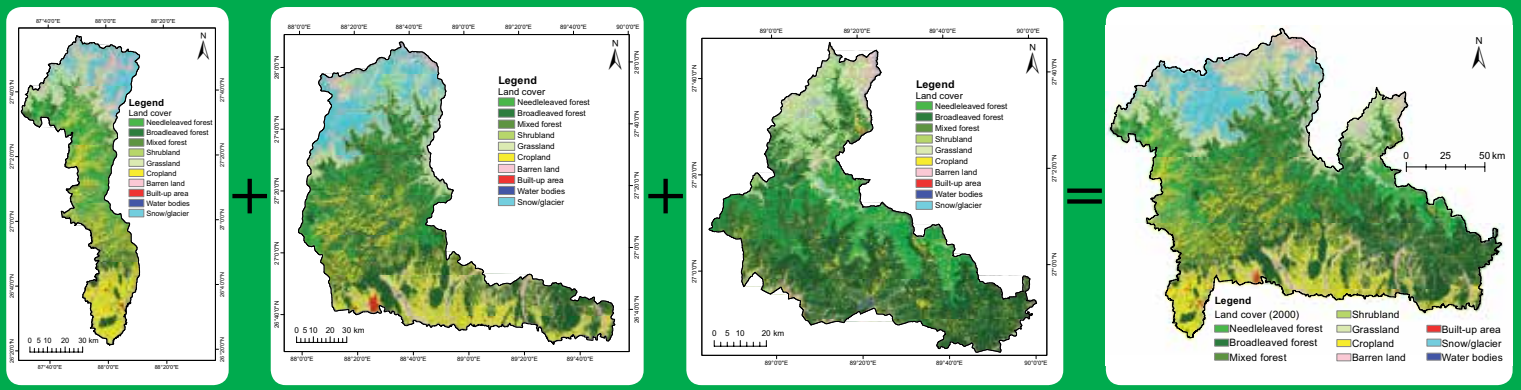
ICIMOD Working Paper 2017/2

Kangchenjunga Landscape Conservation and Development Initiative (KLCDI)

ICIMOD

FOR MOUNTAINS AND PEOPLE

Kangchenjunga Landscape Conservation and Development Strategy and Regional Cooperation Framework



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 Himalaya – 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.

Contact person: Nakul Chettri, nakul.chettri@icimod.org

ICIMOD gratefully acknowledges the support of its core donors: the Governments of Afghanistan, Australia, Austria, Bangladesh, Bhutan, China, India, Myanmar, Nepal, Norway, Pakistan, Switzerland, and the United Kingdom.

ICIMOD Working Paper 2017/2

Kangchenjunga Landscape Conservation and Development Strategy and Regional Cooperation Framework

International Centre for Integrated Mountain Development, Kathmandu, Nepal, March 2017

Published by
International Centre for Integrated Mountain Development
GPO Box 3226, Kathmandu, Nepal

ISBN 978 92 9115 453 1 (printed) 978 92 9115 454 8 (electronic)

Production Team
A Beatrice Murray (Consultant editor)
Christopher Butler (Editor)
Dharma R Maharjan (Layout and design)
Asha Kaji Thaku (Editorial assistant)

Photos: Nakul Chettri, Animesh Bose, ICIMOD

Printed and bound in Nepal by
Quality Printers Pvt. Ltd., Kathmandu, Nepal

Note

This publication is available in electronic form at www.icimod.org/himaldoc

Citation: ICIMOD, WCD, GBPNIHESD, RECAST (2017) *Kangchenjunga Landscape conservation and development strategy and regional cooperation framework*. ICIMOD Working Paper 2017/2. Kathmandu: ICIMOD

Contents

Foreword

The Hindu Kush Himalaya is endowed with a biodiversity and conservation value of global significance. Four of the 36 global biodiversity hotspots are located in the region, spread across 60 ecoregions. The eight countries that share these mountains and hills conserve the region's biodiversity through a network of 488 protected areas. The region provides ecosystem services to a local population of about 210 million and a further 1.6 billion people in the downstream areas of the 10 major rivers that have their origins in the region. Thus sustaining the conservation and development functions of the region is vital.

As elsewhere, ecosystems that harbour biodiversity are found in landscapes that transcend the political boundaries of the countries that contain them. Experience from past global conservation efforts has shown that the transboundary landscape approach is more effective for sustaining the conservation and development functions of ecosystems than the ecosystem approach. The landscape approach involves transboundary cooperation among the countries sharing a landscape for managing the ecosystems under a common management framework, tackling cross-border issues through mutual support, and sharing of expertise and experiences.

The Convention on Biological Diversity (CBD) advocates the landscape approach for conservation and development of biodiversity. As a result, this approach is already being used in several regions around the world. In the Hindu Kush Himalaya, the International Centre for Integrated Mountain Development (ICIMOD) and its partner countries have selected six transboundary landscapes appropriate for promoting the transboundary landscape approach. The Kangchenjunga Landscape (KL) – shared by Bhutan, India, and Nepal – is one of them.

The KL stands out from other landscapes for its high endowment of endemism and an intricate network of 19 protected areas. The Regional Conservation and Development Strategy (RCDS) and the Regional Cooperation Framework (RCF) for this landscape primarily seeks to strike a balance between the development needs of the resident population and the conservation functions of the landscape. It emphasizes the linking of protected areas through conservation corridors to increase their conservation effectiveness, improvement of local economies based on ecosystem services, enhancing the resilience of local communities to climate and socio-economic change, safeguarding local culture and indigenous knowledge, and promoting the integrated regional approach in management of ecosystems.

David J Molden, PhD
Director General
ICIMOD

Contributors

Compiled by Karma Phuntsho, Nakul Chettri, Kabir Uddin, Rucha Ghate, Janita Gurung, Ghulam Muhammad Shah, Sonam Wangchuk, Hemant K. Badola, Ram P. Chaudhary and Rajan Kotru

Bhutan

Core contributors Sonam Wangchuk, Namgay Bidha, Namgay Wangchuk, Ngawang Gyeltshen, Dechen Lham

Other contributors Chimi Namgyel, Gem Tshering, Nima Tshering, Pema Thinley, Rinzin Dorji, Sonam Wangdi, Sonam Wangchuk, Tashi Tobgyel, Tenzin Jamtsho

India

Core contributors Hemant K. Badola, Pitamber P. Dhyani, Kailash S. Gaira (GBPNIHESD), V.K. Sood (DoF North, West Bengal), C.S. Rao (FEWMD Sikkim)

