

Kailash Sacred Landscape Conservation Initiative

Developing a transboundary cooperation framework for conservation and sustainable development in the greater Mt Kailash region of China, India, and Nepal

Target Area Delineation Report

Prepared by

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ICIMOD

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Introduction

As per the Kailash Sacred Landscape Conservation Initiative (KSLCI) project document, one of the primary objectives of the Feasibility Study is the delineation of the target landscape in order to bring clarity to the landscape, description, and delineation, providing a basis for the KSL target area and Regional Cooperation Framework (RCF). The process described within the outline for the Feasibility Assessment Report outlines a delineation of the target landscape, by national partners in consultation with all major stakeholders, within national boundaries based upon ecosystem management criteria and relying on detailed geospatial analysis. The final delineation, provided by the three country lead partners, has been merged to provide a final regional (i.e., transboundary) KSL Boundary. This merged 'outer' boundary does not include any international or internal administrative boundaries and is only intended to provide the external boundary of the KSL across all three countries. This report of the final results is intended to serve as the geographic basis agreed upon for the KSL target area. The merged external KSL boundary has been supplied to all lead partners for evaluation and approval, and thereafter will be supplied to all partners, archived as the official boundary by ICIMOD–MENRIS, and made available publically to interested parties.

Delineation Process for the KSLCI Target Landscape

For the Feasibility Assessment of the KSL transboundary landscape, as well as the eventual RCF, technical delineation of the area was a very important first step that built on country-level activities, and which lays the essential groundwork for transboundary ecosystem management approaches. This activity was carried out by the lead partners and included a stakeholder consultation process in each of the partner countries. Criteria for delineation were developed and then agreed upon by the partners through an iterative and consultative process. The primary criteria fall into three categories:

- ecological, or abiotic and biotic,
- cultural, and
- planning and management.

The main points identified for consideration are summarised below.

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

The process of National Level KSL boundary delineation was carried out by each of the respective countries individually. Each of the three countries identified their own set of respective priorities within the set of criteria. In particular, watershed and administrative boundaries were used as a priority criteria for the final exact location of the target landscape boundaries in each of the countries and chosen to be inclusive of the areas identified by other criteria such as ecoregions, transportation, settlements, and contiguity with existing protected areas. It was agreed by all partners to use a common base map and common geo-referencing system, namely:

coordinate system: UTM Zone 44 R

map datum: WGS 84

Each partner used the publicly available SRTM 90m Digital Elevation Model dataset (available at <http://srtm.csi.cgiar.org>) as a common base map in order to ensure coherence of the final regional transboundary delineation. The SRTM 90m data was reprojected by ICIMOD and provided to partners on CD-ROM.

Each country has now finalised their delineation and developed a geospatial dataset delineating their respective KSL boundaries. These have been merged by ICIMOD to provide a final version of the outline of the KSL transboundary landscape. No attempt has been made by ICIMOD or any of the partners to delineate international boundaries, which are the prerogative of the governments of the respective member countries. The delineation process by country and a brief description of the delineated area, also by country, as provided by the partners, is given in Annex 1.

The final results of the delineation process for the KSL target area as given in this report has been reviewed by the partners. This report represents the final review by all the relevant country partners, approved after revision, and serves as the documentation for the geographic delineation of the the KSL target area, project activities, goals, and outcomes, as now agreed upon by the country partners.

Several maps showing the final delineated KSL target area boundary outline are given below. Some general characteristics of the target area within each country are also provided below in tables, and further details given, as provided by input from the country partners, in Annex 1.

