* Zucc.	Taxaceae	Launtho (N), Sangasing (D)	above Jabkung	3200 m	Wd, Bk	In the preparation of a small vessel for churning Tibetan tea; also used to prepare wodden pestle known as 'Mujul'; bark yields dye for cororing woolen commodities
92	*Thymus linearis* Benth. ex Benth.	Lamiaceae	Ghodamorcha	above Chhipra	2500 m	Lf,Fl	Herbal tea given to treat asthma, cold and cough
93	*Tsuga dumosa* (D. Don) Eichler	Pinaceae	Aggar (N)	above Chhipra	2500 m	Wp	Plant is highly sacred; a small peice of wood is needed in defferent religious occassions, such as marriage, funeral rites, obsequies rites, fire offering etc.; wood is specially valued to prepare 'doli' a kind of palanquin consisting of a covered seat for bride. People believed that it is very auspecious and holly if a dead body is burnt with the help of its wood. Wood paste is applied on forehead as 'chandan'.
94	*Typhonium diversifolium* Wall. ex Schoot	Araceae	Lapchikpa (D)	Manal	2700 m	Lf, Rt	Tubers and leaves are cooked as vegetable
95	*Ulmus wallichiana* Planch.	Ulmaceae	Tyaktyak (N), Tyaksing (D)	Manal	2700 m	Wd,Bk	Bark is used to prepare a cord ('halludo' or 'Jhutak') which is attached to yoke of a plough pole
96	*Urtica dioica* L.	Urticaceae	Sisnoo (N), Ja (D)	Dozam	2600 m	Lf,Sh	Tender parts cooked as vegetable

97	*Urtica hyperborea* Jacquem. ex Wedd.	Urticaceae	Chyangja (D)	Seding	3900 m	Lf	Tender parts cooked as vegetable; highly preferred than *U. dioica*
98	*Valeriana hardwickii* Wall.	Valerianaceae	Samayo/ Sugandhawal	Phwaso	3640 m	Rt	Incense and medicine
99	*Valeriana jatamansii* Jones	Valerianaceae	Samayo/ Sugandhawal	Chhipra	2400 m	Rh,Rt	Incense and medicine; traded
100	*Viscum* sp.	Loranthaceae	Jobjon (D), Ainjeru (N)	Syakri	2550 m	Wp, Fr	Plant extract to treat broken bones

*Parts use: Bk – bark; Lf – leaf; Pt – petiole; Rh – rhizome; Rn – resin, latex; Rt – root, root tuber; Sh – shoot; St – stem; Tr – trunk; Wd – wood; WP – whole plant.

Annex 7. Potential List of Mammals from KSL Nepal

SN	Order/Family/Common Name	Scientific Name	GoN	CITES	IUCN	NRDB	Region	Site	MH	HL
	ORDER - PHOLIDOTA									
	Family - Manidae									
1	Chinese Pangolin	*Manis pentadacyla*	P	II	NT v2.3	S	MH	**6**	1	0
	ORDER : INSECTIVORA									
	Family - Talpidae									
2	Himalayan Mole	*Euroscaptor micrura*			LC v2.3			**3**	0	1
	Family - Soricidae									
3	Himalayan Water Shrew	*Chimarrogale himalayica*			LC v2.3		MH	**4**	1	0
4	Horsfield's Shrew	*Crossidura horsfieldi*			LC v2.3		HL WP	**0**	0	1
5	Elegant Water Shrew	*Nectogale elegans*			LC v2.3		MH	**4**	1	0
6	Eurasian Pygmy Shrew	*Sorex minutus*			LC v2.3			**2**	1	1
7	Bailey's Shrew	*Soriculus baileyi*			LC v2.4			**4**	0	1
8	Brown-toothed Shrew	*Soriculus caudatus*			LC v2.3			**5**	0	1
9	Gruber's Shrew	*Soriculus gruberi*			LC v2.6		MH	**2**	1	0
10	Indian Long-tailed Shrew	*Soriculus leucops*			LC v2.3			**4**	1	1
11	Himalayan Shrew	*Soriculus nigriscens*			LC v2.3			**5**	0	1
12	House Shrew	*Suncus murinus*			LC v2.3			**6**	0	1
13	Yellow-throated Shrew	*Suncus stoliczkanus*			LC v2.3			**2**	0	1
	ORDER : CHIROPTERA									
	Family - Pteropodidae									
14	Indian Short-nosed Fruit Bat	*Cynopterus sphinx*			LC v2.3			**4**	1	1
15	Indian Flying Fox	*Pteropus giganteus*		II	LC v2.3			**6**	1	0
16	Fulvous Fruit Bat	*Rousettus leschenaulti*			LC v2.3			**4**	1	0
	Family - Rhinolophidae									
17	Pearson's Horseshoe Bat	*Rhinolophus pearsonii*			LC v2.3			**0**	1	1
18	Rufous Horseshoe Bat	*Rhinolophus rouxi*			LC v2.3			**0**	1	0
	Family - Hipposideridae									
19	Himalayan Roundleaf bat	*Hipposideros armiger*			LC v2.3			**3**	1	1
	Family - Vespertilionidae									
20	Eastern Barbestelle	*Barbastella leucomelas*			LC v2.3		MH	**3**	1	0
21	Bent Wing Bat	*Miniopterus schreibersii*		III	LC v3.1			**0**	1	0
22	Little Tube-nosed Bat	*Murina aurata*			NT v2.3		MH WP	**0**	1	0
23	Brown Long-eared Bat	*Plectotus auritus*			LC v2.3		HL	**2**	0	1
	ORDER : PRIMATES									
	Family - Cercopithecidae									
24	Assamese Macaque	*Macaca assamensis*	P	II	VU v2.3	V		**5**	1	0
25	Rhesus Macaque	*Macaca mulatta**		II	NT v2.3	S		**21**	1	1
26	Hanuman Langur	*Semnopithecus*		I	NT v2.3	S		**18**	1	1

		*entellus**								
	ORDER : CARNIVORA									
	Family - Canidae									
27	Golden Jackal	*Canis aureus**		III	LC v3.1			**22**	1	1
28	Grey Wolf	*Canis lupus**	P	II	LC v3.1	V		**9**	1	1
29	Asiatic Wild-dog, Dhole	*Cuon alpinus*		II	EN v3.1	V		**14**	1	1
30	Bengal Fox	*Vulpes bengalensis*		III	LC v3.1	S		**12**	1	0
31	Red Fox	*Vulpes vulpes**		III	LC v3.1	S		**10**	1	1
	Family - Ursidae									
32	Brown Bear	*Ursus arctos**	P	I	LC v2.3	V	HL	**3**	0	1
33	Himalayan Black Bear	*Ursus thibetanus**		I	VU v2.3	V		**12**	1	1
	Family - Ailuridae									
34	Red Panda	*Ailurus fulgens*	P	I	EN v2.3	E		**9**	1	1
	Family - Mustelidae									
35	Hog Badger	*Arctonyx collaris*			LC v2.3	S	HL WP	**1**	0	1
36	Common Otter	*Lutra lutra*		I	NT v3.1	S		**11**	1	1
37	Stone Marten (Beech)	*Martes foina*		III	LC v2.3			**4**	1	1
38	Yellow-throated Marten	*Martes flavigula**		III	LC v2.3			**16**	1	1
39	Mountain Weasel	*Mustela altaica*		III	LC v2.3		HL	**5**	0	1
40	Yellow-bellied Weasel	*Mustela kathiah*		III	LC v2.3		HL	**3**	0	0
41	Siberian Weasel	*Mustela sibirica*		III	LC v2.3		HL	**5**	0	1
	Family - Viverridae									
42	Masked Palm Civet	*Paguma larvata*		III	LC v2.3			**6**	1	1
	Family - Herpestidae									
43	Indian Grey Mongoose	*Herpestes edwardsii**		III	LC v2.3			**12**	1	0
	Family - Felidae									
44	Golden Cat	*Catopuma temminckii*		I	VU v3.1	V	MH	**4**	1	0
45	Jungle Cat	*Felis chaus**		II	LC v3.1	S		**18**	1	1
46	Marbled Cat	*Felis marmorata*		I	VU v3.1	V		**6**	1	0
47	Common Leopard	*Panthera pardus**		I	LC v3.1	S		**20**	1	1
48	Snow Leopard	*Panthera uncia**	P	I	EN v3.1	E	HL	**8**	0	1
49	Clouded Leopard	*Pardofelis nebulosa*	P	I	VU v3.1	V		**8**	1	0
50	Leopard Cat	*Prionailurus bengalensis*	P	I	LC v3.1	V		**10**	1	1
	ORDER : PERISSODACTYLA									
	Family - Equidae									
51	Tibetan Wild Ass	*Equus kiang**		II	LC v2.3		HL	**2**	0	1
	ORDER : ARTIODACTYLA									
	Family - Suidae									
52	Wild Boar	*Sus scrofa**			LC v2.3			**17**	1	1
	Family - Moschidae									
53	Musk Deer	*Moschus chrysogaster**	P	I	NT v2.3	E		**10**	1	1
	Family - Cervidae									
54	Sambar Deer	*Cervus unicolor*			LC v2.3	S		**6**	1	0
55	Barking Deer	*Muntiacus muntjak**			LC v2.3			**17**	1	1
	Family - Bovidae									
56	Wild Yak	*Bos mutus**	P	I	VU v2.3	C	HL	**3**	0	1
57	Himalayan Thar	*Hemitragus jemlahicus**			VU v2.3	S		**14**	1	1
58	Himalayan Goral	*Naemorhedus goral**		I	NT v2.3	S		**12**	1	1

59	Mainland Serow	*Capricornis sumatraensis*		I	VU v2.3	S		**10**	1	1
60	Bharal (Blue Sheep)	*Pseudois nayaur**			LC v3.1	S	HL	**5**	1	1
61	Tibetan Antelope	*Pantholops hodgsoni**	P	I	EN v3.1	C	HL	**0**	0	1
	ORDER : RODENTIA									
	Family - Scuiridae									
62	Irrawaddy Squirrel	*Callosciurus pygerythrus*			VU v2.3			**3**	1	0
63	Orange-bellied Himalayan Squirrel	*Dremomys lokriah*			LC v2.3			**5**	0	1
64	Himalayan Marmot	*Marmota bobak**			LC v2.3		HL	**4**	0	1
65	Black Giant Squirrel	*Ratufa bicolor*		II	LC v2.3	S	MH	**2**	1	0
66	Himalayan Striped Squirrel	*Tamiops macclellandi*			LC v2.3			**2**	1	1
	Family - Pteromyidae									
67	Particoloured Flying Squirrel	*Hylopetes alboniger*			EN v2.3		MH	**5**	1	0
68	Hodgson's Flying Squirrel	*Petaurista magnificus*			NT v2.3			**3**	1	1
69	Red Flying Squirrel	*Petaurista petaurista*			LC v2.3			**6**	0	1
70	Hairy-footed Flying Squirrel	*Belomys pearsonii*			NT v2.3		MH WP	**1**	1	0
	Family - Muridae									
71	Himalayan Field Mouse	*Apodemus gurkha*			LC v2.3		es	**0**	0	1
72	Wood Rat	*Apodemus sylvaticus*			LC v3.1		HL	**3**	0	1
73	Lesser Bandicoot Rat	*Bandicota bengalensis*			LC v2.3			**6**	1	0
74	Fawn Colored Mouse	*Mus cervicolor*			LC v2.3			**4**	1	1
75	House Rat	*Mus musculus*			LC v2.3			**9**	0	1
76	White-bellied Rat	*Niviventer niviventer*			LC v2.3			**4**	1	0
77	Turkestan Rat	*Rattus turkestanicus*			LC v2.3			**5**	0	1
	Family - Hystricidae									
78	Indian Crested Porcupine	*Hystrix indica**			LC v2.3			**14**	1	0
	ORDER : LAGOMORPHA									
	Family - Leporidae									
79	Indian Hare (Rufous-tailed)	*Lepus nigricollis*			LC v2.3			**11**	1	0
80	Woolly Hare	*Lepus oiostolus**			LC v2.3		HL	**4**	0	1
	Family - Ochotonidae									
81	Long-eared Pika	*Ochotona macrotis*			LC v2.3		HL	**4**	0	1
82	Nubrica Pika	*Ochotona nubrica*			LC v2.3	V	HL	**0**	0	1
83	Royle's Pika	*Ochotona roylei**			LC v2.3			**7**	0	1
									55	**56**

Sources: B.P.P. 1995a, b, c; DNPWC/MFSC/GoN 2005; Bhuju et al. 2007; Siwakoti & Basnet 2007; NHM/TU & IUCN 2059-BS; Suwal & Verheugt 1995; Humla D.F.O. 2062/63BS and *species are verified in KSL field visit (Humla), 2010.

Legends and Summary

P = Protected by NPWC Act 1973

CITES
Appendix I * 26 species from Humla
Appendix II
Appendix III

NRDB (Nepal Red Data Book) Status
C = Critically endangered
E = Endangered
V = Vulnerable
S = Susceptible

Sites
PAs, RS, WHS of Nepal (total 24)

IUCN = IUCN Red List Category
CR = Critically Endangered
EN = Endangered
VU = Vulnerable
NT = Near Threatened
LC = Least Concern
DD = Data Deficient
v2.3 = IUCN Red List of Threatened Species version 2.3 (1994)
v3.1 = IUCN Red List of Threatened Species version 3.1 (2001)

Region (Spatial confinement)
HL = Confined to Highlands
MH = Confined to Midhills
WP = Confined to Western Part of Nepal
es = Nepal Endemic: Himalayan Field Mouse (*Apodemus gurkha*)

Annex 8. Potential list of birds from KSL

SN	Order/Family/ Common Name	Scientific name	SS	NG /P	CITES	IUCN	NRDB	Region	Site	MH	HL
	ORDER : GALLIFORMES										
	Family - Phasianidae										
1	Chukar	*Alectoris chukar**	ra			LC			**7**	1	1
2	Hill Partridge	*Arborophila torqueola**	r			LC			**7**	1	1
3	Cheer Pheasant	*Catreus wallichii**	r	P	I	**VU**	E		**5**	1	1
4	Black Francolin	*Francolinus francolinus**	r			LC			**13**	1	0
5	Blood Pheasant	*Ithaginis cruentus*	r		II	LC	S		**6**	0	1
6	Snow Partridge	*Lerwa lerwa*	r			LC		HL	**6**	0	1
7	Himalayan Monal	*Lophophorus impejanus**	r	P	I	LC	S		**9**	1	1
8	Kalij Pheasant	*Lophura leucomelanos*	r			LC	S		**15**	1	0
9	Tibetan Partridge	*Perdix hodgsoniae*	r			LC		HL	**3**	0	1
10	Koklas Pheasant	*Pucrasia macrolopha**	r			LC	S		**5**	1	1
11	Tibetan Snowcock	*Tetraogallus tibetanus*	r		I	LC	S	HL	**6**	0	1
12	Himalayan Snowcock	*Tetraogallus himalayensis*	r			LC		HL	**5**	0	1
13	Satyr Tragopan	*Tragopan satyra*	r	P	III	**NT**	E		**7**	1	1
	ORDER : ANSERIFORMES										
	Family - Anatidae										
14	Northern Pintail	*Anas acuta*	w		III	LC			**12**	1	1
15	Northern Shoveler	*Anas clypeata*	w		III	LC			**9**	0	1
16	Common Teal	*Anas crecca*	w		III	LC			**13**	1	1
17	Eurasian Wigeon	*Anas penelope**	w		III	LC	S		**11**	0	1
18	Mallard (Laysan Teal)	*Anas platyrhynchos**	w			LC			**10**	1	1
19	Garganey	*Anas querquedula*	w		III	LC			**8**	1	0
20	Gadwall	*Anas strepera*	w			LC			**11**	0	1
21	Greylag Goose	*Anser anser*	w			LC	S		**5**	1	1
22	Bar-headed Goose	*Anser indicus*	w			LC	S		**12**	0	1
23	Common Pochard	*Aythya ferina*	w			LC			**11**	0	1
24	Tufted Duck	*Aythya fuligula*	w			LC			**11**	1	1
25	Ferruginous Pochard	*Aythya nyroca**	w		III	**NT**	S		**11**	0	1
26	Common Goldeneye	*Bucephala clangula*	w			LC	V		**4**	0	1
27	Common Merganser	*Mergus merganser*	w			LC			**8**	1	1
28	Red-crested Pochard	*Rhodonessa rufina*	w			LC			**9**	1	1
29	Ruddy Shelduck	*Tadorna ferruginea**	wa			LC			**16**	1	1
	ORDER : PICIFORMES										
	Family - Picidae										
30	Rufous Woodpecker	*Celeus brachyurus*	r			LC	S		**10**	1	0
31	Brown-fronted Woodpecker	*Dendrocopos auriceps*	r			LC	S		**7**	1	1
32	Grey-capped Pigmy Woodpecker	*Dendrocopos canicapillus*	r			LC			**8**	1	0
33	Himalayan Woodpecker	*Dendrocopos himalayensis*	r			LC			**7**	1	1
34	Rufous-bellied Woodpecker	*Dendrocopos hyperythrus*	r			LC			**7**	1	1
35	Fulvous-breasted Woodpecker	*Dendrocopos macei*	r			LC			**13**	1	0
36	Eurasian Wryneck	*Jynx torquilla*	m			LC			**9**	1	0
37	Speckled Piculet	*Picumnus innominatus*	r			LC	S		**8**	1	1
38	Grey-headed Woodpecker	*Picus canus**	r			LC			**17**	1	0