Other contributors Thomas Chandy (FEWMD, Sikkim), J.R. Bhatt (MoFECC, GoI), P.T. Bhutia (DoF, WB), Ranbeer S. Rawal (GBPNIHESD), Ghanashyam Sharma (TMI), Animesh Bose (HNAF Siliguri), Ugen P. Lepcha (MLAS), Y.P. Gurung and Usha Lachungpa (FEWMD Sikkim), Rajendra P. Gurung (ECOSS Sikkim), Sunita Pradhan (ATREE Sikkim), Roshan Rai and Shailesh Sharma (PRERNA Darjeeling), L.K. Rai (GBPNIHESD), Priyadarshini Shrestha (WWF Sikkim)

Nepal

Core contributors Ram P. Chaudhary, Yadav Uprety, Krishna R. Shrestha (RECAST-TU), Krishna K. Shrestha (Central Department of Botany-TU), Khadga B. Basnet (Central Department of Zoology-TU), Surya P. Joshi, Govinda Basnet (Independent Experts)

Other contributors Krishna P. Acharya (MoFSC-GoN)

ICIMOD

Core contributors Karma Phuntsho, Janita Gurung, Ghulam M. Shah, Pratikshya Kandel, Kabir Uddin, Manohara Khadka, Rajan Kotru, Kamal Aryal, Nakul Chettri

Other contributors Eklabya Sharma, Farid Ahmad, Rucha Ghate, Marjorie van Strien, Uma Partap, Yi Shaoliang.

Acknowledgements

ICIMOD would like to thank all the people who contributed to the preparation of this report. This publication is based on the individual country-level feasibility assessment and conservation and development strategy reports prepared in a consultative manner within the Kangchenjunga Landscape (KL), and all of those who contributed to the process are duly recognized in the individual country reports. We are grateful for your participation and inputs that have resulted in the development of this report.

ICIMOD would like to thank Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH and Austrian Development Agency (ADA) for their financial support for the preparatory phase of the Kangchenjunga Landscape Conservation and Development Initiative (KLCDI). We also highly appreciate the support we have received from our partners in the KL countries: Wildlife Conservation Division, Department of Forests and Park Services, Ministry of Agriculture and Forests, Government of Bhutan; G.B. Pant National Institute of Himalayan Environment & Sustainable Development formerly known as G.B. Pant Institute of Himalayan Environment & Development, Ministry of Environment, Forest & Climate Change, Government of India; Ministry of Forests and Soil Conservation, Government of Nepal; and Research Centre for Applied Science and Technology – Tribhuvan University, Nepal.

Acronyms and Abbreviations

ADA	Austrian Development Agency
ATREE	Ashoka Trust for Research in Ecology and Environment
CBD	Convention on Biological Diversity
CTA	Chief Technical Advisor
DoF	Department of Forests
ECOSS	Eco-Tourism and Conservation Society of Sikkim
FEWMD	Forest Environment and Wildlife Management Department
GBPNIHESD	GB Pant National Institute for Himalayan Environment and Sustainable Development
GIZ	Deutsche Gessellschaft für Internationale Zusammenarbeit (formerly GTZ)
GoI	Government of India
GoN	Government of Nepal
GLF	Global Landscape Forum
HNAF	Himalayan Nature and Adventure Foundation
HWC	Human Wildlife Conflict
ICIMOD	International Centre for Integrated Mountain Development
IPBES	Intergovernmental Platform on Biodiversity and Ecosystem Services
IPCC	Intergovernmental Panel on Climate Change
JKSNR	Jigme Khesar Strict Nature Reserve (formerly Toorsa Strict Nature Reserve)
KBR	Khangchendzonga Biosphere Reserve
KCA	Kangchenjunga Conservation Area
KLFAR	Kangchenjunga Landscape Feasibility Assessment Report
KL	Kangchenjunga Landscape
KLCDI	Kangchenjunga Landscape Conservation and Development Initiative
LFA	Logical Framework
LoA	Letter of Agreement
MAPs	Medicinal and Aromatic Plants
M&E	Monitoring and Evaluation
MLAS	Mutanchi Lom Aal Shezum
MoFSC	Ministry of Forests and Soil Conservation (Nepal)
MoEFCC	Ministry of Environment, Forest and Climate Change (India)
MoU	Memorandum of Understanding
NCCs	National Coordination Committees
NGOs	Non-Governmental Organisations
NTFPs	Non-Timber Forest Products
PRERNA	Non-Governmental Organisation in Darjeeling
RCB	Regional Coordinating Body
RCDS	Regional Conservation and Development Strategy
RCF	Regional Cooperation Framework
RECAST	Research Centre for Applied Science and Technology
RGoB	Royal Government of Bhutan
RMC	Regional Member Countries
RSC	Regional Steering Committee
RWGs	Regional Working Groups
SPM&E	Strategic Planning, Monitoring and Evaluation
TMI	The Mountain Institute
TOR	Terms of Reference
TU	Tribhuvan University
UNFCCC	United Nations Framework Convention on Climate Change
VDC	Village Development Committee
WCD	Wildlife Conservation Division (Bhutan)
WWF	World Wildlife Fund
WCPA	World Commission on Protected Areas
WB	West Bengal

Executive Summary

The KL encompasses a part of eastern Nepal, Sikkim and part of West Bengal in India, and the western and south western parts of Bhutan. It has a total area of 25,086 km^2 and elevation range from 40 to 8,586 masl.

The KL is particularly rich in biodiversity as it includes both the Indo-Malayan and Palaearctic Realms as well as species of Sino-Japanese origin, with a floral diversity including trees, shrubs, herbs, orchids, lichen, and moss. It has nine highly diverse ecoregions of high ecological and conservation significance ranging from the Lower Gangetic Plains moist deciduous forests in the south, to the Yarlung Tsangpo arid steppe in the north. The fauna include flagship, keystone, focal, umbrella, migratory, and vulnerable species ranging from the tiger of the Indo-Malayan Realm to the snow leopard of the Palearctic Realm. The agro-ecosystem also has a very rich agrobiodiversity with valuable genetic resources. The KL has 19 protected areas covering 30% of the total area (7,176 km^2) to protect this diversity.

The KL is home to more than 7 million people, the great majority in KL-India. The majority of the population are Hindus and – especially in Bhutan – Buddhists, with many other faiths also represented including Muslims, Kiratis, and Christians. Ethnic groups include Brahmin, Chhetri, and Dalit (Indo-Aryan origin), and Limbu, Rai, Magar, Sherpa, Gurung, Tamang, Tharu, Lepcha, Bhote, Newar, and Drukpa (Tibeto-Burman origin). Literacy rates range from 57% in KL-Bhutan to 78% in KL-India; women's literacy is generally lower than for men. The landscape's ecosystems provide a wide range of provisioning services (food, water, medicines, wood energy, timber, non-timber, grazing, hydropower) as well as regulating, supporting, and cultural services to the people living in the landscape and beyond. Mount Kangchenjunga is held sacred by the Buddhist and Kirant religions.