Figure 1: Map of the KSL target area outline boundary based on the merging of the delineation of their respective areas by each of the three KSL countries



Figure 2: Map of the KSL target area outline boundary showing elevation (masl) based on the merging of the delineation of their respective areas by each of the three KSL countries

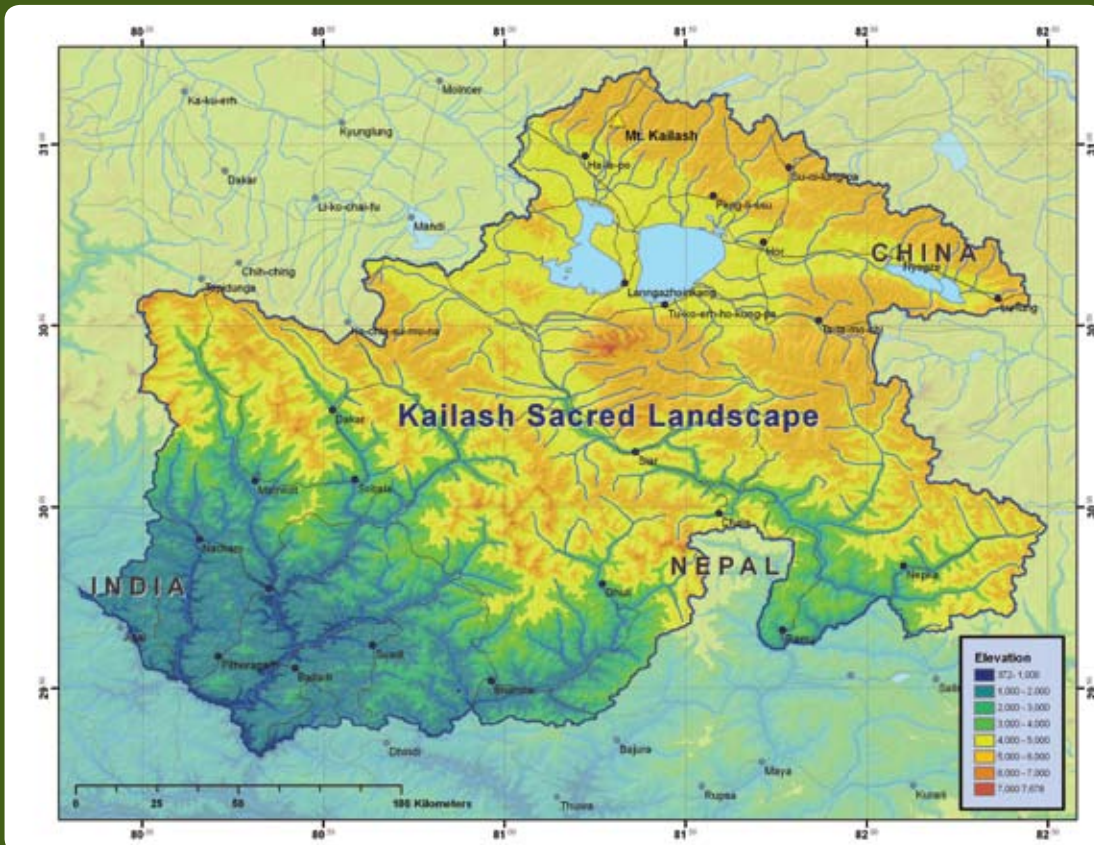


Table 1: **Basic attributes based on the final delineation of the transboundary KSL target area**

Kailash Sacred Landscape	
Total area	31,175 km ²
Elevation range	369 – 7678 masl
Ecoregions found within the KSL target area	>7
Population	1,032,800 persons

Table 2: **Basic attributes based on the final delineation of the KSL target area in China**

China	
Total area	10,843 km ²
Area by district	(all in Pulan County)
Elevation range	3,641 – 7,678 masl
Ecoregions found within the KSL target area	4
No. of watersheds	2
Karnali (Peacock Basin)	3,062 km ²
Manasoravar	7,781 km ²
Population	8,800 persons

Table 3: **Basic attributes based on the final delineation of the KSL target area in India**

India	
Total area	7,120 km ²
Area by district	(all in Pithoragarh District)
Elevation range	428 – 6,895 masl
Ecoregions found within the KSL target area	5
No. of watersheds	4
Panar-Saryu	350 km ²
Saryu-Ramganga	1,500 km ²
Gori-Kali	2,750 km ²
Dhauli-Kali	2,650 km ²
Population	460,000 persons

Table 4: **Basic attributes based on the final delineation of the KSL target area in Nepal**