39	Lesser Yellownape	*Picus chlorolophus*	r			LC			**8**	1	0
40	Greater Yellownape	*Picus flavinucha*	r			LC			**11**	1	0
41	Scaly-bellied Woodpecker	*Picus squamatus**	r			LC			**10**	1	1
	Family - Megalaimidae										
42	Blue-throated Barbet	*Megalaima asiatica**	r			LC			**14**	1	0
43	Coppersmith Barbet	*Megalaima haemacephala*	r			LC			**11**	1	0
44	Lineated Barbet	*Megalaima lineata*	r			LC			**7**	1	0
45	Great Barbet	*Megalaima virens**	r			LC			**14**	1	1
46	Brown-headed Barbet	*Megalaima zeylanica*	r			LC			**4**	1	0
	ORDER : UPUPIFORMES										
	Family - Upupidae										
47	Common Hoopoe	*Upupa epops**	r			LC			**18**	1	1
	ORDER : CORACIIFORMES										
	Family - Coraciidae										
48	Indian Roller	*Coracias benghalensis*	r			LC			**12**	1	0
49	Dollarbird	*Eurystomus orientalis*	r			LC			**8**	1	0
	Family - Alcedinidae										
50	Common Kingfisher	*Alcedo atthis*	r			LC			**15**	1	1
	Family - Dacelonidae										
51	White-throated Kingfisher	*Halcyon smyrnensis**	r			LC			**17**	1	1
	Family - Cerylidae										
52	Crested Kingfisher	*Megaceryle lugubris*	r			LC			**8**	1	1
53	Pied Kingfisher	*Ceryle rudis*	r			LC			**9**	1	0
	Family - Meropidae										
54	Chestnut-headed Bee-eater	*Merops leschenaulti*	s			LC			**10**	1	0
55	Green Bee-eater	*Merops orientalis*	s			LC	S		**10**	1	0
56	Blue-tailed Bee-eater	*Merops philippinus*	s			LC			**7**	1	0
57	Blue-bearded Bee-eater	*Nyctyornis athertoni*	r			LC			**7**	1	0
	ORDER : CUCULIFORMES										
	Family - Cuculidae										
58	Grey-bellied Cuckoo	*Cacomantis passerinus*	s			LC			**8**	1	0
59	Banded Bay Cuckoo	*Cacomantis sonneratii*	r			LC	V		**7**	1	0
60	Pied Cuckoo	*Clamator jacobinus*	s			LC			**10**	1	0
61	Eurasian Cuckoo	*Cuculus canorus**	sa			LC			**20**	1	1
62	Indian Cuckoo	*Cuculus micropterus*	s			LC			**16**	1	1
63	Lesser Cuckoo	*Cuculus poliocephalus*	s			LC			**10**	1	1
64	Oriental Cuckoo	*Cuculus saturatus**	s			LC			**16**	1	1
65	Asian Koel	*Eudynamys scolopacea**	r			LC			**15**	1	1
66	Large Hawk Cuckoo	*Hierococcyx sparverioides*	s			LC			**12**	1	1
67	Common Hawk Cuckoo	*Hierococcyx varius**	r			LC			**12**	1	0
68	Green-billed Malkoha	*Phaenicophaeus tristis*	r			LC			**15**	1	0
69	Drongo Cuckoo	*Surniculus lugubris*	s			LC			**10**	1	0
	ORDER : PSITTACIFORMES										
	Family - Psittacidae										
70	Plum-headed Parakeet	*Psittacula cyanocephala*	r		II	LC	S		**9**	1	0

71	Alexandrine Parakeet	*Psittacula eupatria*	r		II	LC			**8**	0	0
72	Slaty-headed Parakeet	*Psittacula himalayana**	r		II	LC	S		**12**	1	1
73	Rose-ring Parakeet	*Psittacula krameri*	r		III	LC	S		**12**	1	0
	ORDER : APODIFORMES										
	Family - Apodidae										
74	House Swift	*Apus affinis**	ra			LC			**15**	1	0
75	Common Swift	*Apus apus**	rsa			LC			**6**	0	1
76	Alpine Swift	*Tachymarptis melba**	r?a			LC			**15**	1	1
77	Fork-tailed Swift	*Apus pacificus*	r?a			LC			**13**	1	1
78	Himalayan Swiflet	*Collocalia brevirostris**	r			LC			**14**	1	1
79	White-throated Needletail	*Hirundapus caudacutus*	s?			LC			**9**	1	1
	Family - Hemiprocnidae										
80	Crested Treeswift	*Hemiprocne coronata*	r			LC			**6**	1	0
	ORDER : STRIGIFORMES										
	Family - Strigidae										
81	Short-eared Owl	*Asio flammeus*	w		II	LC	S		**7**	0	1
82	Spotted Owlet	*Athene brama**	r		II	LC	S		**13**	1	0
83	Little Owl	*Athene noctua*	r		II	LC	S		**3**	1	0
84	Eurasian Eagle Owl	*Bubo bubo**	r		II	LC	V		**7**	0	1
85	Collared Owlet	*Glaucidium brodiei*	r		II	LC			**9**	1	1
86	Asian Barred Owlet	*Glaucidium cuculoides*	r		II	LC			**16**	1	1
87	Jungle Owlet	*Glaucidium radiatum*	r		II	LC			**9**	1	0
88	Brown Hawk Owl	*Ninox scutulata*	r		II	LC	S		**8**	1	0
89	Collared Scops Owl	*Otus bakkamoena*	r		II	LC	S		**8**	1	0
90	Moutain Scops Owl	*Otus spilocephalus*	r		II	LC	S		**8**	1	0
91	Oriental Scops Owl	*Otus sunia*	r		II	LC	V		**5**	1	0
92	Tawny Owl	*Strix aluco*	r		II	LC			**10**	1	1
93	Brown Wood Owl	*Strix leptogrammica*	r		II	LC	V		**5**	1	0
	Family - Caprimulgidae										
94	Savanna Nightjar	*Caprimulgus affinis*	r			LC			**5**	1	0
95	Grey Nightjar	*Caprimulgus indicus*	r			LC			**13**	1	1
96	Large-tailed Nightjar	*Caprimulgus macrurus*	r			LC			**11**	1	0
	ORDER : COLUMBIFORMES										
	Family - Columbidae										
97	Emerald Dove	*Chalcophaps indica*	r			LC			**8**	1	0
98	Speckleted Wood Pigeon	*Columba hodgsonii**	r			LC			**10**	1	1
99	Snow Pigeon	*Columba leuconota**	ra			LC			**10**	1	1
100	Blue Rock Pigeon	*Columba livia**	rc		III	LC			**18**	1	1
101	Common Wood Pigeon	*Columba palumbus*	w?			LC			**3**	0	1
102	Hill Pigeon	*Columba rupestris*	r			LC			**6**	0	1
103	Spotted Dove	*Streptopelia chinensis*	r			LC			**21**	1	1
104	Eurasian Collared Dove	*Streptopelia decaocto*	r			LC			**9**	1	1
105	Oriental Turtle Dove	*Streptopelia orientalis**	rc			LC			**21**	1	1
106	Red-collared Dove	*Streptopelia tranquebarica*	r			LC			**7**	1	0
107	Yellow-footed Green Pigeon	*Treron phoenicoptera*	r			LC	S		**8**	1	0
108	Wedge-tail Green Pigeon	*Treron sphenura**	r			LC			**10**	1	0
	ORDER : GRUIFORMES										

	Family - Gruidae										
109	Demoiselle Crane	*Grus virgo*	w		III	LC	S		**9**	1	0
	Family - Rallidae										
110	Common Coot	*Fulica atra*	m			LC			**13**	1	1
111	Common Moorhen	*Gallinula chloropus*	rw			LC			**11**	0	1
	ORDER : CICONIIFORMES										
	Family - Scolopacidae										
112	Common Sandpiper	*Actitis hypoleucos*	m			LC			**14**	1	1
113	Little Stint	*Calidris minuta*	w			LC			**5**	0	1
114	Temminck's Stint	*Calidris temminckii*	w			LC			**8**	1	1
115	Common Snipe	*Gallinago gallinago*	w			LC			**10**	1	1
116	Solitary Snipe	*Gallinago solitaria*	rm			LC			**8**	1	1
117	Eurasian Curlew	*Numenius arquata*	w			LC			**4**	1	1
118	Red-necked Phalarope	*Phalaropus lobatus*	m			LC	V	HL WP	**1**	0	1
119	Eurasian Woodcock	*Scolopax rusticola*	r			LC			**11**	1	1
120	Wood Sandpiper	*Tringa glareola*	w			LC			**10**	0	1
121	Common Greenshank	*Tringa nebularia*	sw			LC			**12**	0	1
122	Green Sandpiper	*Tringa ochropus*	w			LC			**17**	1	1
123	Common Redshank	*Tringa totanus*	w			LC			**11**	0	1
	Family - Jacanidae										
124	Pheasant-tailed Jacana	*Hydrophasianus chirurgus*	s			LC			**9**	0	1
	Family - Charadriidae										
125	Black-winged Stilt	*Himantopus himantopus*	m			LC	V		**5**	0	1
126	Ibisbill	*Ibidorhyncha struthersii**	r			LC	S		**6**	1	1
127	Little Ringed Plover	*Charadrius dubius*	rw			LC			**8**	1	0
128	Lesser Sand Plover	*Charadrius mongolus*	w			LC			**5**	0	1
129	River Lapwing	*Vanellus duvaucelii*	r			LC			**7**	1	0
130	Red-wattled Lapwing	*Vanellus indicus*	r			LC			**12**	1	0
131	Northern Lapwing	*Vanellus vanellus*	w			LC			**6**	0	1
	Family - Laridae										
132	Gull-billed Tern	*Gelochelidon nilotica*	m			LC			**4**	0	1
133	Brown -headed Gull	*Larus brunnicephalus**	w		II	LC			**7**	0	1
134	Heuglin's Gull	*Larus heuglini*	w			LC	V		**4**	0	1
135	Pallas's Gull	*Larus ichthyaetus*	w			LC	V		**7**	0	1
136	Black-headed Gull	*Larus ridibundus*	w			LC			**7**	0	1
	ORDER : FALCONIFORMES										
	Family - Accipitridae										
137	Shikra	*Accipiter badius*	r		II	LC	S		**14**	1	0
138	Northern Goshawk	*Accipiter gentilis**	r		II	LC			**12**	1	1
139	Eurasian Sparrowhawk	*Accipiter nisus**	r		II	LC			**18**	1	1
140	Besra	*Accipiter virgatus*	r		II	LC	S		**13**	1	1
141	Cinereous (Black) Vulture	*Aegypius monachus*	w		II	**NT**	V		**12**	1	1
142	Golden Eagle	*Aquila chrysaetos*	r		II	LC	S		**12**	1	1
143	Steppe Eagle	*Aquila nipalensis*	w		II	LC			**14**	1	1
144	Common Buzzard	*Buteo buteo japonicus*	w		II	LC	S		**13**	1	1
145	Upland Buzzard	*Buteo hemilasius*	rw		II	LC	S		**12**	1	1
146	Long-legged Buzzard	*Buteo rufinus*	w		II	LC	S		**11**	0	1
147	Eurasian Marsh	*Circus aeruginosus*	w		II	LC			**12**	1	0

	Harrier										
148	Hen Harrier	*Circus cyaneus*	w		II	LC			**17**	1	1
149	Pallid Harrier	*Circus macrourus*	w		II	**NT**	S		**7**	1	1
150	Pied harrier	*Circus melanoleucos*	w		II	LC	S		**8**	1	0
151	Black-shouldered Kite	*Elanus caeruleus*	rs		II	LC	S		**8**	1	0
152	Lammergeier	*Gypaetus barbatus**	ra		II	LC	S		**13**	1	1
153	White-rumped Vulture	*Gyps bengalensis*	rm		II	**CR**	C		**10**	1	1
154	Eurasian Griffon	*Gyps fulvus*	rm		II	LC			**10**	1	0
155	Himalayan Griffon	*Gyps himalayensis**	ra		II	LC	S		**13**	1	1
156	Slender-billed Vulture	*Gyps tenuirostris*	r			**CR**	C		**10**	1	0
157	Pallas's Fish Eagle	*Haliaeetus leucoryphus*	w		II	**VU**	E		**7**	1	0
158	Bonelli's Eagle	*Hieraaetus fasciatus*	r		II	LC			**7**	1	1
159	Booted Eagle	*Hieraaetus pennatus**	rw		II	LC			**13**	1	1
160	Black Eagle	*Ictinaetus malayensis*	rm		II	LC			**12**	1	1
161	Black Kite	*Milvus migrans*	r		II	LC			**21**	1	1
162	Egyptian Vulture	*Neophron percnopterus**	rm		II	**EN**	S		**13**	1	
163	Osprey	*Pandion haliaetus*	rw		II	LC	S		**12**	1	1
164	Oriental Honey-buzzard	*Pernis ptilorhyncus*	rm		II	LC			**12**	1	0
165	Red-headed Vulture	*Sarcogyps calvus*	r		II	**CR**	S		**12**	1	1
166	Crested Serpent Eagle	*Spilornis cheela*	s		II	LC	S		**18**	1	1
167	Mountain Hawk Eagle	*Spizaetus nipalensis*	r		II	LC	S		**11**	1	0
	Family - Falconidae										
168	Amur Falcon	*Falco amurensis*	m		II	LC	S		**9**	0	1
169	Merlin	*Falco columbarius**	w		II	LC			**5**	0	1
170	Peregrine Falcon	*Falco peregrinus*	r		I	LC	E		**12**	1	1
171	Oriental Hobby	*Falco severus*	rm		II	LC	E		**7**	1	0
172	Eurasian Hobby	*Falco subbuteo*	rw		II	LC			**12**	1	1
173	Common Kestrel	*Falco tinnunculus**	rwa		II	LC			**19**	1	1
174	Collared Falconet	*Microhierax caerulescens*	r		II	LC			**8**	1	0
	ORDER : PODICIPEDIFORMES										
	Family - Podicipedidae										
175	Great Crested Grebe	*Podiceps cristatus*	w			LC	S		**11**	1	1
176	Black-necked Grebe	*Podiceps nigricollis*	m			LC	V		**5**	1	1
177	Little Grebe	*Tachybaptus ruficollis*	rw			LC			**9**	1	1
	ORDER : PELECANIFORMES										
	Family - Phalacrocoracidae										
178	Great Cormorant	*Phalacrocorax carbo*	r			LC			**13**	1	1
	ORDER : CICONIFORMES										
	Family - Ardeidae										
179	Grey Heron	*Ardea cinerea*	rw			LC			**10**	1	1
180	Indian Pond Heron	*Ardeola grayii*	r			LC			**14**	1	0
181	Cattle Egret	*Bubulcus ibis*	r		III	LC			**16**	1	0
182	Great Egret	*Casmerodius albus**	r		III	LC			**10**	1	1
183	Little Egret	*Egretta garzetta*	r		III	LC			**10**	1	0
184	Intermediate Egret	*Mesophoyx intermedia*	r			LC			**9**	1	0
	Family - Threskiornithidae										
185	Black Ibis	*Pseudibis papillosa*	r			LC	S		**9**	1	0
	Family - Ciconiidae										