A wide range of conservation and development challenges were identified at both national and regional levels. The principal problems are deforestation, habitat fragmentation, isolation of protected areas, human-wildlife conflict, overharvested and unregulated natural resource use, knowledge gaps, poor economic and social infrastructure, underdeveloped agricultural production systems, untapped tourism potential, poaching and illegal transboundary trade in flora and fauna, cross-border transmission of livestock disease, and climate change.

The three regional member countries and ICIMOD have prepared a RCDS (2016–2036) and a RCF for the KL to institutionalize fair, equitable, and sustainable use of the biological and other natural resources. The strategy and framework were developed on the basis of country level feasibility assessment reports (FARs) 2014, which were synthesized to provide a regional feasibility assessment reports (KLFAR) 2017, as well as country level conservation and development strategies. This paper summarizes the main elements of the regional strategy and framework, including the mission, vision, goal, outcomes, strategies and key actions, implementation strategy, and monitoring and evaluation. The goal is to ensure better conservation and management of the KL in order to sustain ecosystem goods and services to improve livelihoods and enhance ecological integrity, economic development, and socio-cultural resilience to environmental changes.

Introduction

The transboundary landscape approach

The United Nations Convention on Biological Diversity (CBD) advocates the use of landscape and ecosystem approaches for managing biodiversity, an approach endorsed at the seventh Conference of the Parties' meeting in 2004 (Secretariat of the CBD 2004a). The landscape concept implies coordination and cooperation among all those responsible for an area, regardless of jurisdiction. The approach makes it possible to address the conservation and sustainable use of natural resources (biodiversity, rangelands, farming systems, forests, wetlands, and watersheds) in landscapes defined by ecosystems rather than administrative boundaries. This applies not only to single countries. Landscapes are not confined by national borders and in many places, areas of interest for biodiversity conservation include parts of two, three, or even more countries. At the same time, individual protected areas are like islands and thus less effective ecologically (Secretariat of the CBD 2004b); they need to be connected through conservation corridors to enhance their ecological effectiveness (Chettri et al. 2007), which also requires an overarching landscape management framework.

The landscape approach has many benefits. It enables integrated management of protected areas and the areas surrounding them, which enhances the efficiency of ecological functions and processes such as species dispersal, species migration, and hydrological regulation, as well as promoting cultural integrity and human well-being. Further, social, cultural, and economic similarities tend to be seamless across the political boundaries in a landscape, entailing widespread social, cultural, and economic interdependence among the local populations, and a flow of natural resources and commodities, social transactions, cultural exchanges, trade, employment, tourism, grazing, and other activities, all of which have implications for biodiversity conservation and human well-being.

There are other important aspects that call for a landscape approach. Rivers that originate in one country may flow through a number of other countries before reaching the sea. What happens in one country affects the quality and availability of water, aquatic ecosystems, wetlands, and aquatic life in other countries sharing the same river. A transboundary landscape approach can help countries depending on the same river to manage their watersheds and water resources based on a common management framework and principles. Globalization and climate

'Transboundary issues call for strong coordination and collaboration', David Molden, Director General, ICIMOD

change are also leading to changes of unprecedented kinds and levels with potentially both negative and positive ecological, social, and economic consequences (Chettri et al. 2012). Common, concerted, and collaborative action will also be important for countries managing the impacts of both climatic and non-climatic drivers of change.

ICIMOD's transboundary landscape initiative

Mountain landscapes are very often transboundary, as borders tend to follow river valleys and ridges along mountain chains, dividing the contiguous mountain slopes, river basins, and ecosystems. In such areas, the success of conservation measures in one country may depend heavily on the situation across the border, and conservation approaches need to be agreed among all the countries if they are to be of real benefit.

The ICIMOD and its partners have identified six transboundary landscapes representing different areas in the region. One of these is the KL, which is shared by three of ICIMOD's member countries – Bhutan, India, and Nepal. The KL has nine ecoregions extending across the political boundaries, leading to ecological interdependence. Some of the ecoregions harbour focal species such as Asian elephant (*Elephas maximus*), Royal Bengal tiger (*Panthera tigris*), and snow leopard (*Panthera uncia*), which use a larger habitat and have an extensive home range. Transboundary conservation efforts have a long history in the KL, starting formally with a regional symposium on biodiversity conservation in 1992 (Sharma et al. 2007). Recognition of the extent to which ecoregions and socio-cultural linkages transcend political borders, and the need to connect areas through conservation corridors, led to a call for regional cooperation based on common principles and an ecosystem management framework (Sharma et al. 2007). The transboundary landscape approach provides a way for the three countries to cooperate and develop coordinated planning and implementation of activities to manage cross-border problems that impact on the environment, natural resources, and society using a common management framework and principles as a basis for cooperation.

Formal plans for development of a framework for cooperation in the KL started with a regional workshop held in Gangtok in August 2012, which was followed by a three-year preparatory phase from 2012–2015 (supported by Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) and Austrian Development Agency (ADA)). All three countries prepared country level regional feasibility assessment reports and developed country level conservation and development strategies. These documents have been synthesized to form a regional feasibility assessment report for the whole landscape (Chaudhary et al. 2015), and a RCDS (2016–2036), supported by a RCF for the KL to institutionalize fair, equitable, and sustainable use of the biological and other natural resources. This paper summarizes the main elements of the regional strategy and framework, further details are available in the country level and synthesis reports.

Characteristics of the Kangchenjunga Landscape

Location, boundary, and area

The KL is situated between 26°21'40.49" and 28°7'51.25" E latitude and 87°30'30.67" and 90°24'31.18" N longitude (Figure 1). It encompasses a part of eastern Nepal; Sikkim and part of West Bengal in India; and the western and southwestern parts of Bhutan. It has a total area of just under 25,086 km^2 – 5834 km^2 in Bhutan; 14,127 km^2 in India; and 5,125 km^2 in Nepal (Table 1). The landscape ascends from the Terai-Duar lowlands of India and Nepal through the middle hills to the high Himalayan region, with an elevation range from 40 to 8,586 masl (Table 1). It encompasses five districts in Bhutan, all of Skkim and parts of North Bengal in India, and four districts of Nepal (Table 1).

Physical features

The KL is only 166 km from north to south, but has a very diverse physiography within this short distance. The landscape includes parts of five major physiographic zones: the Indo-Gangetic Plains to the south, the Sub-Himalayan and Lower Himalayan Ranges up to 3,000 masl, the Greater Himalayan Zone, and the Tibetan Plateau; 27% lies below 50 masl and 10% above 8,000 masl, with Mount Kangchenjunga – the dominant feature – rising to 8,586 masl (Figure 2).