Nepal	
Total area	13,289 km ²
Area by the districts	
Baitadi	1,491 km ²
Bajhang	3,456 km ²
Darchula	2,338 km ²
Humla	6,004 km ²
Elevation range	369 – 7,132 masl
Ecoregions found within the KSL target area	6
No. of watersheds	8
Population	564,000 persons

Annex 1: Input from Partners

China

The delineated target landscape is approximately 10,843 km², and it includes two main watersheds: an area draining to Manasarovar of approximately 7,780 km², and the Karnali watershed (also known as Peacock Basin) with 3,062 km² within the Chinese portion of the KSL. More than 40% of this area is covered by very sparse vegetation or barren land, 37% by sparse to open shrublands, and approximately 11% by grasslands, with lakes and wetlands comprising 8% of the area, and about 3% covered by glaciers. The agricultural area is just over 10 km² (or about .10% of the total area), 98% of which is located in the Karnali River basin. The dominant cropping system is one crop per year; namely, winter wheat (or barley), peas, potatoes, and rape seed. The area includes both summer and winter pastures for nomadic herders, and herding activity is seen throughout the year. Rangelands account for almost half of the total area, or about 5,350 km².

The total glacial area is about 262 km², covering 2.42% of the total KSL region within China. The average altitude of the glacier termini is very high, ca. 5,200 masl. Gurla glacier is the largest glacier (182.60 km²) in the Karnali basin; Kailash Glacier (79.72 km²) is prominent in the Manasarovar basin and one of the sources of Lake Rakshastal. The total area of water bodies is about 738 km², which is about 6.82% of the total area of the Kailash region

The area is significant for biodiversity of flora and fauna, both of which are highly vulnerable. Dominant vegetation is mainly north-temperate and worldwide flora. Dominant communities include the following.

- Alpine steppe or meadow communities
- Alpine shrublands
- Wetland vegetation (notably surrounding the Manasarovar - Rakshastal area)
- Lichens

The area has eight endemic plants and approximately 268 identified plant species. In addition, more than 100 species of vertebrates, which include 77 genera and 40 families of fish, amphibians, reptiles, birds, and mammals, have been recorded.

At least 18 CITES and nationally-listed species are found within the protected area of the Manasarovar wetland, with at least 30 species of 'high value' recorded in the KSL. The protected animals are concentrated in the Manasarovar area (approximately 975 km²), and it is a declared Ramsar site and protected area.

The population of this area in 2008 was 8,839 persons, mainly concentrated in Butang township in the south of Burang County, accounting for 61% of the total population. Population density for this area is approximately 0.63/km², mainly distributed in the south Peacock River valley. The agricultural and pastoral populations account for 58 and 42% respectively. The population growth rate is 0.41%. The ratio of males to females is 0.92:1. From 2000 to 2008, the average growth rate of the GDP in Burang County was 17.2%, which was higher than the average GDP for China as a whole.

The main incomes are from livestock husbandry which accounts for almost 50 % of the total sources of income.

The area is of cultural and religious importance and a large numbers of tourists visit every year. In 2007, over 70,000 persons visited the area (most of them pilgrims), and these included about 18,000 foreign tourists. It is expected that the opening of Ngari airport and improved highway access will increase the pressure from tourism.

India

Through a consultative process of partners and other stakeholders, the KSL target landscape for the Indian portion of the KSL was delineated and agreed upon. This identification was based upon considerations that included maintaining contiguity of the landscape with adjacent delineations, representativeness of biophysical and sociocultural diversity; uniqueness (elements and systems); vulnerability to both natural and anthropogenic processes; and ecological, environmental, and socioeconomic values, i.e., ecosystem goods and services. Transboundary implications, as well as existing protected areas and potential connectivity corridors, were considered while identifying the area. A partners' consultation (March 2010) identified the following important considerations.