186	Woolly-necked Storked	*Ciconia episcopus*	r			LC	S		**12**	1	0
187	Black Stork	*Ciconia nigra*	w	P	II	LC	E		**8**	1	1
	ORDER : PASSERIFORMES										
	Family - Irenidae										
188	Golden-fronted Leafbird	*Chloropsis aurifrons*	r			LC			**9**	1	0
189	Orange-bellied Leafbird	*Chloropsis hardwickii*	r			LC			**9**	1	0
	Family - Laniidae										
190	Brown Shrike	*Lanius cristatus*	w			LC			**11**	1	
191	Long-tailed Shrike	*Lanius schach*	r			LC			**20**	1	1
192	Grey-backed Shrike	*Lanius tephronotus**	rc			LC			**18**	1	1
193	Bay-backed Shrike	*Lanius vittatus*	m			LC			**9**	1	0
	Family - Corvidae										
194	Common Green Magpei	*Cissa chinensis*	r			LC			**9**	1	0
195	Large Cuckooshrike	*Coracina macei*	r			LC			**17**	1	0
196	Black-winged Cuckooshrike	*Coracina melaschistos*	r			LC			**12**	1	0
197	Common Raven	*Corvus corax*	r			LC			**8**	0	1
198	Large-billed Crow	*Corvus macrorhynchos**	r			LC			**22**	1	1
199	House Crow	*Corvus splendens*	r			LC			**15**	1	0
200	Grey Treepie	*Dendrocitta formosae*	r			LC			**12**	1	0
201	Rufous Treepie	*Dendrocitta vagabunda*	r			LC			**13**	1	0
202	Eurasian Jay	*Garrulus glandarius*	r			LC			**5**	1	0
203	Black-headed Jay	*Garrulus lanceolatus**	r			LC			**7**	1	1
204	Bar-wing Flycatcher-shrike	*Hemipus picatus*	r			LC			**12**	1	0
205	Spotted Nutcraker	*Nucifraga caryocatactes**	r			LC			**11**	1	1
206	Long-tailed Minivet	*Pericrocotus ethologus**	r			LC			**18**	1	1
207	Scarlet Minivet	*Pericrocotus flammeus*	r			LC			**16**	1	0
208	Hume's Groundpecker	*Pseudopodoces humilis**	r			LC		HL	**3**	0	1
209	Yellow-billed Chough	*Pyrrhocorax graculus**	ra			LC			**6**	0	1
210	Red-billed Chough	*Pyrrhocorax pyrrhocorax**	ra			LC			**10**	1	1
211	Red-billed Blue Magpie	*Urocissa erythrorhyncha*	r			LC			**16**	1	0
212	Yellow-billed Blue Magpie	*Urocissa flavirostris*	r			LC			**9**	1	1
213	Eurasian Golden Oriole	*Oriolus oriolus**	r			LC			**13**	1	0
214	Maroon Oriole	*Oriolus traillii*	r			LC			**11**	1	0
215	Black-hooded Oriole	*Oriolus xanthornus*	r			LC			**8**	1	0
216	White-throated Fantail	*Rhipidura albicollis*	r			LC			**14**	1	0
217	Yellow-bellied Fantail	*Rhipidura hypoxantha*	r			LC			**16**	1	1
218	Bronzed Drongo	*Dicrurus aeneus*	s			LC			**14**	1	0
219	Spangled Drongo	*Dicrurus hottentottus*	r			LC			**13**	1	0
220	Ashy Drongo	*Dicrurus leucophaeus**	sa			LC			**21**	1	1
221	Black Drongo	*Dicrurus macrocercus**	r			LC			**16**	1	0
222	Lesser Racket-tailed Drongo	*Dicrurus remifer*	s			LC			**8**	1	0
223	Asian Paradise Flycatcher	*Terpsiphone paradisi*	r			LC			**8**	1	0
	Family - Cinclidae										
224	White-throated Dipper	*Cinclus cinclus**	ra			LC			**4**	1	1
225	Brown Dipper	*Cinclus pallasii**	ra			LC			**12**	1	1

	Family - Muscicapidae											
226	White-capped Water Redstart	*Chaimarrornis leucocephalus**	r			LC			**16**	1	1
227	Oriental Magpie Robin	*Copsychus saularis*	r			LC			**16**	1	0
228	Grey-headed Canary Flycatcher	*Culicicapa ceylonensis*	r			LC			**19**	1	1
229	Hill Blue Flycatcher	*Cyornis banyumas*	r			LC	V		**5**		
230	Blue-throated Flycatcher	*Cyornis rubeculoides*	m			LC			**10**	1	0
231	Black-backed Forktail	*Enicurus immaculatus*	r			LC			**8**	1	1
232	Spotted Forktail	*Enicurus maculatus*	r			LC			**9**	1	1
233	Slaty-backed Forktail	*Enicurus schistaceus*	r			LC			**8**	1	1
234	Little Forktail	*Enicurus scouleri**	r			LC			**9**	1	1
235	Snowy-browed Flycatcher	*Ficedula hyperythra*	r			LC			**8**	1	0
236	Rufous-gorgeted Flycatcher	*Ficedula strophiata*	r			LC			**14**	1	1
237	Ultramarine Flycathcher	*Ficedula superciliaris*	s			LC			**15**	1	1
238	Slaty-blue Flycatcher	*Ficedula tricolor**	r			LC			**15**	1	1
239	Little Pied Flycatcher	*Ficedula westermanni*	r			LC	S		**14**	1	1
240	Grandala	*Grandala coelicolor**	r			LC			**6**	0	1
241	White-bellied Redstart	*Hodgsonius phaenicuroides*	s			LC			**9**	1	1
242	Indian Blue Robin	*Luscinia brunnea*	s			LC			**15**	1	1
243	Siberian Rubythroat	*Luscinia calliope*	w			LC			**7**	1	0
244	White-tailed Rubythroat	*Luscinia pectoralis**	ra			LC			**12**	1	1
245	Bluethroat	*Luscinia svecica*	w			LC			**10**	1	0
246	Blue-capped Rock Thrush	*Monticola cinclorhynchus**	s			LC			**15**	1	1
247	Chestnut-bellied Rock Thrush	*Monticola rufiventris*	r			LC			**11**	1	1
248	Blue Rock Thrush	*Monticola solitarius**	r			LC			**11**	1	1
249	Asian Brown Flycatcher	*Muscicapa dauurica*	s			LC			**9**	1	0
250	Rusty-tailed Flycatcher	*Muscicapa ruficauda*	s			LC			**11**	1	1
251	Dark-sided Flycatcher	*Muscicapa sibirica**	s			LC			**15**	1	1
252	Verditer Flycatcher	*Eumyias thalassina**	s			LC			**18**	1	1
253	Blue Whistiling Thrush	*Myophonus caeruleus**	ra			LC			**19**	1	1
254	Small Niltava	*Niltava macgrigoriae*	s			LC			**6**	1	0
255	Rufous-bellied Niltava	*Niltava sundara*	rs			LC			**12**	1	1
256	Desert Wheatear	*Oenanthe deserti**	m			LC			**8**	1	1
257	Blue-capped Redstart	*Phoenicurus coeruleocephalus*	r			LC			**8**	1	1
258	White-winged Redstart	*Phoenicurus erythrogaster**	rw			LC			**6**	0	1
259	Rufous-backed Redstart	*Phoenicurus erythronota*	w			LC		HL	**3**	0	1
260	Blue-fronted Redstart	*Phoenicurus frontalis**	rw			LC			**10**	1	1
261	Hodgson's Redstart	*Phoenicurus hodgsoni*	w			LC			**8**	1	1
262	Black Redstart	*Phoenicurus ochruros**	ma			LC			**16**	1	1
263	White-throated Redstart	*Phoenicurus schisticeps*	rw			LC			**6**	1	1
264	Plumbeous Water Redstart	*Rhyacornis fuliginosus**	r			LC			**16**	1	1
265	Pied Bushchat	*Saxicola caprata*	r			LC			**14**	1	0
266	Grey Bushchat	*Saxicola ferrea**	ra			LC			**17**	1	1

267	Common Stonechat	*Saxicola torquata**	rwa			LC			**19**	1	1
268	Golden Bush Robin	*Tarsiger chrysaeus*	r			LC			**9**	1	1
269	Orange-flanked Bush Robin	*Tarsiger cyanurus**	r			LC			**10**	1	1
270	White-browed Bush Robin	*Tarsiger indicus*	r			LC			**10**	1	1
271	White-collared Blackbird	*Turdus albocinctus*	r			LC			**12**	1	1
272	Grey-winged Blackbird	*Turdus boulboul*	r			LC			**12**	1	0
273	Eurassian Blackbird	*Turdus merula**	sw			LC			**8**	1	1
274	Dusky Thrush	*Turdus naumanni*	w			LC	UR		**3**	1	0
275	Chestnut Thrush	*Turdus rubrocanus*	sw			LC			**6**	0	1
276	Dark-throated Thrush	*Turdus ruficollis*	w			LC			**17**	1	1
277	Tickell's Thrush	*Turdus unicolor*	s			LC			**13**	1	0
278	Mistle Thrush	*Turdus viscivorus*	r			LC			**7**	1	1
279	Orange-headed Thrush	*Zoothera citrina*	sw			LC			**11**	1	0
280	Scaly Thrush	*Zoothera dauma*	s			LC			**13**	1	1
281	Long-tailed Thrush	*Zoothera dixoni*	r			LC			**7**	1	1
282	Pain-backed Thrush	*Zoothera molissima*	r			LC			**8**	1	1
283	Long-billed Thrush	*Zoothera monticola*	r			LC	V		**8**	1	0
284	Pied Thrush	*Zoothera wardii*	s			LC	S		**8**	1	1
	Family - Sturnidae										
285	Jungle Myna	*Acridotheres fuscus*	r			LC			**15**	1	0
286	Common Myna	*Acridotheres tristis*	r			LC			**19**	1	1
287	Spot-winged Starling	*Saroglossa spiloptera*	r			LC	S		**5**	1	0
288	Chestnut-tailed Starling	*Sturnus malabaricus*	r			LC			**13**	1	0
289	Brahminy Starling	*Sturnus pagodarum*	r			LC			**9**	1	0
	Family - Sittidae										
290	Kasmir Nuthatch	*Sitta cashmirensis*	r			LC			**2**	0	1
291	Chestnut-bellied Nuthatch	*Sitta castanea*	r			LC			**17**	1	0
292	Velvet-fronted Nuthatch	*Sitta frontalis*	r			LC			**11**	1	0
293	White-tailed Nuthatch	*Sitta himalayensis*	r			LC			**8**	1	0
294	White-cheeked Nuthatch	*Sitta leucopsis**	r			LC			**3**	1	1
295	Wallcreeper	*Tichodroma muraria*	r			LC			**12**	1	1
	Family - Certhiidae										
296	Eurasian Treecreeper	*Certhia familiaris*	r			LC			**9**	1	1
297	Bar-tailed Treecreeper	*Certhia himalayana*	r			LC			**6**	1	1
298	Rusty-flank Tree Creeper	*Certhia nipalensis*	r			LC			**10**	1	1
299	Winter Wren	*Troglodytes troglodytes*	r			LC			**8**	1	1
	Family - Paridae										
300	Fire-capped Tit	*Cephalopyrus flammiceps*	r			LC			**6**	1	0
301	Coal Tit	*Parus ater*	r			LC			**9**	1	0
302	Grey-crested Tit	*Parus dichrous*	r			LC			**9**	1	1
303	Great Tit	*Parus major**	r			LC			**19**	1	0
304	Spot-winged Tit	*Parus melanolophus**	r			LC			**4**	1	1
305	Green-backed Tit	*Parus monticolus**	r			LC			**12**	1	1
306	Rufous-vented Tit	*Parus rubidiventris**	rw			LC			**10**	1	1
307	Rufous-naped Tit	*Parus rufonuchalis**	r			LC		HL	**4**	0	1
308	Black-lored Tit	*Parus xanthogenys*	r			LC			**13**	1	1

309	Yellow-browed Tit	*Sylviparus modestus*	r			LC			**6**	1	0
	Family - Aegithalidae										
310	Black-throated Tit	*Aegithalos concinnus*	r			LC			**11**	1	1
311	White-throated Tit	*Aegithalos niveogularis*	r			LC			**5**	1	1
312	White-cheeked Tit	*Aegithalos leucogenys*	r			LC		HL WP	**0**	0	1
	Family - Hirundinidae										
313	Asian House Martin	*Delichon dasypus**	ra			LC			**9**	1	1
314	Nepal House Martin	*Delichon nipalensis**	ma			LC			**15**	1	1
315	Red-rumped Swallow	*Hirundo daurica*	m			LC			**16**	1	1
316	Barn Swallow	*Hirundo rustica**	m			LC			**18**	1	1
317	Eurasian Crag Martin	*Hirundo rupestris**	ra			LC			**10**	1	1
318	Plain Martin	*Riparia paludicola*	r			LC			**10**	1	0
319	Sand Martin	*Riparia riparia*	r			LC			**9**	0	1
	Family - Regulidae										
320	Goldcrest	*Regulus regulus**	r			LC			**11**	1	1
	Family - Pycnonotidae										
321	Ashy Bulbul	*Hemixos flavala*	r			LC			**6**	1	0
322	Black Bulbul	*Hypsipetes leucocephalus**	ra			LC			**15**	1	1
323	Mountain Bulbul	*Hypsipetes mcclellandii*	r			LC			**8**	1	
324	Red-vented Bulbul	*Pycnonotus cafer**	r			LC			**16**	1	1
325	Himalayan Bulbul	*Pycnonotus leucogenys**	r			LC			**16**	1	1
326	Black-crested Bulbul	*Pycnonotus melanicterus*	r			LC			**9**	1	0
	Family - Cisticolidae										
327	Zitting Cisticola	*Cisticola juncidis*	r			LC			**8**	1	0
328	Hill Prinia	*Prinia atrogularis**	r			LC			**2**	0	1
329	Grey-crown Priniya	*Prinia cinereocapilla*	r			**VU**	S		**7**	1	0
330	Striated Prinia	*Prinia criniger*	r			LC			**13**	1	1
331	Grey-breasted Prinia	*Prinia hodgsonii*	r			LC			**9**	1	0
	Family - Zosteropidae										
332	Oriental White-eye	*Zosterops palpebrosus*	r			LC			**20**	1	1
	Family - Sylviidae										
333	Chestnut-headed Tesia	*Tesia castaneocoronata*	r			LC			**9**	1	0
334	Grey-bellied Tesia	*Tesia cyaniventer*	r			LC			**10**	1	0
335	Common Tailorbird	*Orthotomus sutorius**	r			LC			**17**	1	0
336	White-browed Tit Warbler	*Leptopoecile sophiae*	r			LC		HL	**2**	0	1
337	Yellowish-bellied Bush Warbler	*Cettia acanthizoides*	r			LC	S		**6**	1	1
338	Grey-sided Bush Warbler	*Cettia brunnifrons*	r			LC			**15**	1	1
339	Aberrant Bush Warbler	*Cettia flavolivacea**	ra			LC			**12**	1	
340	Brownish-flanked Bush Warbler	*Cettia fortipes fortipes**	r			LC			**4**	1	1
341	Blyth's Reed Warbler	*Acrocephalus dumetorum*	m			LC			**9**	1	0
342	Tickell's Leaf Warbler	*Phylloscopus affinis**	r			LC			**17**	1	1
343	Common Chiffchaff	*Phylloscopus collybita**	w			LC			**11**	1	0
344	Smoky Warbler	*Phylloscopus fuligiventer*	m			LC	S		**14**	1	0
345	Dusky Warbler	*Phylloscopus fuscatus*	w			LC			**10**	1	0
346	Yellow-browed Warbler	*Phylloscopus inornatus*	rm			LC			**17**	1	1
347	Ashy-throated Warbler	*Phylloscopus maculipennis*	r			LC			**10**	1	1

348	Large-billed Leaf Warbler	*Phylloscopus magnirostris*	s		LC			**16**	1	1
349	Western Crowned Warbler	*Phylloscopus occipitalis*	w		LC			**11**	1	0
350	Lemon-rumped Warbler	*Phylloscopus chloronotus**	r		LC			**15**	1	1
351	Buff-barred Warbler	*Phylloscopus pulcher*	m		LC			**14**	1	1
352	Blyth's Leaf Warbler	*Phylloscopus reguloides*	s		LC			**18**	1	1
353	Greenish Warbler	*Phylloscopus trochiloides**	s		LC			**18**	1	1
354	Tytler's Leaf Warbler	*Phylloscopus tytleri**	m		**NT**	S		**1**	1	0
355	Hume's Warbler	*Phylloscopus humei*	r		LC			7		
356	Golden-spectacled Warbler	*Seicercus burkii*	r		LC			**17**	1	1
357	Chestnut-crowned Warbler	*Seicercus castaniceps*	r		LC			**7**	1	0
358	Grey-hooded Warbler	*Seicercus xanthoschistos**	r		LC			**18**	1	1
359	Black-faced Warbler	*Abroscopus schisticeps*	r		LC			**6**	1	0
360	Black-faced Laughingthrush	*Garrulax affinis*	r		LC			**6**	0	1
361	White-throated Laughingthrush	*Garrulax albogularis*	r		LC			**9**	1	1
362	Grey-sided Laughingthrush	*Garrulax caerulatus*	r		LC	E	MH	**3**	1	0
363	Chestnut-crowned Laughingthrush	*Garrulax erythrocephalus*	r		LC			**9**	1	1
364	White-crested Laughingthrush	*Garrulax leucolophus*	r		LC			**7**	1	0
365	Streak Laughigthrush	*Garrulax lineatus**	ra		LC			**11**	1	1
366	Spotted Laughingthrush	*Garrulax ocellatus*	r		LC			**8**	1	1
367	Rufous-chinned Laughingthrush	*Garrulax rufogularis*	r		LC	S	MH	**3**	1	0
368	Striated Laughingthrush	*Garrulax striatus*	r		LC			**8**	1	0
369	Variegated Laughingthrush	*Garrulax variegatus**	r		LC			**7**	1	1
370	Rusty-cheeked Scimitar Babbler	*Pomatorhinus erythrogenys*	r		LC			**10**	1	0
371	Streak-breasted Scimitar Babbler	*Pomatorhinus ruficollis*	r		LC			**5**	1	0
372	White-browed Scimitar Babbler	*Pomatorhinus schisticeps*	r		LC			**7**	1	0
373	Scaly-breasted Wren Babbler	*Pnoepyga albiventer*	r		LC			**9**	1	1
374	Pygmy Wren Babbler	*Pnoepyga pusilla*	r		LC			**8**	1	0
375	Black-chinned Babbler	*Stachyris pyrrhops*	r		LC			**9**	1	0
376	Spiny Babbler	*Turdoides nipalensis*	r		LC		es	**7**	1	0
377	Jungle Babbler	*Turdoides striatus*	r		LC			**10**	1	0
378	Red-billed Leiothrix	*Leiothrix lutea*	r	II	LC			**6**	1	0
379	Hoary-throated Barwing	*Actinodura nipalensis*	r		LC			**6**	1	0
380	White-browed Shrike Babbler	*Pteruthius flaviscapis*	r		LC			**4**	1	0
381	Green Shrike Babbler	*Pteruthius xanthochlorus*	r		LC			**6**	1	0
382	White-browed Fulvetta	*Alcippe vinipectus*	r		LC			**11**	1	1
383	Blue-winged Minla	*Minla cyanouroptera*	r		LC			**6**	1	0
384	Chestnut-tailed Minla	*Minla strigula*	r		LC			**10**	1	1
385	Whiskered Yuhina	*Yuhina flavicollis*	r		LC			**7**	1	0
386	Striped-throated Yuhina	*Yuhina gularis**	r		LC			**10**	1	1
387	Black-chinned Yuhina	*Yuhina nigrimenta*	r		LC	V		**1**	1	0