Figure 1: **The Kangchenjunga Landscape**

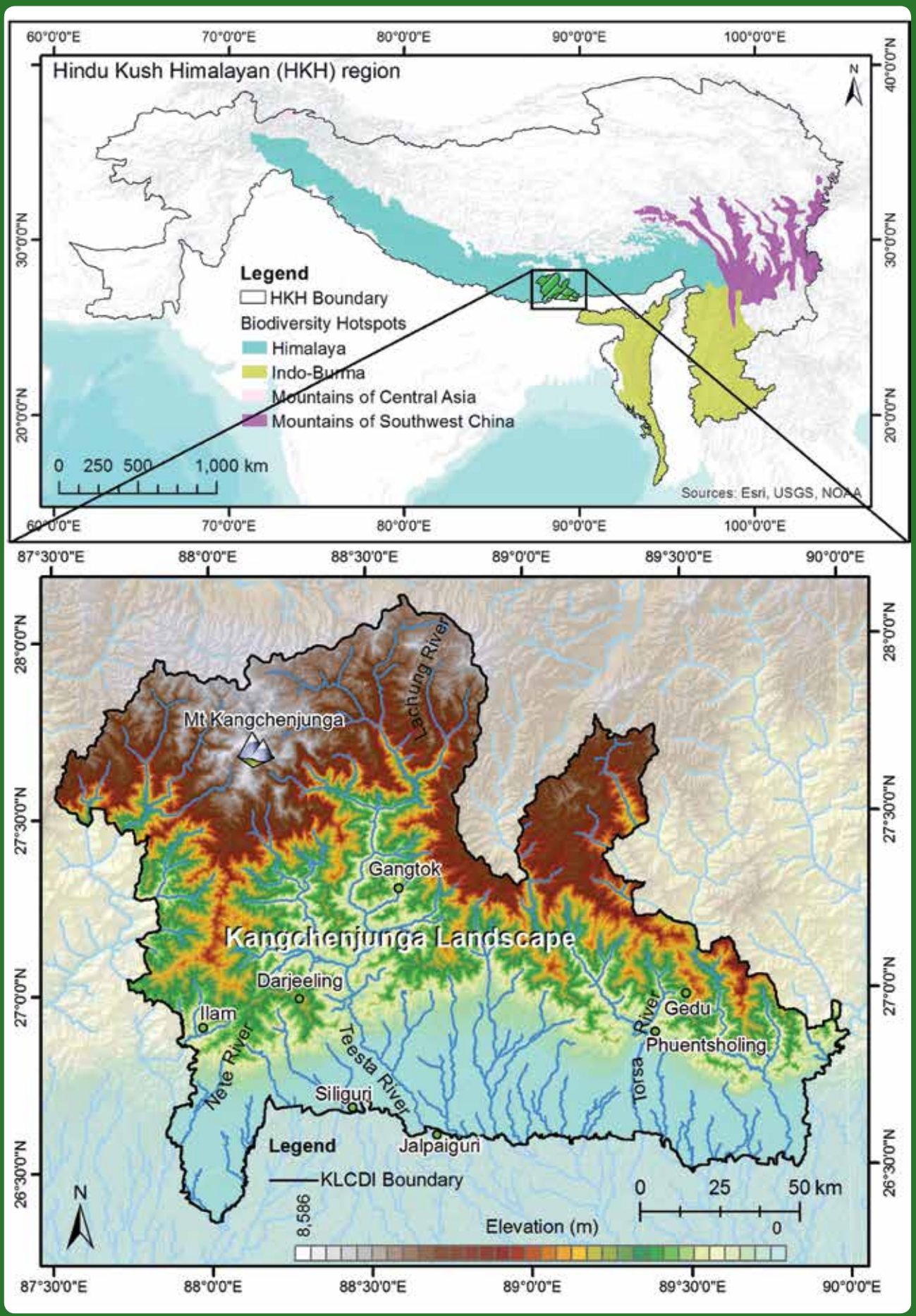
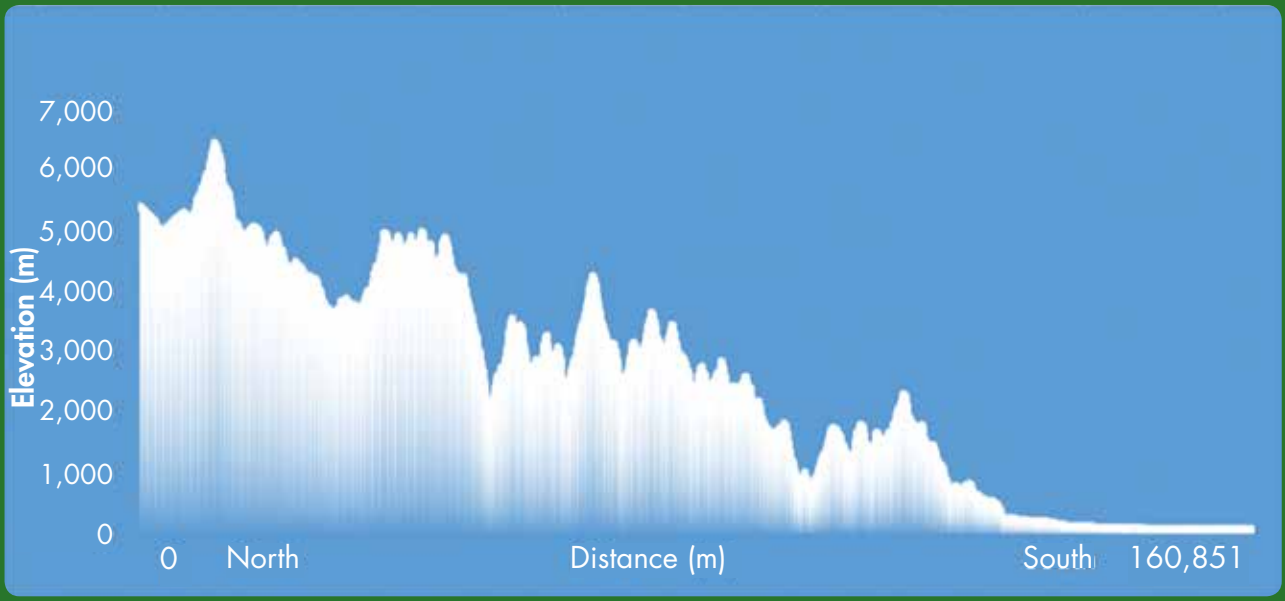


Table 1: **The Kangchenjunga Landscape – area, elevation, administrative districts**

	K- Bhutan	KL-India	KL-Nepal	KL-total
Area (km^2)	5,834	14,127	5,125	25,086
Elevation (masl)	95–5,640	40–8,586	100–8,586	40–8,586
Administrative districts	5 Paro, Haa, Samtse, Chukha, Dagana	4 Sikkim, Darjeeling, northern parts of Jalpaiguri, Alipurduar	4 (with 85 VDCs and 25 municipalities) Taplejung (23), Panchthar (14/2), Ilam (25), Jhapa (23/23)	

Figure 2: **Cross section of a typical north-south elevation profile within the Kangchenjunga Landscape**