- Natural linkages – transboundary
- Biophysical diversity – representativeness
- Sociocultural affinities – traditional and/or historical
- Ecological and economic values – unique and/or incomparable
- Sacredness – inherent affection and relative approachability to Kailash
- Workability and feasibility of implementation

Description of the KSL target landscape

The Indian portion of the KSL Target Landscape is comprised of four major hydrological units, i.e., Panar-Saryu (350 km²), Saryu-Ramganga (1,500 km²), Gori-Kali (2,750 km²), and Dhauli-Kali (2,650 km²), with a total area of approximately 7,120 km². A distinct bioclimatic zonation is evident across an elevational gradient ranging from less than 500 to almost 7,000 masl. The total area of the target landscape is approximately 7,440 km², and it includes portions of Dharcula, Didibat, Musavari, and Pithoragarh subdivisions. The total population of this area is more than 460,000 persons. The main languages include Kumaoni (high variability), Beyanese, Bhotia, and Hunia (a Tibetan mixed dialect), Hindi, and Nepali. Indigenous ethnic groups in this area include Van Rawats and Bhotiya. Literacy rates for men are quite high (90%), but not quite as high for women (63%).

Approximately 50% of the area is forest land, with an agricultural area (22%) and significant portions of uncultivated area (10%). Permanent grazing areas and other pasture lands comprise 13% of the area. Dominant cropping systems centre around paddy, jhangora, mandua, pulses and potatoes in the Kharif season (Oct to May), and wheat, barley, masur, ginger and pepper in the Rabi season (May-November). Vegetables, for example, potatoes, onions, radishes are grown during different times of the year. The livestock population is quite numerous with local cow varieties being predominant.

Biodiversity, and rare and threatened species

There are numerous forest species and a rich diversity of plants, and distributed along a gradient categorised into four main bioclimatic ecozones ranging from subtropical (300-1,800 m), through temperate (1,500-2,800 m), subalpine (2,800-3,800 m), and alpine (3,500-5,000 m). Based on data from a case study undertaken in the Ashok Wildlife Sanctuary, there are at least 1,200 species of plants, representing over 700 genera and 173 families. This area is dominated by west Himalayan forest types (Chir pine; Oaks), and this is the western most limit of *Tsuga* and *Macaranga* communities. There is a high rate of species' richness, e.g., 120 species of Orchidaceae with particular richness in epiphytic orchids. There are 234 near endemic and 24 endemic species (together constituting 21% of flora). There are 10 species listed in the Red Data Book, and 11 species with small populations, narrow geographic range, and/or under high use pressure. There are significant sensitive habitats and/or areas e.g., Panchchuli basin and Ralam valleys are among recognized priority sites. Over 172 species are used by local communities, which have a significant amount of indigenous knowledge based on traditional ecological knowledge. The area is very rich in terms of diversity of medicinal and aromatic plants (MAPs). Several botanical hotspots are known in the area, including in the alpine zone (above 3,500 masl).

Faunal diversity

Fauna reported in this area include at least 15 reptiles, 196 aves, and 83. The IUCN listed species reported for this area include three that are critically endangered, seven endangered, seven vulnerable, and 18 that are near-threatened.

Cultural diversity and biodiversity conservation

This area is particularly rich in cultural diversity, with its history and cultural traditions. It was emphasised that the different sacredness values within the landscape have contributed to conservation of biodiversity in the area. In addition to the main pilgrimage routes and associated cultural heritage sites, there are many sites regarded as sacred, religious, or otherwise culturally significant; for example, there are at least six sacred lakes: Parvati Sarovar, Anchari Tal, Jolingkong Lake, Chhiplakot Lake, Maheshwari Kund, and Thamri Kund. Additionally, there are many festivals and fairs held in this area throughout the year.

Nepal

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

The delineated target area for KSL-Nepal is approximately 13,289 km², and is comprised of four districts; namely, Humla, Bajhang, Baitidi, and Darchula. The altitudinal gradient ranges from 518m to 7,132 masl. Average rainfall ranges from 25mm in parts of Humla to 1,344 mm in Bhajang. The 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 connections to Surkhet and Nepalganj. Land-use patterns for these districts indicate that the amount of arable land is quite low, with less than one per cent of the total land being irrigated. There is significant forest coverage in this area (24% of the total area), and more than 18% is pasture and rangelands. 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, in addition there is a great deal of variability from year to year, and recently there have been several drought years.