388	Rufous Sibia	*Heterophasia capistrata*	r		LC			**9**	1	1
389	Great Parrotbill	*Conostoma oemodium*	r		LC	V		**5**	1	1
390	Black-throated Parrotbill	*Paradoxornis nipalensis*	r		LC	S		**7**	1	1
	Family - Alaudidae									
391	Oriental Skylark	*Alauda gulgula*	r		LC			**13**	1	1
392	Hume's Short-toed Lark	*Calandrella acutirostris**	r		LC			**8**	1	1
393	Horned Lark	*Eremophila alpestris**	r		LC		HL	**4**	0	1
	Family - Nectariniidae									
394	Thick-billed Flowerpecker	*Dicaeum agile*	r		LC			**9**	1	0
395	Fire-breasted Flowerpecker	*Dicaeum ignipectus*	r		LC			**11**	1	1
396	Mrs Gould's Sunbird	*Aethopyga gouldiae*	r		LC			**9**	1	1
397	Fire-tailed Sunbird	*Aethopyga ignicauda**	s		LC			**8**	1	1
398	Green-tailed Sunbird	*Aethopyga nipalensis*	r		LC			**10**	1	1
399	Black-throated Sunbird	*Aethopyga saturata*	r		LC			**9**	1	0
400	Crimson Sunbird	*Aethopyga siparaja*	r		LC			**12**	1	0
401	Purple Sunbird	*Nectarinia asiatica*	r		LC			**12**	1	0
	Family - Passeridae									
402	Red-throared Pipit	*Anthus cervinus*	w		LC			**7**	0	1
403	Olive-backed Pipit	*Anthus hodgsoni**	r		LC			**20**	1	1
404	Rosy Pipit	*Anthus roseatus**	ra		LC			**17**	1	1
405	Upland Pipit	*Anthus sylvanus**	r		LC			**10**	1	1
406	Tree Pipit	*Anthus trivialis trivialis*	w		LC			**5**	1	1
407	White Wagtail	*Motacilla alba alboides**	ra		LC			**18**	1	1
408	Grey Wagtail	*Motacilla cinerea**	r		LC			**19**	1	1
409	Citrine Wagtail	*Motacilla citreola**	m		LC			**15**	1	1
410	Yellow Wagtail	*Motacilla flava beema**	w		LC			**12**	1	1
411	White-browed Wagtail	*Motacilla maderaspatensis*	r		LC			**11**	1	1
412	Black-throated Accentor	*Prunella atrogularis*	r		LC		HL	**4**	0	1
413	Alpine Accentor	*Prunella collaris**	r		LC			**7**	0	1
414	Brown Accentor	*Prunella fulvescens*	r		LC		HL	**5**	0	1
415	Altai Accentor	*Prunella himalayana*	w		LC			**8**	1	1
416	Robin Accentor	*Prunella rubeculoides*	r		LC			**6**	0	1
417	Rufous-breasted Accentor	*Prunella strophiata*	r		LC			**9**	1	1
418	Black-winged Snowfinch	*Montifringilla adamsi*	r		LC			**6**	0	1
419	House Sparrow	*Passer domesticus**	ra		LC			**18**	1	0
420	Eurasian Tree Sparrow	*Passer montanus**	ra		LC			**18**	1	1
421	Russet Sparrow	*Passer rutilans**	r		LC			**7**	1	1
422	Baya Weaver	*Ploceus philippinus*	r		LC			**8**	1	0
423	Scaly-breasted Munia	*Lonchura punctulata*	r		LC			**11**	1	0
	Family - Fringillidae									
424	Spectacled Finch	*Callacanthis burtoni*	w		LC			**1**	1	0
425	European Goldfinch	*Carduelis carduelis*	r		LC			**4**	1	1
426	Yellow-breasted Greenfinch	*Carduelis spinoides**	r		LC			**12**	1	1
427	Dark-rumped Rosefinch	*Carpodacus edwardsii*	r		LC	UR		**3**	1	0
428	Common Rosefinch	*Carpodacus erythrinus**	ra		LC			**16**	1	1
429	Dark-breasted Rosefinch	*Carpodacus nipalensis*	r		LC			**8**	1	0

430	Beautiful Rosefinch	*Carpodacus pulcherrimus**	r		LC			**10**	1	1
431	Red-fronted Rosefinch	*Carpodacus puniceus**	r		LC			**7**	0	1
432	Pink-browed Rosefinch	*Carpodacus rhodochrous**	r		LC			**8**	1	1
433	Spot-winged Rosefinch	*Carpodacus rodopeplus**	r		LC			**8**	1	1
434	Great Rosefinch	*Carpodacus rubicilla*	r		LC		HL	**5**	0	1
435	Streaked Rosefinch	*Carpodacus rubicilloides**	r		LC		HL	**6**	0	1
436	White-browed Rosefinch	*Carpodacus thura*	r		LC			**7**	1	1
437	Vinaceous Rosefinch	*Carpodacus vinaceus*	r		LC	UR		**2**	0	1
438	Chaffinch	*Fringilla coelebs*	w		LC			**4**	0	1
439	Brambling	*Fringilla montifringilla*	w		LC			**3**	1	1
440	Crested Bunting	*Melophus lathami*	r		LC			**14**	1	0
441	Brandt's Mountain Finch	*Leucosticte brandti**	r		LC			**7**	0	1
442	Plain Mountain Finch	*Leucosticte nemoricola**	r		LC			**9**	1	1
443	Red Crossbill	*Loxia curvirostra*	r		LC			**6**	1	1
444	Collared Grosbeak	*Mycerobas affinis*	r		LC			**9**	1	1
445	White-winged Grosbeak	*Mycerobas carnipes*	r		LC			**11**	0	1
446	Spot-winged Grosbeak	*Mycerobas melanozanthos**	r		LC			**5**	1	1
447	Gold-naped Finch	*Pyrrhoplectes epauletta*	r		LC			**5**	0	1
448	Red-headed Bullfinch	*Pyrrhula erythrocephala*	r		LC			**10**	1	1
449	Brown Bullfinch	*Pyrrhula nipalensis*	r		LC			**7**	1	0
450	Fire-fronted Serin	*Serinus pusillus**	ra		LC			**4**	1	1
451	Tibetan Siskin	*Carduelis thibetana*	w		LC			**4**	1	1
452	Rock Bunting	*Emberiza cia**	rc		LC			**7**	1	1
453	Yellowhammer	*Emberiza citrinella*	w		LC	UR		**1**	1	0
454	Chestnut-eared Bunting	*Emberiza fucata*	r		LC			**7**	1	0
455	Pine Bunting	*Emberiza leucocephalos*	w		LC			**2**	0	1
456	Little Bunting	*Emberiza pusilla*	w		LC			**10**	1	1
									388	288

Sources: B.P.P. 1995a, b, c; DNPWC/MFSC/GoN 2005; Bhuju *et al.* 2007; Siwakoti & Basnet 2007; NHM/TU & IUCN 2059-BS, Fleming *et al.* 1976; Inskipp 1989; Grimmet *et al.* 1998, 2000; Baral & Inskipp 2004, 2005; DF5YsWP, Humla 2066/63BS and *species are verified in KSL field visit (Humla), 2010.

Legends and Summary				
Legends and Summary P = Protected by NPWC Act 1973 **CITES** Appendix I Appendix II Appendix III	**IUCN = IUCN Red List Category** CR = Critically Endangered EN = Endangered VU = Vulnerable NT = Near Threatened LC = Least Concern	**SS - Seasonal status** r – resident m – migratory s - summer visitor s - summer visitor w - winter visitor c – common a - abundant	**Region (Spatial confinement)** HL = Confined to Highlands MH = Confined to Midhills **Sites** PAs, RS, WHS of Nepal (total 24)	**NRDB (Nepal Red Data Book) Status** C = Critically endangered E = Endangered V = Vulnerable S = Susceptible

Annex 9. Potential list of Herpeto from KSL Nepal

SN	Order/Family/ Local Names	Scientific names	NG/P	CITES	IUCN	NRDB	Region	Site	MH	HL
	ORDER : ANURA									
	Family: Bufonidae									
1	Himalayan Toad	*Bufo himalayanus*			LC v3.1		MH	**3**	1	0
2	Black0spined Toad	*Bufo melanostictus*			LC v3.1			**5**	1	0
	Family: Pelobatidae									
3	Khaptad pelobatid toad	*Scutiger nepalensis*			VU v3.1	S(es)	MH	**4**	1	0
4	Nyingchi high altitude toad	*Scutiger nyingchiensis*			LC v3.1		HL WP	**0**	0	1
5	Sikkimese pelobatid toad	*Scutiger sikimmensis*			LC v3.1		HL	**1**	0	1
	Family: Ranidae									
6	Skittering Frog	*Euphlyctis cyanophlyctis*			LC v3.1			**2**	1	0
7	Bajang frog	*Paa ercepeae*			NT v3.1	S(es)	MH WP	**1**	1	0
8	Indian Rice Frog	*Rana limnocharis*			LC v3.1			**3**	1	0
9	Small paa frog	*Paa minica*			VU v3.1	S(es)	MH WP	**1**	1	0
10	Langtang frog	*Paa polunini*			LC v3.1			**1**	0	1
11	Indian Bull Frog	*Hoplobatrachus tigerinus*		II	LC v3.1			**6**	1	0
12	Indian Borrowing Frog	*Sphaerotheca breviceps*			LC v3.1			**0**	1	0
	ORDER: TESTUDINES									
	Family: Testuninidae									
13	Elongated Tortoise	*Indotestudo elongata*		II	EN v2.3	S		**1**	1	0
	ORDER : SAURIA									
	Family: Agamidae									
14	Common Garden Lizard	*Calotes versicolor versicolor*						**14**	1	0
15	Large mountain lizard	*Oriotiaris major*					HL WP	**1**	0	1
16	Kashmir agama	*Laudakia tuberculata*			DD v3.1			**4**	0	1
17	Agaupani forest agama	*Oriotiaris dasi*					MH WP	**1**	1	0
18	Kumaon mountain lizard	*Oriotiaris kumaonensis*					MH WP	**1**	1	0
19	Theobald's Toad Agama	*Phrynocephalus theobaldi*						**1**	1	0
	Family: Gekkonidae									
20	Nepalese rock gecko	*Cyrtopodion nepalense*				(es)	MH WP	**1**	1	0
	Family: Scincidae									
21	Himalayan ground skink	*Asymblepharus himalayanus*						**1**	1	1
22	Nepalese ground skink	*Asymblepharus nepalensis*				(es)		**0**	1	0
23	Brahminiy Skink	*Mabuya carinata*						**6**	1	0
24	Glacier Ground Skink	*Asymblepharus ladacensis*					HL WP	**2**	1	1
	Family: Varanidae									
25	Bengal Monitor	*Varanus bengalensis bengalensis*		I		S		**6**	1	0

26	Yellow Monitor	*Varanus flavescens*	P	I	LC v2.3	S		**8**	1	0
	ORDER : SERPENTES									
	Family: Colubridae									
27	Mountain Keelback	*Amphiesma platyceps*						**3**	0	1
28	Buff0striped Keelback	*Amphiesma stolata*						**8**	1	0
29	Common Cat Snake	*Boiga trigonata triogonata*						**7**	1	0
30	Eastern Trinket Snake	*Elaphe cantoris*						**0**	1	0
31	Himalayan Trinket Snake	*Elaphe hodgsoni*						**4**	0	1
32	Red0bellied Kukri Snake	*Oligodon erythrogaster*						**1**	1	0
33	Asiatic Rat Snake	*Ptyas mucosus mucosus*		II		S		**9**	1	0
34	Boulenger's Keelback	*Amphiesma parallelum*						**0**	1	0
35	Olive oriental slender snake	*Trachischium laeve*						**0**	0	1
36	St. John's keelback water snake	*Xenochrophis piscator sanctijohannis*					MH	**3**	1	0
	Family: Viperidae									
37	Himalayan Pit Viper	*Gloydius himalayanus*						**3**	1	1
38	Mountain Pit Viper	*Ovophis monticola monticola*						**3**	1	0
									30	**11**
	Sources:									
	B.P.P. 1995a, b; DNPWC/MFSC/GoN 2005; Bhuju *et al.* 2007; Siwakoti & Basnet 2007; NHM/TU & IUCN 2059-BS, Shah 1995 and Shah 2004									

Annex 10. Potential list Fish from KSL Nepal

SN	Order/Family/Local Names	Scientific Names	River	NRDB	Site	MH	HL
	ORDER: CLUPEIFORMES						
	Family - Clupeidae						
1	Suia, Sidhri, Suhia	*Gudusia chapra*	K,M		**6**	-	-
	Family - Notopteridae						
2	Mohi, Chital	*Notopterus chitala* (Hamilton-Buchanan)			**5**	-	-
3	Golhi, Patara, Mohi, Chitala	*Notopterus notopterus* (Pallas)			**8**	-	-
	ORDER : CYPRINIFORMES						
	Family - Cyprinidae						
4	Katle	*Acrossocheilus hexagonolepis*		V	**4**	-	1
5	Mada, Dhawai	*Amblypharyngodon mola* (Hamilton-Buchanan)	K,M		**5**	-	-
6	Harda, Bhegna, Karangi, Chakale	*Aspidoparia morar* (Hamilton-Buchanan)	K,M		**4**	-	-
7	Fageta, Poti, Faktar	*Barilius barna*			**4**	1	-
8	Guderi, Fageta, Jhojho, Chilti, Faketo	*Barilius bendelisis* (Hamilton-Buchanan)			**3**	1	-
9	Fageta, Lam Fageta	*Barilius vagra*	K		**3**	-	-
10	Rato machha	*Carassius carassius*			**1**	1	-
11	Bhakur, Katla	*Catla catla* (Hamilton-Buchanan)	K,M		**5**	-	-
12	Rewa, Chaguni, Patharchatti, Kubre	*Chagunius chagunio* (Hamilton-Buchanan)	K,M	V	**4**	-	-
13	Palanka, Chelhwa	*Chela cachius* (Hamilton-Buchanan)	K,M	S	**3**	-	-
14	Deduwa, Malaguddi, Planka, Chela	*Chela laubuca*	K,M		**3**	-	-
15	Naini, Mrigal, Jhilke	*Cirrhinus mrigala* (Hamilton-Buchanan)	K,M		**5**	-	-
16	Rewa	*Cirrhinus reba* (Hamilton-Buchanan)	K,M		**8**	-	-
17	Bhitti	*Danio aequipinnatus*		S	**1**	-	-
18	Nepti, Pothi, Danio	*Danio dangila* (Hamilton-Buchanan)	K		**2**	-	-
19	Chitahari, Pothi, Chitharipoti	*Danio devario* (Hamilton-Buchanan)	M		**3**	-	-
20	Dedhawa, Darai, Flying barb, dadewa	*Esomus dandricus* (Hamilton-Buchanan)	K,M		**6**	1	-
21	Bucluna, Lohari, Lahare Buduna	*Garra annandalei* (Hora)	K,M		**4**	1	-
22	Buduna	*Garra gotyla* (Gray)	K,M		**3**	1	-
23	Thed,Thaid	*Labeo angra*			**4**	1	-
24	Bata, rohu	*Labeo bata* (Hamilton-Buchanan)	K		**3**	-	-
25	Boga, Jhilke, Tikuali	*Labeo boga* (Hamilton-Buchanan)	K,M		**3**	-	-
26	Kalbasu, Basarhii	*Labeo calbasu* (Hamilton-Buchanan)	K,M		**5**	-	-
27	Roi, Rohu	*Labeo coeruleus*	K	S	**1**	-	-
28	Gurdi, Rahu, Kathlegi	*Labeo dero* (Hamilton-Buchanan)	K,M		**3**	-	-
29	Kalanch, Garde, Brahmaputra rohu, Calbasu	*Labeo dyocheilus*	K,M,S	S	**4**	-	-
30	Garde, Boi, Finged lipped, carp	*Labeo fimbriatus* (Bloch)	K	S	**0**	-	-
31	Termassa, Pangusia, Kalaacha	*Labeo pangusia* (Hamilton-Buchanan)	K	S	**3**	-	-
32	Darai	*Oxygaster (Salmostoma) phulo*	K	S	**2**	-	-
33	Bukuda	*Puntius (Cyclocheilichthys) apogon (Valenciennes)*		S	**2**	-	-
34	Kande, Bhitti, Sidhri, Bhitte, Olive barb	*Puntius sarana* (Hamilton-Buchanan)	K,M		**6**	-	-
35	Sidre, Firefin barb, Poti, Bhitte	*Puntius ticto* (Hamilton-Buchanan	K,M		**3**	-	-
36	Dedhawa, Darai, Rasbora	*Rasbora (Parluciosoma) daniconius* (Hamilton-Buchanan)			**4**	-	-
37	Chuche Asala	*Schizotharaichthys annandalei*		(es)	**1**	1	-