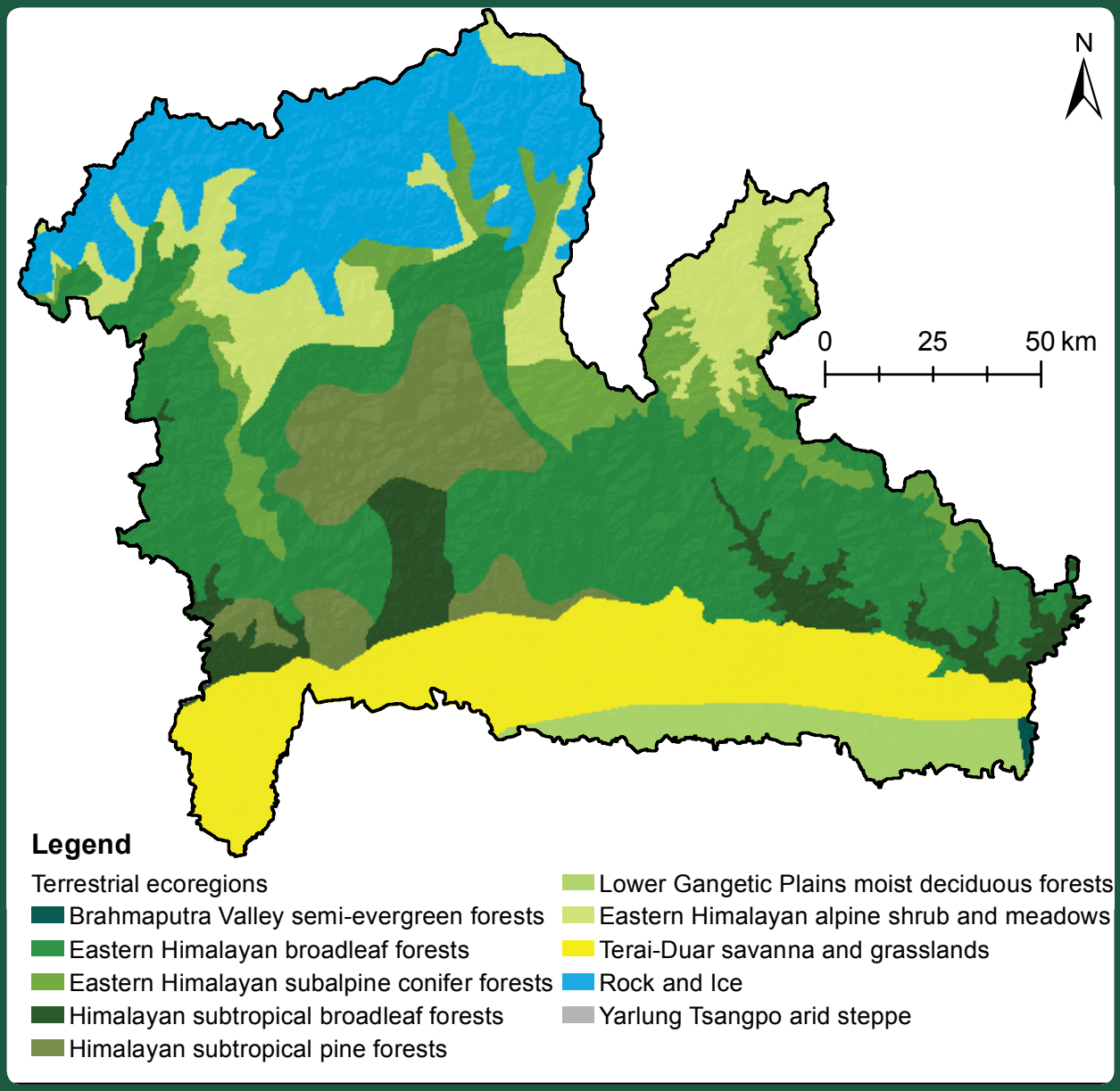
The complex topography leads to marked variability in climate: places with upward air movement are very wet and those with downward air movement dry. The total monthly rainfall in KL-Bhutan ranges from 10 to 185 mm in Haa, 25 to 300 mm in Gedu, and 50 to 1,400 mm in Sibsoo; in KL-India it ranges from 8 to 798 mm in Darjeeling, 20 to 537 mm in Gangtok (Sikkim), and 2 to 972 mm in Jalpaiguri; and in KL-Nepal it ranges from 85 mm in Nup to 277 mm in Gaida in the Terai. Generally, about 81% of precipitation falls during the monsoon.

Ecological features

The landscape includes two of the eight global biogeographic realms – Palaearctic and Indo-Malayan – and also harbours flora and fauna of Sino-Japanese origin; it has nine highly diverse ecoregions of high ecological and conservation significance ranging from the Lower Gangetic Plains moist deciduous forests in the south to the Yarlung Tsangpo arid steppe in the north (Figure 3).

The landscape abounds in umbrella species such as tiger (*Panthera tigris*), greater one-horned rhinoceros (*Rhinoceros unicornis*), and elephant (*Elephas maximus*). There are keystone species such as hornbills; focal species such as snow leopard (*Panthera uncia*), brown bear (*Ursus arctos*), wolf (*Canis lupus*), takin (*Budorcas taxicolor*), Himalayan musk deer (*Moschus leucogaster*), red panda (*Ailurus fulgens*), pheasants (e.g. *Tragopan satyra*), and Himalayan griffon (*Gyps himalayensis*); and habitat specialist species such as swamp deer or barasingha (*Rucervus duvaucelii*), wild water buffalo (*Bubalus arnee*), hispid hare (*Caprolagus hispidus*), and pygmy hog (*Porcula salvania*).

Figure 3: **Terrestrial ecoregions in the Kangchenjunga Landscape**



Floristically, the Indo-Malayan realm plants include *Dipterocarpus* spp., *Shorea* spp., *Terminalia* spp., climbing figs, lianas, epiphytic orchids, and others, while the Palaearctic realm plants include spruce (*Picea* spp.), fir (*Abies* spp.), and larch (*Larix* spp.); deciduous broadleaf taxa such as birch (*Betula* spp.), alder (*Alnus* spp.), and willow (*Salix* spp.), and numerous forbs such as Potentilla spp.and Pedicularis spp. Plants of Sino-Japanese origin include *Camellia* spp., *Rhododendron* spp., and angiosperms such as *Tetracentron sinense* and the dove tree (*Davidia involucrata*). In addition to wild biodiversity, the landscape also abounds in agro-biodiversity consisting of a wide variety of cereal crops (including many landraces), vegetables, horticultural crops, and domesticated medicinal plants.

Socio-economic, gender, and livelihood characteristics

Population, demography, ethnicity and religion

As of 2014, the human population of the landscape was 7,248,311 with the overwhelming majority (87%) in India ( ). About 51% of the total population is male and 49% female.