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. The region falls within the Himalayan Biodiversity Hotspot and is comprised of five major ecoregions as follows.

- 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, approximately 82 species of mammals, 455 birds, 38 reptiles, and 20 fish species have been reported. Of these, 22 mammals, 12 birds, and one reptile are on the IUCN Red List. Eight mammals, seven birds, 22 reptiles, and eight fish are either endemic or have a restricted range. Additionally, there are 35 species of mammals and 73 species of birds that are listed in various categories in CITES. Ten mammals, four birds and one reptile are listed as legally protected by the Government of Nepal. Important fish species include *Schizothorax nepalensis* (endemic) and *Shizothorax raraensis* (restricted-range).

There is a wide range of agricultural biodiversity, with globally significant genetic resources and locally important landraces maintained by farmers, and many wild relatives of economically important food crops are found in this area. Over 200 species of non-timber forest products (NTFPs) are used for food and/or medicine in Bajhang district, of which 38 species (or their products) are commonly traded. A total of 83 species of NTFPs are recorded in Darchula district, of which 73 species (products) are used in ethnomedicine.

Industries based on forest products include Nepali paper factories, furniture industries, fibre-refining factories (allo-bhangro refineries), medicinal herb processing, fruit processing, rattan factory, honeybee refineries, and honey farms. There is significant trade in and revenue from the collection of medicinal plants (and other medicinal resources). There are 14 forest types reported in this region. Most of the forest area is managed by the government; however, a significant portion is under community forest management by the many community forestry user groups (CFUGs) in the area.

Socioeconomic, livelihood, poverty, and gender dimensions

The total population for this area in 2001 was approximately 564,035 persons, with close to half found in Bajhang District. Humla, although it is the largest district, has the fewest people and lowest population density. The gender balance shows significant male outmigration. The main ethnic groups or castes include the Chhetri, Bahun, Thakuri, Tamang, Bhote, Dalit, and Lama. In terms of religion more than 90% of the people are Hindu, with Buddhists primarily comprising the remainder. Agriculture is the main occupation for over 75% of the population. The population density ranges from 7/km² in Humla, to 49/km² in Bajhang. Literacy rates are generally low throughout the three districts. Health indicators are also low, reflecting the widespread and deep poverty of this area where there are very few doctors or health-care facilities. Chronic malnutrition is found to be prevalent among children under five, and the percentage of the population with access to safe drinking water is very low. There are almost no roads in the area, although there are several under construction. Darchula and Bajhang districts together have about 140 km of earthen road, while Humla has none.

Acronyms and Abbreviations

CFUGs	community forestry user groups
CITES	Convention on International Trade in Endangered Species
GDPG	gross domestic product
ICIMOD	International Centre for Integrated Mountain Development
IUCN	International Union for Conservation of Nature
KSL	Kailash Sacred Landscape
KSLCI	Kailash Sacred Landscape Conservation Initiative
MAPs	medicinal and aromatic plants
NTFPs	non-timber forest products
RCF	Regional Cooperation Framework
STRM	Shuttle Topographic Radar Mission
UNEP	United Nations Environment Programme

About ICIMOD

The International Centre for Integrated Mountain Development, ICIMOD, is a regional knowledge development and learning centre serving the eight regional member countries of the Hindu Kush-Himalayas – Afghanistan, Bangladesh, Bhutan, China, India, Myanmar, Nepal, and Pakistan – and based in Kathmandu, Nepal. Globalisation and climate change have an increasing influence on the stability of fragile mountain ecosystems and the livelihoods of mountain people. ICIMOD aims to assist mountain people to understand these changes, adapt to them, and make the most of new opportunities, while addressing upstream-downstream issues. We support regional transboundary programmes through partnership with regional partner institutions, facilitate the exchange of experience, and serve as a regional knowledge hub. We strengthen networking among regional and global centres of excellence. Overall, we are working to develop an economically and environmentally sound mountain ecosystem to improve the living standards of mountain populations and to sustain vital ecosystem services for the billions of people living downstream – now, and for the future.



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