38	Chuche Asala, Kunar snow trout	*Schizotharaichthys labiatus* (McClelland)	K,M		**0**	-	1
39	Chuche Asala, poit nose snow trout	*Schizotharaichthys progastus*	K,M	V	**4**	-	-
40	Sunaula Asala	*Schizothorax molesworthii*		S	**0**	-	-
41	Bucche Asala, Spotted snow trout	*Schizothorax plagiostomus* (Heckel)	K,M	V	**4**	1	1
42	Asala, Soal, Puko, Buche Asla	*Schizothorax richardsonii*		V	**3**	1	-
43	Asala	*Schizothorax sinuatus*			**0**	-	-
44	Chepti	*Semiplotus (Cyprinon) semiplotus* (McClelland)	K,M	S	**2**	-	-
45	Dark Mahseer	*Tor chelynoides* (McClelland					
46	Mosal mahseer	*Tor mosal* (Hamilton-Buchanan)					
47	Mahaseer, Himalayan golden mahseer Pahale sahar	*Tor putitora* (Hamilton)	K,M	V	**4**	1	-
48	Sahar, satto	*Tor tor*		E	**5**	1	-
	Family - Psilorhynchidae						
48	Titari, Dhami	*Psilorhynchus homaloptera*			**0**	-	1
50	Patharchatti, Tite	*Psilorhynchus sucatio* (Hamilton-Buchanan)	K,M		**3**	-	-
	Family - Homalopteridae						
51	Tita kabri, Burmese loach	*Balitora brucei* (Gray)	K,M		**2**	-	-
	Family - Cobitidae						
52	Baghi, almora loach	*Botia almorhae* (Gray)	K,M		**1**	-	-
53	Baghi	*Botia dario* (Hamilton-Buchanan)			**1**	-	-
54	Gettu, Singhi, Hora loach	*Botia dayi* (Hora)			**2**	-	-
55	Getu, Baghi	*Botia lohachata* (Chaudhuri)	K,M		**3**	-	-
56	Latani, Lata	*Lepidocephalichthys (Lepidocephalus) nepalensis*	K		**1**	-	-
57	Lata, Nakata, Goira, Guntea loach	*Lepidocephalichthys (Lepidocephalus) guntea*	K,M		**6**	-	-
58	gadela	*Nemacheilus multifaciatus* (Day)					
59	Gadela, Pate goira, Kancheni, loach	*Noemacheilus (Nemacheilus) beavani*	K,M		**3**	1	-
60	Natwa, Bhoti, Daadegoira, Baghilata	*Noemacheilus (Nemacheilus) botia* (Hamilton-Buchanan)			**3**	1	-
61	Gadela	*Noemacheilus rupecola var. inglishi*			**2**	1	-
62	Gadela	*Noemacheilus rupecola*			**4**	1	-
63	Copper Mahseer, Katle	*Neolissochilus hexagonolepis*	K,M				
64	Gadela	*Noemacheilus savona* (Hamilton-Buchanan)			**2**	-	-
65	Baga Lata, Gongota loach	*Somileptes gongota* (Hamilton-Buchanan)	K,M		**2**	-	-
	Family - Amblycipidae						
67	Pichhi, Bindhar	*Amblyceps mangois* (Hamilton-Buchanan)			**3**	-	-
	Family - Bagridae						
68	Bagrid Catfish, Tista batasio	*Batasio batasio* (Hamilton-Buchanan)	K		**0**	-	-
69	Tengra, Lachawz, Palawa, Junge, GANGETIC MYSTUS \ TENGER	*Mystus cavasius* (Hamilton-Buchanan)	M		**4**	-	-
70	Tengra, Kanti, Giant river catfish	*Mystus (Aorichthys) seenghala* (Sykes)	K,M		**3**	-	-
71	Tengra, STRIPED DWARF CATFISH \ TERNGER KANTI	*Mystus vittatus* (Bloch)	K,M		**4**	-	-
72	Rita, Chona, Belaunda	*Rita rita* (Hamilton-Buchanan)	K		**4**	-	-
	Family - Siluridae						

73	Pabata, Chachara, Chali, BUTTER-CATFISH \ PAPTA	*Ompok bimaculatus* (Bloch)	K,M		**5**	-	-
74	Pabda, PABDAH CATFISH	*Ompok pabda* (Hamilton-Buchanan)	K		**1**	-	-
75	Buhari, Padni, Barahi, BOAL \ BUHANI	*Wallago attu*	K,M		**7**	-	-
	Family - Schibeidae						
76	Patasi, Patanga, Sutara, Satara, GANGETIC AILIA	*Ailia coila* (Hamilton-Buchanan)	K,M		**3**	-	-
77	Jalkapur, GARUA BACHCHA, GUARCHCHA	*Clupisoma garua* (Hamilton-Buchanan)	K,M		**4**	-	-
78	Bachora, Chekri, BATCHWA VACHA	*Eutropiichthys vacha* (Hamilton Buchanan)	K,M		**4**	-	-
79	GOONGWAREE VACHA	*Eutropiichthys goongware* (Sykes)	K				
80	Jalkapur, Patasi	*Pseudeutropius atherinoids* (Bloch)	K,M		**3**	-	-
81	Jalkapur, MURIYS VACHA	*Pseudeutropius marius* (Hamilton-Buchanan)	K		**1**	-	-
82	Gonch, Gonchara, SILONDIA VACHA	*Silonia silondia* (Hamilton-Buchanan)	K		**1**	-	-
	Family - Sisoridae						
83	Gonch, GANGETIC GOONCH	*Bagarius bagarius* (Hamilton-Buchanan)	K,M		**4**	1	-
84	GOONCH \ GOUNCH	*Bagarius yarrellii* (Sykes)	K				
85	Tilkabri, TELCAPRE	*Euchiloglanis hodgartii* (Hora)	S		**1**	-	-
86	Tikthigogta, Padana, GAGATA \ GANFAK	*Gagata cenia* (Hamilton-Buchanan)	K,M		**4**	-	-
87	GANGETIC GAGATA	*Gagata gagata* (Hamilton-Buchanan)			**0**		
88	TORRENT CATFISH KAPRE	*Glyptosternum maculatum* (Regan)	M		**0**		
89	Tengana, Tilkabre	*Glyptosternum blythii*			**0**	1	-
90	Kapree	*Glyptothorax cavia* (Hamilton-Buchanan)	K,M,S		**2**	-	-
91	Kathiyal, Kavre	*Glyptothorax garhwali*					
92	Khasre, Kavre	*Glyptothorax nelsoni Ganguly, Datta & Sen*			**0**		
93	Khasre, Kavre	*Glyptothorax stoliczkae* (Steindachner)			**0**		
94	Karsingha, CAPRE	*Glyptothorax pectinopterus* (McClelland)	K,S		**3**	1	-
95	Kavre	*Glyptothorax trilineatus* (Blyth)	S		**2**	-	-
96	Kabre, SULCATUS CATFISH \ GOTEL	*Pseudecheneis sulcatus* (McClelland)	K,M,S		**4**	1	-
	Family - Chacidae						
97	Pauwa, Bheda, Kirkire, CHACA \ PAUNA	*Chaca chaca* (Hamilton-Buchanan)	K		**1**	-	-
	Family - Saccobranchidae						
98	Singhi, STINGING CATFISH	*Heteropneustes fossilis* (Bloch)	K,M		**8**	-	-
	Family - Claridae						
99	Mungri, MAGUR \ MANGUR, MUNGAR	*Clarias batrachus* (Linnaeus)	K,M		**7**	-	-
	ORDER - BELONIFORMES						
	Family - Belonidae						
100	Sui, Kauwo, Chuchhe Bam, FRESHWATER GARFISH KAUWA	*Xenentodon cancila* (Hamilton-Buchanan)			**7**	-	-
	ORDER - ANGUILLIFORMES						
	Family - Anguillidae						
101	Rajabam, eel	*Anguilla bengalensis* (Gray)	M	V	**4**	1	-
	ORDER - CHANNIFORMES						
	Family - Channidae						
102	Sauri, Saul, GIANT	*Channa marulius* (Hamilton-	K,M		**7**	-	-

	SNAKEHEAD	Buchanan)					
103	Chringe, ASIATIC SNAKEHEAD \ GARAHI	*Channa orientalis* Bloch & Schneider	K		**1**	-	-
104	Garahi, Gauri, SPOTTED SNAKEHEAD HELAE	*Channa punctatus* (Bloch)	K,M		**6**	-	-
105	Saura, Sauri	*Channa striatus* (Bloch)			**7**	-	-
	ORDER - SYNBRANCHIFORMES						
	Family - Synbranchidae						
106	Bam	*Amphipnous cuchia*			**6**	1	-
	ORDER - PERCIFORMES						
	Family - Chandidae						
107	Nata, Chanda, Gurda	*Chanda nama* (Hamilton-Buchanan),	K,M		**5**	-	-
	Family - Nandidae						
108	Khesalei, BADIS, DWARF CHAMELEONFISH \ PASARI	*Badis badis* (Hamilton-Buchanan)	K, M		**3**	-	-
109	Dhala, Dhalai, MOTTLED NANDUS	*Nandus nandus* (Hamilton-Buchanan)	K,M		**7**	-	-
	Family - Anabantidae						
110	Kabai, CLIMBING PERCH KABAI	*Anabas testudineus* (Bloch)	K, M		**3**	-	-
	Family - Belontidae						
111	Sunkatta, Goila	Crossocheilus burmanicus Hora					
112	Katara, Bhotia, STRIPLED GOURAMI, Kotari	*Colisa (Crossocheilus) fasciatus* (Bloch & Schneider)	K,M		**7**	-	-
113	Kotri, Mate budua	*Colisa Crossocheilus) latius* (Hamilton-Buchanan)	K,M		**2**	-	-
	Family - Gobidae						
114	Bulla, TANK GOBY	*Glossogabius giuris* (Hamilton-Buchanan)	K,M		**4**	-	-
	ORDER - MASTACEMBELIFORMES						
	Family - Mastcembelidae						
115	Gainchi, BAMI,GAINCHI	*Macrognathus aral* (Bloch & Schneider)	K,M	V	**2**	-	-
116	Chusi Bam, Kande Ban, TIRE-TRACK, SPINY EEL GARCHI,CHUCHEBAM	*Mastacembelus armatus* (Lacepede)	K,M		**6**	-	-
117	Kath Gainchi	*Mastacentbelus pancalus* (Hamilton-Buchanan)			**6**	-	-
	ORDER : MUGILIFORMES						
	Family - Mugulidae						
118	Ladhiya, Rewa, YELLOWTAIL MULLET	*Sicamugil cascasia* (Hamilton-Buchanan)	K,M		**2**	-	-
	ORDER : TETRAODONTIFORNiES						
	Family - Tetroadontidae						
119	Pokcha, OCELLATED PUFFER FISH	*Tetraodon cutcutia*	M		**0**	-	-
							4
		Juke machha reported from Humla					
	Sources:						
	B.P.P. 1995a, b; DNPWC/MFSC/GoN 2005; Bhuju *et al.* 2007; Shrestha 1994, 1995 and DF5YsWP, Humla 2066/63BS, Bhattarai et al. 2062-BS, WSHL 2007						
	Rivers						
	M - Mahakali river						
	K- Karnali river						
	S - Seti river						

Annex 11. Endangered, Threatened and Protected Flora and Fauna of Api-Nampa Conservation area

S.N	Scientific Name	Common Name	Family	Status Code		Legal Status
				IUCN	CITES	
A.	***Floral Species***					
1	*Dactyaloriza hatagirea*	Panch Aule	Orchidaceae	-	II	P
2	*Picrorhiza scrophulariiflora*	Kutki	Scrophulariaceae	V		P
3	*Nardostachys grandiflora*	Jatamansi	Valerianaceae	V	II	P
5	*Valeriana jatamansii*	Sugandabala	Valerianaceae	-	II	P
6	*Rauvolfia serpentina*	Sarpaganda	Apocynaceae	E	II	P
7	*Abies spectabilis*	Talispatra	Pinaceae	-	II	P
8	*Taxus wallichina*	Himalayan Yew	Pinaceae	-	II	P
9	*Aconitum hetrophyllum*	Bikh	Ranunculaceae	R		-
10	*Meconopsis regia*	Himalayan Yellow Poppy	Papaveraceae	-	III	-
11	*Lichens*	Jhyau	-	-		P
12	*Orchidaceae*	Sungava	Orchids	-	II	
13	*Swertia chirayita*	Chirayato	Gentianaceae	V		
B.	***Fauna - Mammals***					
1	*Naemorhedus goral*	Goral	Bovidae	-	I	
2	*Moschus chrysogaster*	Musk deer	Cervidae	E	I	P
3	*Ailurus fulgens*	Red panda	Ailuridae	E	I	P
4	*Uncia uncial*	Snow leopard	Felidae	E	I	
5	*Selenarctos thibetanus*	Himalayan black Bear	Ursidae	V	-	-
6	*Bos grunniens*	Yak	Bovidae	V	I	-
7	*Hemitragus Jemlahicus*	Himalayan Tahr	Bovidae	V	K	-
8	*Canis aurevs*	Jackal	Canidae	-	III	-
C.	***Fauna – Birds***					
1	*Lophophorus impejanus*	Danfe	Phasianidae		I	
2	*Tragopan Satyra*	Monal	Phasianidae	E	III	

Source: Api-Nampa Conservation area Management Plan, DNPWC 2009

Annex 12a. Mammal diversity of Rara national park

Name of Species	Family	Common Name	CITES Status
Ailirus fulgens	Ailuridae	Red panda	
Hemitragus jemalhicus	Bovidae	Himalayan thar	C
Nemorhaedus goral	Bovidae	Goral	
Nemorhaedus sumatraensis	Bovidae		
Dremomys lokriah	Callosciurinae		
Tamiops macclellandi	Callosciurinae		
Canis aureus	Canidae	Jackal	C/III
Canis lupus	Canidae		P/I
Cuon alpinis	Canidae	Indian wild dog	C/II
Vulpes bengalensis	Canidae	Indian fox	
Vulpes vulpes	Canidae	Red fox	C
Macac assamensis	Ceropithecidae		
Macaca mulatta	Ceropithecidae	Rhesus macaque	C/II
Presbytis entullus	Ceropithecidae	Common languor	C/II
Muntiacus muntajk	Cervidae		
Catopuma temminckii	Felidae		
Felis chaus	Felidae	Jungle cat	C/II
Panthera pardus	Felidae	Leopard	C/I
Panthera uncial	Felidae		
Pardofelis mamorata	Felidae		
Pardofelis nebulos	Felidae		
Prionailurus bengalensis	Felidae		
Hipposideros armiger	Hipposoderidae		
Lutra lutra	Lutranae	Common otter	
Manis Pentadactyla	Manidae		
Moschus chrysogaster	Moschidae		P/I
Moschus moschiferus	Moschidae	Musk deer	
Mus musculus	Muridae		
Martes flavigula	Mustelidae	Yellow-throated marten	C/III
Mustela altaica	Mustelidae		
Mustela sibirica	Mustelidae	Himalayan weasel	C/III
Ochotona macrotis	Ochotonidae	Himalayan mouse hare	
Petaurista peturista	Pteromyidae	Giant flying squirrel	
Hylopetes alboniger	Pteromyidae		
Petaurista magnificus	Pteromyidae		
Petaurista pturista	Pteromyidae	Flying squirrel	
Trogopterus peasonii	Pteromyidae		
Ratufa bicolor	Sciuridae		
Chimarrogale himalayica	Soricidae		
Nectogale elegans	Soricidae		
Soriculus baileyi	Soricidae		
Soriculus caudatus	Soricidae		
Soriculus gruberi	Soricidae		
Soriculus leucops	Soricidae		
Soriculus nigrescens	Soricidae		
Suncus marinus	Soricidae		
Suncus stoliczkanus	Soricidae		
Sus scrofa	Suidae	Wild boar	C

Talpa macrura	Talpidae		
Ursus selenarctos thibetans	Ursidae	Himalayan black bear	
Ursus arctos	Ursidae		
Ursus thibetanus	Ursidae		
Barbastella leucomelas	Vespertilionidae		
Plecotus auritus	Vespertilionidae		

Source: BPP (1995)
Note: C= Common, P = Protected R= Rare: I, II, III=CITES APPENDIX, * =Probable

Annex 12b. Endemic fish of RNP

Name of Species	Familay	Common Name
Schizothorax macrophthalus	Cuprinidae	Snow trout
Schizothorax nepalensis	Cuprinidae	Snow trout
Schizothorax raraensis	Cuprinidae	Snow trout