Table 2: **Demographic characteristics of the KL**

	KL-Bhutan	KL-India	KL-Nepal	KL total
Population	150,902	6,325,457	771,934	7,248,311
Households	29,157	NA	174,484	NA
Majority religion	Buddhist/Hindu	Hindu	Hindu/Buddhist	NA
Literacy	57% (2005)	78% (2011); Sikkim 82%; Darjeeling 76%; Jalpaiguri 73%	75%	NA
Female/male literacy	43/ 57%	Sikkim 76/87%; Darjeeling 72/80%; Jalpaiguri 66/80%	68/82 (high school completion rate)	NA

The majority of the population are Hindus or Buddhists, with many other faiths also represented including Muslims, Kirantis, and Christians (Table 2). Mount Kangchenjunga is held sacred by the Buddhist and Kirant religions. The mountain is known as *Chuthing bojetpimgo* among the Lepcha people of Sikkim; the Sikkimese revere the deity that resides in Kangchenjunga and celebrate a religious festival called *Pang Lhabsol* in its honour. The Kirantis revere the mountain as *Sewalungma*, which means the 'mountain to which we offer greetings'.

Ethnic groups include Brahmin, Chhetri, and Dalit (Indo-Aryan origin) and Limbu, Rai, Magar, Sherpa, Gurung, Tamang, Tharu, Lepcha, Bhote, Newar, and Drukpa (Tibeto-Burman origin). Literacy rates range from 57% in KL-Bhutan to 78% in KL-India (Table 2).

The domesticated animals include cattle, buffaloes, yak, sheep, goat, pigs, and fowl. KL-Nepal has 590,000 cattle, 260,000 buffalo, 4,000 yak, 25,000 sheep, 680,000 goats, 144,000 pigs, and 2,300,000 fowl. The types of domesticated animals in Bhutan and India are likely be similar, but there are no available estimates of population.

Gender and inclusive development

About 49% of the total population is female. Women have consistently lower literacy rates than men (Table 2) and generally enjoy less power in decision making, have less control of access to public and private resources, and are given less opportunity to take part in capacity building and decision making related to socioeconomic development programmes.

Livelihood and economic activities

The livelihood and economic activities in the landscape include agriculture, animal husbandry, trade, tourism, and remittances.

Agriculture: Agriculture is predominantly subsistence. The major crops are rice, millet, maize, wheat, and buckwheat; rice is the major crop at lower elevations and potato at higher elevations. In KL-Bhutan red rice is grown up to an elevation of 3,500 masl. Cropping patterns are largely dependent on elevation and the availability of irrigation. In river valleys at lower elevations, three crops are grown per year, and in other parts two. At higher elevations, shifting cultivation (also known as slash-and-burn agriculture or rotational agroforestry) is practised in Nepal, particularly on steep slopes. Maize used to be the major crop grown on shifting cultivation sites, but is now being replaced by the more economically lucrative chiraito - *Swertia chirayita* (a medicinal herb) in Nepal. Organic farming is being promoted in some areas of the landscape with a view to promoting livelihoods while conserving the ecosystems and the services they provide.

Cash crops are an important source of income for local communities. Major cash crops in the region include cardamom, tea, tangerine, and ginger. Many traditional rice terraces have been converted into cardamom plantations, and the shade trees grown in these plantations have improved the availability of fuelwood in these areas. Globally, the brand 'Darjeeling tea' is a synonym for high quality tea, while Ilam tea and Sikkim tea are also making an impact. It is estimated that the tea industry in Darjeeling alone employs almost 250,000 people. Other cash crops include cinchona, turmeric, areca nut, broom grass, and fruit.

Animal husbandry: Animal husbandry is an integral part of the farming systems in the landscape and includes dairy, poultry, and fish. Livestock provide dairy products, draft power, and farmyard manure. Cattle, buffalo, goats, pigs, and poultry are the main livestock kept in the lower altitude areas, and yak, yak cross breeds, and sheep at higher altitude. Milk and poultry have become major economic activities and a number of dairy cooperatives have been established. Both sedentary grazing and transhumant pastoralism – in which livestock are moved to higher elevation pastures in summer and back down to the lower valleys in winter – are prevalent.

Trade: Trade, both in-country and cross-border, is an age-old practice among communities in the landscape. In some parts, a traditional bartering system used to be common in which high-elevation communities offered milk products, medicinal plants, and salt from the Tibetan plateau to low-elevation communities in exchange for grain and sugar, but this is now in decline. As the market connections increase, trading in food items, wool, clothes, livestock, medicinal plants, other non-timber resources, and horticultural products is on the rise, both in-country and cross-border. The metropolis of Siliguri in Jalpaiguri district in West Bengal is a major trading centre. Local bazaars (markets, also known as haats) are a common feature, and take place weekly or fortnightly in many small towns; they offer local farmers an opportunity to showcase their fresh agrobiodiversity products, cereals, and handicrafts, and earn income through sales.

Tourism: Tourism – local, national, and international – is an important livelihood opportunity for many people in the landscape. Tourism products include nature and trekking tourism, eco and wilderness tourism, village/rural homestays, adventure travel, pilgrimage, culture and heritage, tea tourism, and flori-tourism. Mount Kangchenjunga and other high mountain peaks are popular attractions, but there are many other tourism destinations. The Haa valley, Nup Tshonapatra, Jigme Khesar Strict Nature Reserve, and Chomolhari trek are among the popular destinations in KL-Bhutan. The major attractions in KL-India include the Darjeeling Himalayan Railway (a World Heritage Site), Tiger Hill, scenic tea estates in the mid hills, and wildlife tourism in the lowland protected areas, as well as sacred sites in Darjeeling and Sikkim, Darjeeling Zoological and Botanical Parks, Mirik lake, and the Himalayan Mountaineering Institute in Darjeeling. Major tourism sites in KL-Nepal include the temples and historical artefacts in Jhapa District, tea gardens and Mai Pokhari in Ilam District, and Pathibhara temple in Taplejung district. In 2012, more than 550,000 domestic and foreign tourists visited the landscape – about 3,000 foreign tourists visited Haa in Bhutan, 585,027 tourists (4.5% foreign) visited Sikkim, and 635 foreign tourists trekked in Nepal.

Other economic activities: One of the major livelihood strategies in the KL, particularly in KL-Nepal, is migration for employment. Over the past decade, many young people have migrated to foreign countries for employment, and the remittances they send home are an important feature of the rural economy. There is also considerable migration to urban centres for work. As of 2011, about 19% of the total population of KL-Nepal had migrated from remote areas to urban and semi-urban centres or overseas to take advantage of better livelihood opportunities. Women make up 13% of migrants. The volume of remittances and their effects on the villages in the landscape has not yet been determined.