Source: Rara NP Management plan 2009

Annex 12c. Birds of Rara National park

Name of Species	Family	Common Name	CITES Status
Accipiter gentilis	Accipitrade	Northern goshawk	C
Accipter chrysaetos	Accipitrade		
Accipter nisus	Accipitrade	Northern sparrowhawk	C
Accipter trivirgatus	Accipitrade		
Accipter virgatus	Accipitrade		
Aquila chrysaetos	Accipitrade		
Aquila nipalensis	Accipitrade	Steppe eagle	
Buteo buteo	Accipitridae	Eurasian buteos	R
Buteo rufinus	Accipitrade		
Buteo hemilasius			
Circus aeruginosus	Accipitrade	Marsh harrier	
Circus cyaneus	Accipitrade	Hen harrier	C
Circus macrourus	Accipitrade	Pallid harrier	
Gypaetus barbatus	Accipitrade	Lammergeier	C
Gyps himalayensis	Accipitrade	Himalayan griffon vulture	
Hieraaetus fasciatus	Accipitrade		
Ictinaetus malayensis	Accipitridae	Eagle	
Milvus migrans	Accipitrade	Black kite	R
Neophron percnopteris	Accipitrade	Egypteon vulture	
Pandion haliaetus	Accipitrade	Osprey	
Spizaetus nipalensis	Accipitrade	Mountain hawk eagle	
Sarcogyps vulture	Accipitrade	Red headed vulture	
Alauda gulgula	Alaudidae	Oriental skylark	C
Calandrella acutirostris	Alaudidae	Hume's short toed lark	
Calandrell			
Alcedo athis	Alcedinadae		
Anas acuta	Anatidae	Pintail	
Anas clypeata	Anatedae	Shoveler	
Anas crecca	Anatidae	Common teal	
Anas formosa	Anatodae		
Anas penelope	Anatadae	Eurasian wigeon	C/III
Anas platyrchynchos	Anatidae	Mallrd	
Anas stepera	Anatidae	Widgeon	
Anser anser	Anatodae		
Anser Indicus	Anatedae	Bar headed goose	R
Apus apus	Anatidae		
Aythya ferina	Anatidae	Pochard	
Aythya fuligula	Anatidae	Tufted duck	C
Aythya nyroca	Anatidae	Ferruginous duck	
Bucephala clangula	Anatidae	Golden Eye	
Calandrella acutairastris	Alaudidae	Hume's short-toed lark	
Mergus merganser	Anatidae		
Netta rufina	Anatidae	Red crested pochard	
Tadorna ferruginea	Anatidae	Ruddy shelduck	C
Hirundapus caudacatus	Apodidae	White-throated needletail	
Ardea cinerea	Ardeidae	Greater heron	
Botaurrus stellaris	Ardeidae	Great white egret	
Egreta alba	Ardeidae		
Megalaima virens	Capitonidae		
Caprimulgus indicus	Caprimulgidae		
Actitis hypolucos	Charadriidae		
Caladris minuta	Charadriidae		
Caladris timmincki	Charadriidae		
Charadrius mongolus	Charadriidae		
Gallinago gallinago	Choradriidae	Common snipe	
Phalaropus lobatus	Choradriidae	Red necked phalarope	
Scolopax rusticola	Charadriidae		
Tringa glareola	Choradriidae	Wood sandiper	
Tringa nibularia	Charidiriidae	Greenshank	
Tringa ocropus	Choradriidae	Green Sandiper	
Tringa totanus	Charadriidae		
Cinslus pallasii	Cinclidae	Brown dipper	C
Certhia himalayana	Cirthedae	Bar-tailed treecreeper	

Certhia nipalensis	Cirthedae	Rusty-flanked teeecreeper	
Certhia familaris	Cirthidae	Common treecreeper	
Columba hodgsonii	Columbidae		*C
Columba rupestris	Columbidae		C
Columbia leuconota	Columbidae	Snow pigeons	C
Columbia livia	Columbidae	Rock Pigeon	C/III
Streptopelia orientalis	Columbidae	Rufous turtle dove	C
Pericrocotus ethologrs	Compephagidae	Long-tailed minivet	
Corvus corax	Corvidae	Jungle crow	C
Corvus macrorhynchos	Corvidae	Common mynah	C
Cuculus canorus	Corvidae	Common cuckoo	
Garrulus lanceolatus	Corvidae	Lanceolated jay	
Nucifraga caryocatactes	Corvidae	Eurasian Nutcracker	C
Pyrrhocorax pyrrhocorax	Corvidae	Red-billed chough	
Urocissa flavirostris	Corvidae	Yellow-billed blue magpie	
Urocissa erythrorhuncha	Corvidae	Red-billed Blue magpie	
Dicrurus leucophaeus	Dicruridae	Ashy drongo	C
Emberiza cia	Emberizidae	Rock bunting	
Falco subbeuteo	Falconidae	Hobbies	
Falco tinnuculus	Falconidae	Kestrel	C
Carduelis carduelis	Fringillida	Eurasian goldfinch	
Carduelis spinoides	Fringillidae	Yello-breasted greenfinch	C
Carpidacu erythrinus	Fringillidae	Common rosefinch	C
Carpidacus pulcherrimus	Fringillidae	Beautiful rosefinch	
Carpidacus puniceus	Fringillidae	Red-breasted rosefinch	
Carpidacus rhodochrous	Fringillidae	Pink-browed rose finch	C
Carpidacus rubiccilloides	Fringillidae	Crimson-eared rosefinch	-
Carpodacus pulcherrinus	Fringillidae	Beautiful rose finch	
Cerinus thibetanus	Fringillidae		
Frilngilla montifringilla	Fringillidae	Brambling	
Fringilla coelebs	Fringillidae	Common chaffinch	C
Fringilla montifringilla	Fringillidae	Brambling	
Leucosticte nemoricola	Fringillidae	Plain mountain finch	C
Luecosticte nemoricola	Fringillidae	Plain mountain finch	
Mycerobas affinis	Fringillidae	Collared grosbeak	R
Pyrrhula erythrocephala	Fringillidae	Red-headed bullfinch	C*
Serinus pusillus	Fringillidae	Red-fronted serin	C
Anthropoides virgo	Gruidae		
Ptyonoprogne rupestris	Hirundinidae		
Riparia riparia	Hirundinidae	Collared sand martin	
Lanius schach	Jacanidae	Long-tailed strike	C
Lanius tephronotus	Jacanidae	Grey-backed shrike	
Larus argentatus	Laradae		
Larus brunnicephalus	Laradae		
Larus rudibundus	Laradae		
Larusfuscus	Laradae		
Gelochelidon nilotica	Laridae	Gull billed turn	
Larus ichthyaetus	Laridae	Great black headed gull	
Montacilla cinerea	Moticilladae	Grey wagtail	
Anthus hodgsoni	Moticillidae	Olive-backed pipit	C
Athus cervinus	Moticillidae	Red-throated pipit	
Motacilla alba	Moticillidae	White wagtail	C
Motacilla cinerea	Moticillidae	Grey wagtail	C
Motacilla citreola	Moticillidae	Citrine wagtail	C
Motacilla flave	Moticillidae	Yellow wagtail	
Alcippe cinipectus	Muscicapidae	White-browed gulvetta	
Cettia brunnifrons	Muscicapidae	Grey-sided bush warbler	
Cettia fortipes	Muscicapidae		
Chaimarrornis leucocephalus	Muscicapidae	White-capped redstar	C
Enicurus maculatus	Muscicapidae	Spotted Fork tail	
Enicurus scouleri	Muscicapidae	Little forktail	C
Ficedula strophiata	Muscicapidae	Oravge-gorgetted flaycatcher	
Ficedula superciliaris	Muscicapidae	Ultramarine flycatcher	R
Ficedula tricolor	Muscicapidae	Slaty-blue flycatcher	*
Garrulax lineattus	Muscicapidae	Streaked laughing-thrush	
Garrulax ocellatus	Muscicapidae	Spotted laughing-thrush	

Garrulax variegatus	Muscicapidae	Streaked laughing thrush	
Heterophasia capistrats	Muscicapidae	Black-capped sibia	
Luscinia cyane	Muscicapidae	Indian blue robin	
Minla strigula	Muscicapidae	Chestnut-tailed	
Muscicapa ruficauda	Muscicapidae	Rufous-tailed flycatcher	
Muscicapa sibirica	Muscicapidae	Asian sooty flycatcher	C
Myiophoneus caeruleus	Muscicapidae	Blue whistling thrush	C
Oenanthe deserti	Muscicapidae	Desert wheatear	-
Phoenicurus caefulioceohalus	Muscicapidae	Blue-headed redstart	
Phoenicurus erythronotus	Muscicapidae	Rufous-backed redstart	C
Phoenicurus frontalis	Muscicapidae	Blue-headed redstart	
Phoneicurus caeruleocephalus	Muscicapidae	Blue-capped redstare	C
Phoneicurus frontalis	Muscicapidae	Blue-redstart	C
Phoneicurus ochruros	Muscicapidae	Black redstart	C
Phylloscopus affinis	Muscicapidae	Tickell's leaf warbler	
Phylloscopus fuscatus	Muscicapidae	Dusky warbler	
Phylloscopus inornatus	Muscicapidae	Yellow-browned warbler	
Phylloscopus maculipennis	Muscicapidae	Grey-faced leaf warbler	
Phylloscopus magnirostaris	Muscicapidae	Large-billed leaf warbler	
Phylloscopus occipitalis	Muscicapidae	Western crowned warbler	
Phylloscopus proregulus	Muscicapidae	Palla's leaf warbler	
Phylloscopus pulcher	Muscicapidae	Orange barred leaf warbler	
Phylloscopus pulcher	Muscicapidae	Orange-barred warbler	
Phylloscopus reguloides	Muscicapidae	Blyth's crowned leaf warbler	
Phylloscopus trochiloides (nitides)	Muscicapidae	Green/greenish warbler	
Pnoepyga albiventer	Muscicapidae	Greater scaly-breasted wren-babbler	
Regulus regulus	Muscicapidae	Goldcrest	
Rhipidura albicolis	Muscicapidae		
Rhipidura hypoxantha	Muscicapidae	Yellow-bellied fantail	
Rhyacornis fuliginosus	Muscicapidae	Plumbeous restart	C
Saxicola ferrea	Muscicapidae	Dark grey bush chat	C
Saxicola torguata	Muscicapidae	Common stonechat	C
Sercercus burkii	Muscicapidae	Golden-spectacled warbler	
Sercercus xanthoschistos	Muscicapidae	Grey-hooded wargler	
Tarsiger cyanurus	Muscicapidae	Orange-flanked bush-robin	C
Turdus albocinctus	Muscicapidae	White-collared blackbird	*
Turdus ruficollis	Muscicapidae	Dark-throated thrush	
Turdus unicolor	Muscicapidae	Tickell's thrush	*
Turdus viscivorous	Muscicapidae	Mistle thrush	
Yuhina gularis	Muscicapidae	Stripe-throated yuhina	
Zoothera dixoni	Muscicapidae	Long-tailed mountains thrush	
Aethopyga nipalensis	Nectariniidae	Green-tailed shrike	
Aegithalos concinnus	Paridae	Black-throated tit	
Aegithalos niveogularis	Paridae	White-throated tit	
Aegithalos niveogularis	Paridae	Black-throated tit	
Parus dichorous	Paridae	Grey crested tit	
Parus major	Paridae	Grea tit	
Parus melanolophus	Paridae	Spot-winged black tit	
Parus monticolus	Paridae	Green-backed tit	
Parus rubidiventris	Paridae	Rufous-napped black tit	
Parus rufonuchalis	Paridae	Rufous-vented black tit	
Parus xanthogenys	Paridae	Black-lored tit	
Sitta cashmirensis	Paridae	Kasmir nuthatch	
Sitta leucopsis	Paridae	White-checked nuthatch	
Phalacrocorax carpo	Phalacrocoracidae	Large coromorant	R
Alectoris chukar	Phasianidae		C
Catreus wallichii	Phasianidae		GT
Ithaginis cruentus	Phasianidae		
Lophophorus impejanus	Phasianidae	Himlayan monal	*P
Lophora leucomelana	Phasianidae	Kalij pheasant	R
Pucrasia macrolopha	Phasianidae		
Tetraogallus himalayensis	Phasianidae		C/III
Dendrocopos himalayendis	Picidae	Himalayan pied woodpecker	
Dendrocopus himalayensis	Picidae		
Picus sqamatus	Picidae	Scaly-bellied green woodpecker	
Passer montanus	Ploceidae	Eurasian tree sparrow	C

Podiceps nigrticolis	Podicipadae	Black-Necked Grebe	
Podiceps cristatus	Podicipedodae		
Podiceps nigrcollis	Podicipedodae		
Tachybaptus ruficollis	Podicipedodae	Little Grebe	
Prumella himalayana	Prunellidae	Altai accentor	C
Prunella astrogularis	Prunellidae	Black-throated accentor	?
Prunella collaris	Prunellidae	Alpine accentor	C
Prunella flavescens	Prunellidae	Brown accentor	C
Prunella strophiata	Prunellidae	Rufous-breasted accentor	C
Pycnonotus leucogeyns	Pycnonotidae	White-cheeked bulbul	C
Fulica atra	Ralliedae	Common coot	R
Gallnula chloropus	Ralliedae	Moorhen or Indian gallinule	
Sitta eutopaea	Sittidae	Eurasian nuthatch	
Strix aluco	Strigidae	Tawny awl	C
Acridotheres tristis	Sturnidae	Common raven	C?
Upupos epops	Upupidae	Common hoopoe	C

Source: BPP 1995

Note: C= common, P= Protected, R= Rare (Qualitative assessment), GT= Globally Threatened (Birdlife International, 1999), III= CITES Appendix (1995).

Annex 13. Commonly traded plant species/products from Baitadi, Darchula, Bajhang and Humla districts

S. No.	Commonly traded plant species/products	Family
1	Aconitum spicatum	Ranunculaceae
2	Acorus calamus	Araceae
3	Asparagus racemosus	Lilliaceae
4	Asphalt organic exudate (silajit)	
5	Astilbe rivularis	Saxifragaceae
6	Bauhinia vahlii	Malvaceae
7	Berberis asiatica	Berberridaceae
8	Bergenia ciliate	Saxifragaceae
9	Betula utilis	Betulaceae
10	(Bikhfej)	
11	Carcuna zedoaria	Zingiberaceae
12	Centella asiatica	Umbelliferae
13	Cinnamommum glaucescens	Lauraceae
14	Cinnamommum tamala	Lauraceae
15	Cordyseps sinensis	Hypocreaceae
16	(Daruhaldi)	Zingiberaceae
17	Delphinium himalayai	Ranunculaceae
28	Dioscorea deltoidea, D. bulbifera	Diascoreaceae
19	Ephedra gerardiana	Ephedraceae
20	Eulophia species	
21	Fritiilaria cirrhosa	Lilliaceae
22	(Halik)	
23	Juniperus indica	Cupressaceae
24	(Kakuli Jara)	
25	(Katush)	
26	Lindera neesiana	Lauraceae
27	Morchella conica	Morchellaceae
28	Morchella species	Morchellaceae
29	Nardostachys grandiflora	Valerianaceae
30	Neopicrorhiza scrophulariiflora	Scrophulariaceae
31	Orchid (Jibanti)	Orchidaceae
32	Paris polyphylla	Lilliaceae
33	Machilus species (Pawan ko bokra)	Lauraceae
34	Persea odoratissima	Lauraceae
35	Phyllanthus emblica	Euphorbiaceae
36	Pistacea chinensis	Anacardiaceae
37	Daphnephyllum species (Raktachandan)	
38	Rheum australe	Polygonaceae
39	Rubia manjith	Rubiaceae
40	Salla ko simta	
41	Sapindus mukerossi	Sapendaceae
42	Saussurea lappa	Compositae
43	Selinum tenuifolium	Umbelliferae
44	(Setak chini jara)	
45	(Sunpati)	
46	Swertia chirayita	Gentianaceae
47	(Thingure salla)	Pinaceae
48	Tribulus terrestris	Zygophyllaceae
49	Usnea longissima	Usneaceae
50	Valeriana jatamansii	Valerianaceae
51	Xanthoxylum oxyphyllum	Rutaceae

(Source: Annual reports from District forest office)

Annex 14. Population distribution in different VDCs/Municipality in each district

District	VDC	Area (sq.km)	Population in 2001			No. of households		Proj. population 2009	Literacy Rate	Pop. Density
			Male	Female	Total	2001	2009			
Baitadi	Amchaur	29.12	2042	2401	4443	794	898	5025	38.6	152.58
Baitadi	Basantapur	12.65	1091	1317	2408	453	512	2723	46.3	190.36
Baitadi	Basulinga	16.74	1497	1674	3171	565	639	3586	46.8	189.43
Baitadi	Bhatana	15.70	1667	1696	3363	549	621	3803	37.0	214.20
Baitadi	Bhumeshwar	18.87	1505	1660	3165	581	657	3579	51.5	167.73
Baitadi	Bhumiraj	23.90	1888	1880	3768	617	698	4261	33.6	157.66
Baitadi	Bijayapur	22.61	1905	1879	3784	610	690	4279	38.6	167.36
Baitadi	Bishalpur	20.14	1762	1818	3580	566	640	4049	40.5	177.76
Baitadi	Chaukham	39.56	1451	1362	2813	446	504	3181	47.5	71.11
Baitadi	Dasharathchand Municipality	54.97	8697	9648	18345	3481	3937	20747	60.0	333.73
Baitadi	Dehimandaun	12.74	1866	1991	3857	734	830	4362	59.7	302.75
Baitadi	Deulek	8.38	999	1143	2142	378	427	2422	49.0	255.61
Baitadi	Dhungad	26.01	1073	1246	2319	405	458	2623	31.6	89.16
Baitadi	Dilasaini	22.14	2772	2694	5466	909	1028	6182	34.6	246.88
Baitadi	Durgabhawani	11.23	1097	1276	2373	433	490	2684	57.0	211.31
Baitadi	Durgasthan	20.32	1828	1969	3797	659	745	4294	53.5	186.86
Baitadi	Gajari	39.33	1909	1885	3794	615	696	4291	44.3	96.47
Baitadi	Giregada	27.86	1412	1684	3096	587	664	3501	47.2	111.13
Baitadi	Gokuleshwar	16.69	1903	2191	4094	783	886	4630	51.0	245.30
Baitadi	Gujar	15.31	1324	1435	2759	527	596	3120	52.6	180.21
Baitadi	Gurukhola	16.41	1890	2127	4017	667	754	4543	49.4	244.79
Baitadi	Gwalek	23.60	1555	1843	3398	643	731	3843	57.6	143.98
Baitadi	Hat	7.68	1018	1025	2043	325	368	2311	49.3	266.02
Baitadi	Hatairaj	12.96	528	592	1120	179	202	1267	60.9	86.42
Baitadi	Kailpal	20.18	1368	1591	2959	489	553	3346	56.2	146.63
Baitadi	Kataujpani	29.44	2123	2210	4333	760	860	4900	42.3	147.18
Baitadi	Kotila	14.20	1586	1618	3204	542	613	3624	45.5	225.63
Baitadi	Kotpetara	40.11	2731	2752	5483	907	1026	6201	32.9	136.70
Baitadi	Kulaun	20.17	1318	1449	2767	443	501	3129	39.3	137.18
Baitadi	Kuwakot	21.47	2208	2204	4412	722	817	4990	32.8	205.50
Baitadi	Mahadevsthan	21.32	1604	1673	3277	538	608	3706	46.1	153.71
Baitadi	Mahakali	12.34	1420	1557	2977	439	496	3480	40.1	241.25
Baitadi	Maharudra	13.06	2011	2077	4088	656	742	4623	51.1	313.02
Baitadi	Malladehi	32.37	1889	1928	3817	657	743	4317	40.9	117.92
Baitadi	Mathairaj	17.30	1457	1395	2852	483	546	3225	42.9	164.86
Baitadi	Mauneli	11.38	1292	1543	2835	498	563	3206	43.3	249.12
Baitadi	Melauli	29.83	2299	2375	4674	688	778	5286	49.3	156.69
Baitadi	Nagarjun	11.90	912	1184	2096	411	465	2370	61.1	176.13
Baitadi	Nwadeu	28.18	1946	1953	3899	660	746	4410	27.8	138.36
Baitadi	Nwali	14.34	1457	1487	2944	494	559	3329	50.6	205.30
Baitadi	Pancheshwar	25.61	1590	1739	3329	560	633	3765	37.6	129.99
Baitadi	Patan	20.35	2852	2799	5651	1075	1216	6391	67.3	277.69
Baitadi	Rauleshwar	22.19	1723	2004	3727	750	848	4215	36.7	167.96
Baitadi	Rim	22.18	1946	2054	4000	678	767	4524	36.4	180.34
Baitadi	Rodidewal	23.82	1614	2042	3656	727	822	4135	48.0	153.48
Baitadi	Rudreshwar	28.64	1647	1656	3303	569	644	3735	49.7	115.33
Baitadi	Sakar	25.59	1655	1746	3401	549	621	3846	41.8	132.90
Baitadi	Salena	20.00	1481	1704	3185	538	608	3602	55.5	159.25
Baitadi	Sarmali	40.11	3255	3120	6375	976	1104	7210	37.1	158.94
Baitadi	Shankarpur	18.80	1039	1110	2149	437	494	2430	55.6	114.31

Baitadi	Shikharpur	50.18	2421	2503	4924	793	897	5569	42.9	98.13
Baitadi	Shivalinga	67.48	1710	1812	3522	588	665	3983	23.0	52.19
Baitadi	Shivanath	26.62	2550	2557	5107	784	887	5776	45.7	191.85
Baitadi	Shree Kedar	11.04	1069	1168	2237	378	427	2530	68.7	202.63
Baitadi	Shrikot	14.77	1542	1775	3317	599	677	3751	50.1	224.58
Baitadi	Siddhapur	33.93	1070	1142	2212	351	397	2502	54.3	65.19
Baitadi	Siddheshwar	45.16	1969	2045	4014	729	824	4540	58.4	88.88
Baitadi	Sigas	38.12	1711	1799	3510	677	766	3970	33.9	92.08
Baitadi	Silanga	26.50	1311	1370	2681	440	498	3032	59.2	101.17
Baitadi	Sitad	22.23	2091	2299	4390	673	761	4965	27.4	197.48
Baitadi	Talladehi	10.47	1309	1498	2807	531	601	3175	25.6	268.10
Baitadi	Thalakanda	26.09	1215	1248	2463	416	470	2786	22.0	94.40
Baitadi	Udayadev	19.02	1967	2243	4210	661	748	4761	36.3	221.35
Subtotal		**1491.41**	**113037**	**120865**	**233902**	**42373**	**47671**	**264641**		
Bajhang	Banjh	27.70	1930	2188	4118	744	860	4761	36.6	148.66
Bajhang	Bhairavnath	22.67	2084	2154	4238	725	827	4900	37.0	186.94
Bajhang	Bhamchaur	29.72	2017	2026	4043	606	701	4674	27.7	136.04
Bajhang	Bhatekhola	16.77	1417	1642	3059	543	628	3537	32.9	182.41
Bajhang	Byasi	31.74	1948	2081	4029	638	738	4658	42.5	126.94
Bajhang	Chainpur	41.19	2594	2547	5141	925	1069	5944	49.9	124.81
Bajhang	Chaudhari	14.31	1659	1931	3590	619	716	4150	38.2	250.87
Bajhang	Dahabagar	240.75	2674	2639	5313	923	1067	6143	20.4	22.07
Bajhang	Dangaji	29.48	1622	1860	3482	624	721	4026	29.6	118.11
Bajhang	Datola	94.38	1180	1205	2385	450	520	2757	19.0	25.27
Bajhang	Daulichaur	202.64	2037	1881	3918	624	721	4530	23.8	19.33
Bajhang	Deulek	11.74	1809	1776	3585	572	661	4145	37.9	305.37
Bajhang	Deulikot	40.44	2989	3138	6127	1009	1167	7084	35.9	151.51
Bajhang	Dhamena	171.50	1098	1171	2269	379	438	2623	38.3	13.23
Bajhang	Gadaraya	43.53	1558	1541	3099	508	587	3583	44.9	71.19
Bajhang	Hemantawada	12.04	1502	1525	3027	484	560	3500	40.6	251.41
Bajhang	Kadel	24.40	2067	2212	4279	768	888	4947	39.3	175.37
Bajhang	Kailash	34.16	943	888	1831	290	335	2117	33.0	53.60
Bajhang	Kalukheti	13.22	1301	1361	2662	477	551	3078	42.9	201.36
Bajhang	Kanda	1463.97	839	876	1715	292	338	1983	18.4	1.17
Bajhang	Kaphalseri	56.68	2683	2661	5344	832	962	6178	24.3	94.28
Bajhang	Khaptad National Park	69.72	0	0	0	0	0	0	0.0	0.00
Bajhang	Khiratadi	45.60	3037	3454	6491	1150	1330	7504	27.6	142.35
Bajhang	Koiralakot	15.62	1491	1728	3219	566	654	3722	48.1	206.08
Bajhang	Kotbhairab	11.06	1515	1754	3269	590	682	3779	42.2	295.57
Bajhang	Kotdewal	19.32	1340	1598	2938	512	592	3397	35.8	152.07
Bajhang	Lamatola	15.09	763	906	1669	304	351	1930	47.9	110.60
Bajhang	Lekgaun	44.82	1909	2021	3930	616	712	4544	35.1	87.68
Bajhang	Luyata	31.08	1257	1486	2743	490	567	3171	42.6	88.26
Bajhang	Majhigaun	18.02	2005	2094	4099	701	810	4739	39.6	227.47
Bajhang	Malumela	17.32	1005	1122	2127	361	417	2459	36.7	122.81
Bajhang	Mastadev	36.78	1169	1186	2355	391	452	2723	34.7	64.03
Bajhang	Matela	15.07	1103	1228	2331	381	440	2695	41.3	154.68
Bajhang	Maulali	12.28	1374	1613	2987	581	672	3453	35.0	243.24
Bajhang	Melbisauni	52.28	1242	1509	2751	547	632	3181	39.2	52.62
Bajhang	Parakatne	31.75	1818	2113	3931	703	813	4545	42.4	123.81
Bajhang	Patadebal	13.19	1133	1266	2399	463	535	2774	34.1	181.88
Bajhang	Pauwagadhi	10.20	847	940	1787	332	384	2066	29.5	175.20
Bajhang	Pipalkot	62.87	1945	2064	4009	672	777	4635	32.7	63.77
Bajhang	Rayal	33.50	2904	3187	6091	1011	1169	7042	33.0	181.82

Bajhang	Rilu	36.11	1800	1962	3762	677	783	4349	30.1	104.18
Bajhang	Rithapata	25.35	1194	1218	2412	424	490	2789	45.5	95.15
Bajhang	Senpasela	35.08	2661	2784	5445	876	1013	6295	31.3	155.22
Bajhang	Subeda	22.56	1832	2107	3939	733	847	4554	37.9	174.60
Bajhang	Sunikot	16.34	807	918	1725	303	350	1994	32.7	105.57
Bajhang	Sunkuda	44.93	2751	3159	5910	1033	1194	6833	30.6	131.54
Bajhang	Surma	67.49	1309	1296	2605	453	524	3012	24.5	38.60
Bajhang	Syadi	29.22	2335	2334	4669	695	804	5398	30.3	159.79
Subtotal		**3455.68**	**80497**	**86350**	**166847**	**28597**	**33049**	**192901**		
Darchula	Bhagawati	16.23	1490	1546	3036	546	631	3507	54.1	187.06
Darchula	Boharigaun	18.81	1858	2006	3864	676	781	4464	51.9	205.42
Darchula	Bramhadev	6.45	988	1000	1988	319	369	2297	40.5	308.22
Darchula	Byas	563.79	326	327	653	149	172	754	50.2	1.16
Darchula	Chhapari	19.06	1411	1397	2808	454	524	3244	48.9	147.32
Darchula	Dandakot	12.20	952	1094	2046	358	414	2364	64.6	167.70
Darchula	Dattu	10.22	1029	1202	2231	405	468	2577	63.4	218.30
Darchula	Dethala	27.09	1681	1894	3575	600	693	4130	47.5	131.97
Darchula	Dhap	49.25	2345	2543	4888	786	908	5647	57.1	99.25
Darchula	Dhari	32.94	1924	1975	3899	671	775	4504	42.2	118.37
Darchula	Dhaulakot	12.55	1289	1292	2581	411	475	2982	47.7	205.66
Darchula	Dhuligada	46.04	1814	1918	3732	634	732	4311	33.0	81.06
Darchula	Ghunsa	319.96	655	638	1293	182	210	1494	45.2	4.04
Darchula	Gokuleshwar	13.01	1726	1721	3447	631	729	3982	53.8	264.95
Darchula	Guljar	115.11	1830	1818	3648	584	675	4214	40.0	31.69
Darchula	Gwani	30.54	2087	2109	4196	749	865	4847	37.9	137.39
Darchula	Hikila	16.66	1318	1265	2583	399	461	2984	47.7	155.04
Darchula	Hunainath	11.57	755	876	1631	296	342	1884	41.8	140.97
Darchula	Huti	6.30	1284	1410	2694	439	507	3112	49.8	427.62
Darchula	Iyarkot	69.39	1041	1067	2108	323	373	2435	27.4	30.38
Darchula	Katai	22.44	1427	1438	2865	479	553	3310	52.0	127.67
Darchula	Khalanga	33.69	3004	2760	5764	1173	1355	6659	71.5	171.09
Darchula	Khandeshwari	179.62	1336	1251	2587	376	434	2989	53.0	14.40
Darchula	Khar	25.87	1881	1785	3666	623	720	4235	40.1	141.71
Darchula	Kharkanda	16.01	1331	1643	2974	528	610	3436	47.7	185.76
Darchula	Lali	29.63	1437	1651	3088	597	690	3564	55.8	104.22
Darchula	Latinath	47.64	1898	2022	3920	632	730	4528	42.5	82.28
Darchula	Malikarjun	18.77	1123	1126	2249	422	488	2598	39.4	119.82
Darchula	Pipalchauri	9.09	1037	1100	2137	347	401	2469	46.2	235.09
Darchula	Ranishikhar	13.37	1109	1178	2287	374	432	2642	42.3	171.05
Darchula	Rapla	178.78	613	594	1207	227	262	1394	45.3	6.75
Darchula	Riththa Chaupata	18.87	2271	2493	4764	859	992	5503	51.4	252.46
Darchula	Sarmauli	19.19	2005	2309	4314	810	936	4984	41.7	224.80
Darchula	Seri	19.68	1081	1065	2146	379	438	2479	33.7	109.04
Darchula	Shankarpur	19.00	1454	1542	2996	541	625	3461	61.8	157.68
Darchula	Shikhar	14.60	1206	1254	2460	409	472	2842	48.6	168.49
Darchula	Sipti	38.41	1806	1831	3637	642	742	4204	30.8	94.69
Darchula	Sitaula	122.45	1285	1327	2612	428	494	3017	45.1	21.33
Darchula	Sunsera	75.48	1603	1608	3211	545	630	3709	51.1	42.54
Darchula	Tapoban	15.24	1039	1076	2115	357	412	2443	52.9	138.78
Darchula	Uku	22.69	1877	2054	3931	668	772	4541	61.2	173.25
Subtotal		**2337.69**	**59626**	**62205**	**121831**	**21028**	**24292**	**140740**		
Humla	Baraigaun	21.49	519	530	1049	177	206	1220	18.2	48.81
Humla	Bargaun	46.29	549	474	1023	145	169	1190	34.0	22.10
Humla	Chhipra	33.59	464	455	919	177	206	1069	29.3	27.36

Humla	Dandaphaya	39.59	887	778	1665	284	330	1937	30.6	42.06
Humla	Darma	80.92	846	765	1611	307	357	1874	29.5	19.91
Humla	Gothi	25.33	580	572	1152	188	219	1340	37.2	45.48
Humla	Hepka	177.45	583	538	1121	189	220	1304	27.4	6.32
Humla	Jair	54.49	862	887	1749	316	368	2035	22.6	32.10
Humla	Kalika	85.35	1261	1169	2430	412	479	2827	22.5	28.47
Humla	Khagalgaun	285.36	662	615	1277	202	235	1486	37.4	4.48
Humla	Kharpunath	737.62	673	635	1308	228	265	1522	29.4	1.77
Humla	Lali	38.84	673	640	1313	223	259	1528	22.6	33.81
Humla	Limi	1199.15	452	535	987	182	212	1148	9.0	0.82
Humla	Madana	34.89	667	616	1283	206	240	1493	31.1	36.77
Humla	Maila	123.96	1537	1460	2997	528	614	3487	27.6	24.18
Humla	Melchham	27.26	393	375	768	137	159	894	22.7	28.17
Humla	Mimi	638.43	511	465	976	179	208	1135	29.4	1.53
Humla	Muchu	753.29	519	502	1021	172	200	1188	35.8	1.36
Humla	Raya	68.87	833	766	1599	279	325	1860	17.3	23.22
Humla	Rodikot	85.25	1148	1022	2170	385	448	2525	24.4	25.45
Humla	Sarkideu	104.72	882	752	1634	313	364	1901	26.0	15.60
Humla	Saya	21.12	483	424	907	152	117	1055	18.1	42.95
Humla	Shrimasta	556.45	482	433	915	157	183	1065	26.2	1.64
Humla	Shrinagar	65.04	1259	1135	2394	349	406	2785	18.1	36.81
Humla	Simikot	35.03	1263	1213	2476	408	475	2881	38.2	70.68
Humla	Syada	89.93	834	796	1630	261	304	1896	18.0	18.13
Humla	Thehe	573.97	1117	1048	2165	396	461	2519	28.6	3.77
Subtotal		**6003.68**	**20939**	**19600**	**40539**	**6952**	**8029**	**47164**		
Total		**13288.46**	**274099**	**289020**	**563119**	**98950**	**113041**	**645446**		

Annex 15. Important natural, cultural, religious and trade centers in the KSL Nepal

Humla District
Mountain Ranges:
A) Nalakangkad range: Nalakangkad (7337m), Tankh Himal, Chalna Himal
B) Jarkar range, Nampa Chalang, Saipal Range (7036m)

Trade Centers

Simikot: Simikot is headquarters of the district and is situated at 2900m above sea level. A fort is located in the western side of the place and at the base of mountain there was swamp (*Sim*) land. Therefore the place was named as Simikot. Simikot is at 10 days walk from Jumla and is 192km from the zonal headquarters.