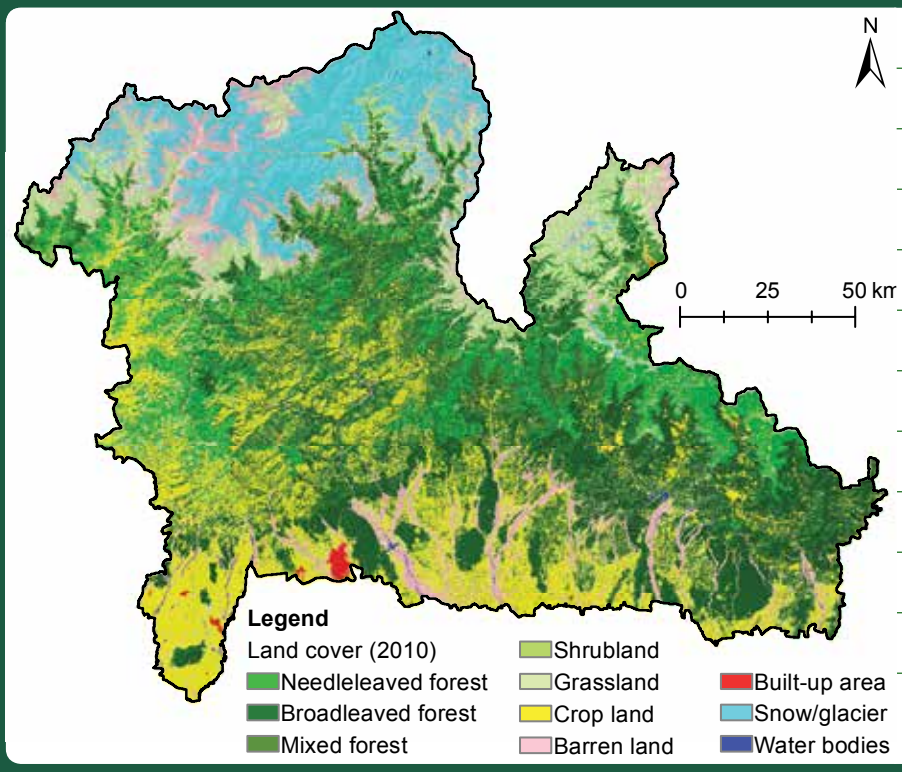
Local people are also engaged in economic activities such as textile production, especially traditional textiles; handicrafts, such as carpet weaving, bamboo and rattan weaving, and wood products; knitting, including shawls, bags, and clothes; and food processing and packaging, such as production of pickles, jams, and dried foods. Some of the better known products include the 'Tibetan' carpets produced in KL-India (Darjeeling and Sikkim) and KL-Nepal (Taplejung), and traditional Nepalese *dhaka* textiles in KL-Nepal (Panchthar and Taplejung). Floriculture is also growing as an economic activity, particularly in KL-India.

Natural resource governance

Figure 4 shows the land cover in 2010. The greater part is forest (45%) and rangeland (shrubland and grassland, 20%). The major natural resource base is forest – needleleaved, broadleaved, and mixed. Forest is used for timber, non-timber products, and grazing; provides habitat for flora and fauna; and protects watersheds and soil. The snow and glacier areas (11%) and water bodies are a source of water for drinking, irrigation, hydropower, and industrial use.

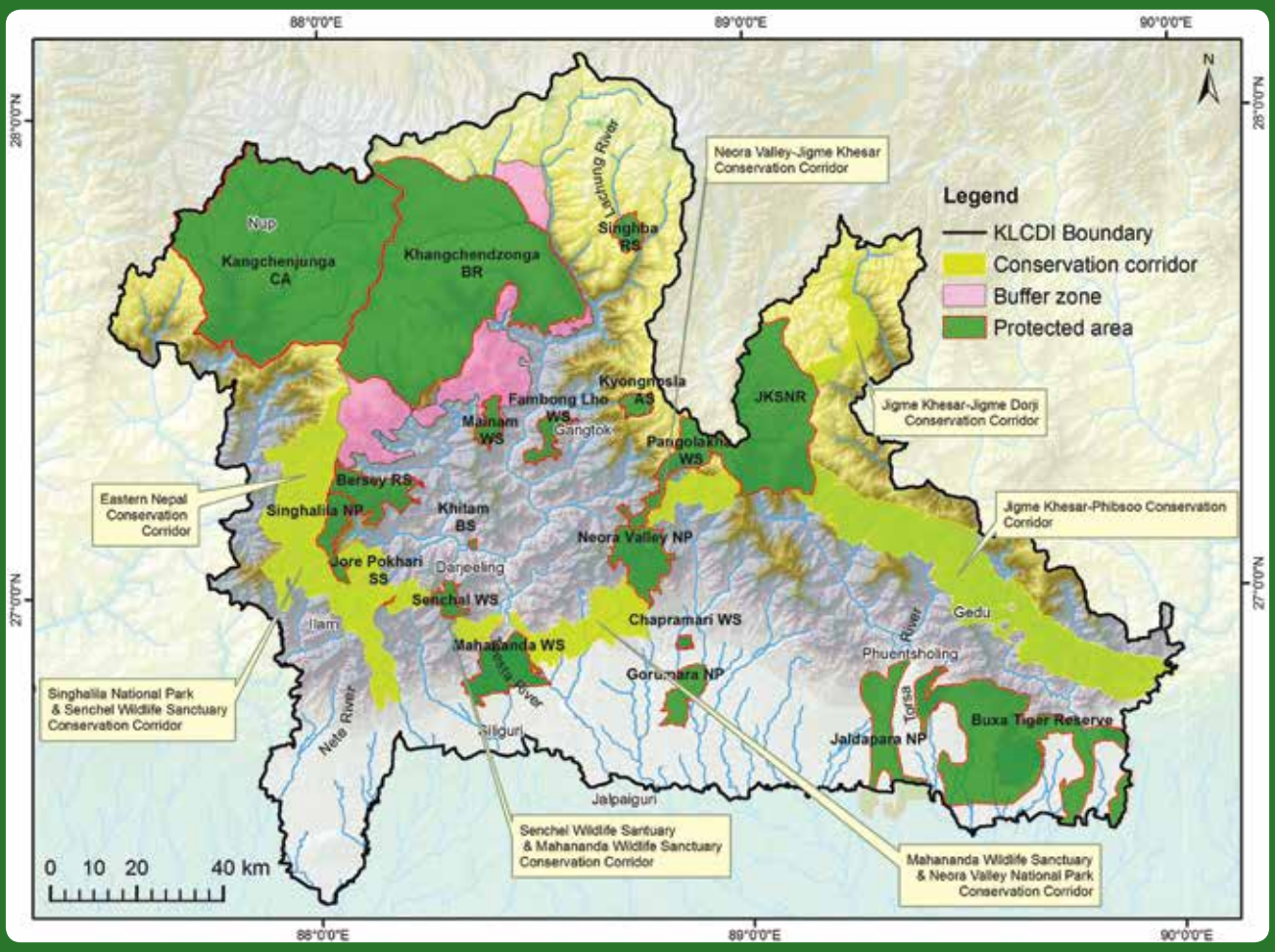
The landscape has 19 protected areas covering 30% of the landscape (7,176 km^2) and including most of the forest area (Figure 5). Most of the protected areas are in KL-India, with two in KL-Bhutan and one in KL-Nepal. The largest