Darma: It lies at south-east corner of the district at an elevation of 1600 msl along the side of Tanke khola. This is the main agricultural production site of the district. The government has also established a horticultural farm in the place. It is at four days walk from Simikot and two days walk from Gamgadhi.

Sorugalfa: The region is extended along the sides of Humla Karnali up to the southern border of the district. This region was very famous for cotton farming. The cotton was used to knitting the clothes before an easier access to cheaper clothes in the market. The trend is in practice in these days also with the help of the traditional equipments. Paddy farming is also a common agricultural practice in the region. The Tamang trader those come from the northern parts, exchange paddy from the place.

Limi: Limi, located at an elevation of 3659 msl, is inhabited by Tamangs, and the main source of income for these people is livestock farming and business. They import salt and wool from Tibet and export cereals, timber and furu (a wooden tea bowl) to Tibet. The gompa located at the Halji village is the largest and the most important among the gompas of the district. The gompa contain a statue of 12th century made by a very famous Tibetan lama of that time. Large number of Tibetan pilgrims comes to the place.

Reling: It is a great holy place of the Buddhists living in the mid-parts of the districts. A famous gompa is located at that place and a feast is celebrated here on Jestha Poornima. Since the place is located at high altitude, remains covered with snow for six months.

Kharpunath: The place is located near the junction of Humla Karnali and Dojam khola. This is one of the main holy places of the district. Great feasts are celebrated here on Maghe Sankranti and Shivaratri. Around the place there are hot springs named agni-kunda, doodh-kunda, and rakta-kunda.

Muchu: The place is located south to the Limi at an elevation of 2868 msl on the side of Humla karnali. A beautiful village named Tumkot lies 3km west to the place, where a famous gompa is also located.

Bajhang District

Mountain ranges: Nampa (6757m)- Bankiya lekh (6936m)- Saipal (7036m)- Kapkot (6373m), Khyuri khala (5992m)
Main Places:

Chainpur: It is the headquarters of the district and is located at an elevation of 1227 m asl near the junction of Seti River and Baauli Gad. There is a palace of Bajhangi king and the place is also known as Hattisar. One can see there the remnants of the places for horseracing. There is also a famous Hanuman temple, and a Ramji temple, as the religious places. The place is 64km from Doti, 171km from Jhulaghat, and 173km from the China border.

Jayaprithvinagar: This place is about 22km south-west to the Chainpur, previously known as Mellak. Due to its natural beauty and clean environment, King Jayaprithvi Bahadur Singh had planned to make there a summer palace and a town.

Surmasarovar: This is very beautiful lake situated on the foot of Himalaya. The lake is regarded as a great holy place and the pilgrims come here on Shravan ekadashi. A small river named Suligad originates from the lake and the local people believe that gold is found in the concrete of the river.

Dhuli: This place is located 80km north to the Chainpur at an elevation of 1463 m asl. This is the last northern village of the district and it takes 3 days walk to reach at the China border.

Thalhara: This is a historical place. The place was capital of Thalhari king at the time of Baisi-Chaubisi kings. The palace of the last Thalhari king Govind Narayan Singh is now provided for a secondary school. Here is also a famous temple of Bhairab.

Khaptad Lekh: This lekh has its own religious, social and economic importance for the hilly districts of the Seti zone. It lies at the junction of Bajhang, Bajura, and Achham districts. The Khaptad lekh has highest peak of 3276m asl and is very famous for medicinal herbs and rattans. The village near to the lekh also has small enterprise based on the rattans. Lekh also have a mine of mica, which was used to export to India in the past. It is a great religious place for Hindus, having feast at Dashahara.

Darchula District

Mountain Ranges: Byash-Rhishi Himal range, Jaskar range
The famous mountains are: Api Himal (7134m): Famous local name 'Mayur' or Kapoo lekh and Nampa Himal (6757m)

There is a famous pass between Byash-Rhishi and Jaskar ranges, known as Tinkar Bhanjyang (6097m).
Main Places:

Darchula Khalanga: This place is adjacent to the Dharchula of India, and connected with a bridge. Khalanga is the headquarters of Darchula district located at an elevation of 915 masl and 80km from the headquarters of Baitadi district.

Tapoban: This place is located on the side of Mahakali River, at the Dhari VDC, and is a famous holy place. Here is a hot spring, where the pilgrims go for bathing. Long ago, the pilgrims and the local peoples used to cook rice by putting it directly into this water. According to Hindu Mythology, the place was used for meditation by Rhishis.

Gokuleshwor Temple: This place is located on the side of Chaulani river of Gokule. A great feast is celebrated here at Shivaratri. Large amount of woolen and other local products are traded at the place during the feast. This place is about 61km far from the Darchula Khalanga.

Malikarjun: There is a mountain between Lekam and Gwani VDCs, at the peak of which is a famous temple of Malikarjun. Feasts are celebrated twice a year at this place. This place is 40km far from the Khalanga.

Joljivi: The place is about 32km south to the Khalanga. The greatest feast of Far West Nepal is celebrated here for five days. The feast starts from the last of Kartik and large number of traders from different districts of Nepal as well as from India and Tibet come here for business. Large amounts of local woolen products, horses as well as all the things necessary for livelihood are traded during the feast. The place is located at the bank of Mahakali River and linked with India through a bridge. There is also a local custom office called Chhoti Bhansar.

Chhangru: (3354m asl) The village is located 144km north to Khalanga. The village is quite remote and there is great scarcity of drinking water. The place is very difficultly accessible from Nepal's side (6 days walk from Khalanga), therefore, an alternative route through India (4 days walk) is used to reach the village. However, typical Bhotia culture and tradition can be observed at the place.

Tinkar: (3963m asl) This village is about 8 km east to Chhangru and is last village of the Byash region. Taklakot is at about one day walk from the place. Therefore, the place has been an important trade place of the region. During the trade, cereals, spices, gud (local sugarcane product) are exported to Tibet; whereas, the wool and salt are imported.

Ukoo: The small valley is located on the side of Mahakali River and is important from architectural viewpoint. It is believed that the place was inhabited by the local rulers of historical time. There is a description about Ukoo in the Kanakpatra of Jumleshwar Punya Malla of Sahke Sanvat 1259. Here is a remnant of a huge temple which is called 'Mahal' by the local people and large amount of ancient carving are found at the place. Beautifully carved pieces stones are found in the region when one digs deeper in the soil.

Baitadi District:
Main Places:

Khalanga Bazar: (1524m) Khalanga bazaar is the headquarters of Baitadi district and is the main market of the district. The bazaar lies on the main route and therefore, except the district residents, citizens of the

Dadeldhura, Doti and Bajhang district go to India through this bazaar. Chainpur of Bajhang lies 96km, Silhadhi lies 83km and Dadeldhura lies 48 km from the place.

Shera gaun: This village is located near the junction of Mahakali and Chaulani rivers. Here is the largest cemetery of the region. The village is about 6km from Jhulaghat, one of the markets at Indian border. Here is a large and very fertile plain land called Phant. Some of the peoples of the region are also involved in the fishery.

Patan: This place is about 19km east to the Khalanga bazaar. The main river of the region is Surnaya gad and Patan lies on the main route from Dadeldhura to Baitadi and therefore have importance for trade.

Jhulaghat: This place lies on the eastern bank of Mahakali River. Here is a main custom office of the region. The market is established at very steep place and therefore, there is no any place to buildup new houses in the future.

Killekot: This place is about 1.5km south to the Khalanga bazaar, where are the remnants of forts and a palace. A Durga Bhawani temple is located near to the palace and large number of goats and buffaloes are sacrificed here during Badadashain. This place was used by the kings of Chand generation for the judgments.

Temple of Dewalghaat: The place lies near to the Kullekot and several temples are located at that place. According to local peoples, these temples were built-up by the Pandawps; whereas some others think that these were made during the time of Chand rulers.

Temple of Tripurasundari: The temple is also known as the 'Rana Shaini Bhagwati'. Very famous feast of the district is celebrated here during Vijayadashami and thousands of goats and buffaloes are sacrificed here in a day. Peoples from the neighboring districts as well as from the different parts of India come here to participate in the feast and worship the goddess.

Jagannath temple: This is one of the oldest temples of the district located near the Khalanga. The burocrates (employees) transferred to the district first make worship at the temple and donate 2rupee before joining their duty.

Ishwari Ganga: This is regarded as main place of Gagannath and which is located in a cave. This is a holy place of the district and large feast is celebrated here during Magh1st.

Patal Bhumeshwar: This place lies east to the Satbaaj horticulture centre. Here is a lake and a cave, the depth and distance and direction of which could not be measured till today. This is also a holy place for Hindus.

Raulakedar: This place is near Warayal VDC at an altitude of 2744m asl. According to the local peoples, a king of Dipayal named Naag Malla sent his bramin to the place to make regular reporting about Baitadi district. But, the Chanda rulers of Baitadi arrested him and killed at that place. A statue of shiva and some old weapons are still found there.

Thehimandu Bhagwati: Thehimandu Bhagwati is one of the seven Bagwatis of the district, also known as Ninglashaini Bhagwati. Local people believe that the Bhagwati originated from a tiller of rattan (nigala) of the place. Great feasts are celebrated here during Bhadra 8th and during Vijayadashami.

Major routes

Major routes and the time of travel in these routes are listed below.

1. **Jumla Khalanga to Simikot trail:**

Khalanga bazaar to Patmara:	4hrs
Patmara to Bumara (should cross dori lekh):	4hrs
Bumara to chautha:	4hrs
Chautha to Pina (should cross Ghucchi lekh):	7hrs
Pina to Gam (Srinagar):	2hrs
Gam to Rhuga	2hrs
Rhuga to Lhuga:	2hrs
Lhuga to Banba:	3hrs
Banba to Rimi (Should cross Chankheli lekh):	8hrs
Rimi to Darma:	2hrs
Darma to Melchham:	6hrs
Melchham to Pooma:	3hrs

Pooma to Kalansh:	1hr
Kalansh to Foocha:	3hrs
Foocha to Durpa (Shouldd cross Margor lekh):	9hrs
Durpa to Kharpel:	1hr
Kharpel to Kharpunath (bridge at Dojamkhola):	2hrs
Kharpunath to Shyamney:	2hrs
Shyamney to Simikot:	2hrs

Simikot to Tibet:

Two ways: - 1) Simmikot- Nara Lagna (through Yari route)
2) Simikot- Til (Limi route)

1) Yari route:

Simikot- Dandaphya:	2.5hrs
Dandaphya- Tuling:	1hr
Tuling- Dharapori:	2.5hrs
Dharapori- Kermi:	5hrs
Kermi- Yalwang:	5hrs
Yalwang- Yangar:	1hr
Yangar- Muchu:	3.5hrs
Muchu- Tumkot:	1hr
Tumkot-Yari:	4hrs
Yari- Nara Lagna:	3hrs
Nara Lagna- Hilsa	2. 5 hrs

2) Limi Route

Simikot- Dandaphya:	2.5hrs
Dandaphya- Tuling:	1hr
Tuling- Hyakpa:	2hrs
Hyakpa- dhinga:	3hrs
Dhinga- Jang (Limi) **Should cross Nyalu Lagna:**	3days

Note: - Of the suitable routes, Yari route is the main trade route of the district to Tibet.

Bajhang district

Chainpur- Jhulaghat route: This is the most important route to India through Baitadi district. Total length of the route is 179km and takes 7 days walk from Chainpur.

Chainpur- Northern border route: This route is about 179km long and very difficult since one should cross very high passes to reach the border. The route remains open only from Asar to Bhadra.

Chainpur-Silgadhi route: This route links Chainpur to headquarters of the Doti district and is 64km long.

Darchula

Main trekking routes are as follows:

Baku bato- Ukoo:	9.6km
Mul bato Dumling- Rapla:	8km
Kalagad- Bramlek	
Mul Bato-Hikila:	11.2km
Shribagad pool-Madi:	12.8km
Hapusain bato-Chhapari:	6.4km
Hoperigad-Sipti:	9.6km
Khalanga-Sitola:	12.8km
Chumchum gad-Ghusa:	19.2km
Sadikucha-Deythala:	9.6km
Gokule-Gokuleshwar:	8km
Gwani-kadaparidhar:	12.8km
Bhartola khola-Pasti:	9.6km
Sakar-Dhap:	4.8km

Baitadi

Good facility of transportation from Terai districts to Baitadi.
Attariya station (Kailali)- Dadeldhura (Amargadhi highway): 130km
Dadeldhura- Baitadi (Dashrath chand Highway): 120km

Other Pilgrimage routes are as follows:
1) Baitadi- Dadeldhura- Doti- Bajura (Badimalika) route
2) Baitadi- Dadeldhura- Doti (Khaptad) route
3) Dadeldhura- Baitadi- Gokule route (Gokuleshwar)
4) Dadeldhura- Patan- Melauli Route (Baitadi Melauli Bhagwati temple)
5) Doti- Dadeldhura- Patan- Baitadi (Tripurasundari) route
6) Bajhang- Patan- Ningalashaini/ Theyhimandu (Baitadi) route

Existing infrastructures and facilities:

Facilities	**Baitadi**	**Darchula**	**Bajhang**	**Humla**
Medical facilities	Hospital, health posts, private clinics, Ayurved clinic	Hospital, health posts	Hospital, health posts, Ayurved clinic	Hospital, health posts, rescue centers
Accommodation	Guest houses, hotels, eco-lodges, tea houses	Guest houses, tea houses, hotels	Guest houses, tea houses, hotels	Guest house, tea house, eco-lodge, base camps
Communication	Post offices, telecommunication, radio, internet	Post offices, telecommunicatio n, radio, internet	Post offices, telecommunication, radio	Post offices, telecommunication, radio, internet
Accessibility	Airport, bus stations, helipads	Bus stations, helipads	Bus stations (in area adjacent to Baitadi), helipads	Airport, bus stations (at Jumla), helipads, Simikot-Hilsa road is under construction through food-for work programme
Tourism Infrastructures	Visitor information centres, porter shelters, tourist information boards	Visitor information centres, porter shelters, tourist information boards	Visitor information centres, porter shelters, tourist information boards	Visitor information centres, tourist information boards, sign posting, view points, porter shelters, snow poles, kerosene and stove depots
Energy	Hydropower (supplied from other districts), Hydropower station (under construction: Pancheshwar), micro-hydro plants, solar, biogas, LP gas	Hydropower station (Chamelia-under construction), micro-hydro plants, bio gas, LP gas, Solar	Micro-hydro plants, Solar	Micro-hydropower plants, solar
Other Services	Police station, banking, money exchanger	Police station, banking, money exchanger	Police station, banking, money exchanger	Police station, money exchanger

Annex 16 Principal Pressures Faced by the Protected Areas of Nepal

	Cumulative pressure	Occurance of pressure	KTWR	KCA	MBNP	SNP	PWR	RCNP	SHNP	LNP	MCA	ACA	DHWR	RBNP	RNP	SPNP	RSWR	KNP
Conservation awareness	**114**	**8**	✓		✓				✓	✓			✓		✓	✓	-	✓
Cross border issues	**25**	**4**			✓						✓	✓				✓		
Crop damage	**147**	**7**	✓				✓	✓						✓		✓		✓
Current security situation	**181**	**10**			✓		✓		✓	✓	✓	✓	✓			✓	✓	✓
Dam Building	**175**	**9**				✓	✓	✓	✓	✓		✓		✓		✓	✓	
Fishing	**68**	**5**					✓	✓						✓	✓		✓	
Forest fire	**56**	**5**				✓			✓						✓	✓		✓
Grazing	**270**	**13**	✓		✓	✓	✓	✓	✓	✓			✓	✓	✓	✓	✓	✓
Hunting	**219**	**14**		✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓
Illegal settlements	**171**	**12**	✓	✓	✓		✓	✓				✓	✓	✓	✓	✓	✓	✓
Illegal harvest of Timber	**200**	**13**	✓	✓		✓	✓	✓		✓	✓		✓	✓	✓	✓	✓	✓
Invasion of alien species	**72**	**5**	✓	✓						✓				✓			✓	
Landslides	**71**	**3**							✓						✓			✓
NTFP collection	**157**	**9**		✓	✓				✓	✓		✓	✓		✓	✓		✓
Over cutting of Fuel Wood	**212**	**10**	✓	✓		✓	✓	✓		✓	✓	✓	✓		✓			
Retaliatory killing	**60**	**6**		✓	✓				✓		✓	✓	✓					
Shifting cultivation or slash and burn	**58**	**4**		✓	✓						✓					✓		✓
Socio-economic condition	**119**	**7**	✓	✓	✓	✓			✓		✓					✓		✓
Stone and sand collection	**93**	**6**		✓		✓	✓	✓				✓		✓				
Tourism and recreation	**152**	**8**		✓		✓		✓	✓	✓	✓	✓			✓			

Source: Rapid Assessment and Prioritization of Protected Area Management in Nepal. WWF Nepal 2005.