Figure 4: **Land cover (in 2010)**



Land use	% area in KL
Needleleaved forest	12.0
Broadleaved forest	27.5
Mixed forest	5.2
Shrubland	7.6
Grassland	12.2
Crop land	16.7
Barren land	7.6
Built-up area	0.3
Water bodies	0.4
Snow/glacier	10.6
Total	**100.0**

Figure 5: **Protected areas and conservation corridors**



is the Khangchengzonga Biosphere Reserve in Sikkim, India (2,620 km^2) and the next largest the Kangchenjunga Conservation Area in Taplejung District, Nepal (2,035 km^2). These two areas are contiguous, giving a total protected area of 4,655 km^2 under two separate jurisdictions. The other protected areas all have areas of less than 800 km^2; the smallest at less than 1 km^2 is the Jore Pokhari Salamander Sanctuary in West Bengal, India.

The protected areas include 4 national parks (7% of the protected area), 1 biosphere reserve (37%), 1 conservation area (28%) 1 strict nature reserve (9%), 1 tiger reserve (11%), and 11 sanctuaries (8%). Nine of the protected areas directly border a neighbouring country within the landscape and have strong transboundary influence (Table 3). At present, these areas are managed in isolation by the governments of the respective countries, but offer opportunities for transboundary management. Eight potential conservation corridors have been identified in the southern part of the landscape (Figure 5) that could be promoted to provide connectivity between the individual protected areas.

Table 3: **Protected areas contiguous with national borders within the KL**

Reserve	Main country	Bordering countries
Jigme Khesar Strict Nature Reserve	Bhutan	India
Phibsoo Wildlife Sanctuary	Bhutan	India
Buxa Tiger Reserve	India	Bhutan
Jaldhapara National Park	India	Bhutan
Barsey Rhododendron Sanctuary	India	Nepal
Khangchengzonga Biosphere Reserve[a]	India	Nepal
Singhalila National Park	India	Nepal
Pangolakha Wildlife Sanctuary	India	Bhutan
Kangchenjunga Conservation Area[a]	Nepal	India

[a] contiguous

The institutional basis for governance of the natural resources in the protected areas is provided by formal policies, legislation, regulations, and programmes (Phuntsho et al. 2012). In addition, there are some limited customary institutions followed by a few local communities. The KLFAR, (2017) provides a detailed review of the existing institutions, policy instruments, and other resource governance tools used in the KL.

Interactive session on conservation and development issues in the landscape

Strategic Conservation and Development Issues in the Landscape

As a part of the preparation of the feasibility assessments (2012–2015), a wide range of conservation and development challenges were identified, discussed, and documented at both national and regional levels. The common conservation and development challenges were identified which, together with the available opportunities, formed the basis for development of a long-term conservation and development strategy for the KL. The main issues identified were as follows.

Ecosystem degradation, deforestation, and habitat fragmentation

The main component of the rural economy is subsistence agriculture, which is based on multiple uses of natural resources. Ecosystems that provide habitat to flora and fauna are being used for a range of agro-pastoral systems such as shifting cultivation, sedentary agriculture, grazing land, and horticulture such as cardamom cultivation and tea gardens, as well as for fuelwood, timber, and non-timber forest products, including medicinal plants. With modernization, use of the landscape for activities such as industrial mining, hydropower development, urbanization, and infrastructure development are also on the rise. All of these activities are leading to deforestation, forest degradation, and fragmentation of the ecosystems, especially in areas with intense population pressure and having a huge demand for natural resources (Sharma et al. 2016). Forest degradation and fragmentation is apparent in most of the forested ecosystems within the landscape as a result of overexploitation. Creation of tea gardens along the foothills has not only fragmented the habitat of mega fauna such as elephant, but led to loss of biodiversity, drying up of springs, and widespread loss of top soil through erosion. Excessive use of chemical fertilizers and pesticides has polluted water resources and led to health hazards and even death for tea garden workers. Furthermore, invasive alien species such as *Eupatorium*, *Chromolaena* and *Mikania* are also posing a threat to local species.

Isolated protected areas (islands)

The 19 protected areas are dedicated to safeguarding wildlife; conserving natural habitat areas to maintain the ecological and evolutionary processes that make and sustain biodiversity; supporting viable populations of characteristic and focal species; and protecting large natural areas to ensure ecological resilience to periodic large-scale perturbations and long-term changes. However, most of the protected areas are small and isolated and cannot fulfil their intended purpose unless connected to other areas by conservation corridors (Chettri et al. 2008; Rana 2008).

Human-wildlife conflict

As a result of habitat fragmentation and the impact of small isolated protected areas next to fields and villages, human wildlife conflicts are multiple and widespread. Predators such as leopard, wild dog, and tiger predate upon cattle, goats, pig, poultry, dogs, and yak. They also frequently attack human beings. Small predators such as golden cat, leopard cat, Himalayan yellow throated marten, and eagle predate upon poultry and goat kids. Wild animals such as elephant, wild boar, macaque, bear, barking deer, rodents, porcupine, and birds devour and trample agricultural crops. Especially in the ecoregions that provide habitat for elephant, rhinoceros, and bison, agricultural crop depredation, destruction of houses, and attacks on humans by elephants are common. As a result, retaliatory killing of animals is common. Elephants and bison are also killed occasionally following collisions with trains (Chakraborty 2015).

Pattern of use of natural resources

Timber, fuelwood, non-timber forest resources such as medicinal plants, grazing resources, soil resources, and agrobiodiversity are all used to support the local livelihoods. These ecosystem services support 80–85% of household income if considered in economic terms (Pant et al. 2012). The institutional and development interventions for managing, regulating, and promoting sustainable use of timber, non-timber, and grazing resources are generally weak and not well funded. As a result, pastures are under severe grazing pressure and medicinal plants and fuelwood are overharvested, particularly in the government managed forests; institutional arrangements to manage water resources for drinking and irrigation are non-existent or inappropriate, and can lead to pollution

of water resources and drying up of springs. There is effectively no system to encourage sustainable and self-sufficient agriculture – permaculture – or to conserve agrobiodiversity or judicious use of farming inputs such as pesticides and inorganic fertilizers. Commercial mining operations have a marked negative impact and there is considerable scope to manage them more scientifically and reduce the associated environmental problems.

Information and knowledge gap

The biodiversity and ecosystems in the landscape provide a wide range of provisioning services (food, water, medicines, wood energy, timber, non-timber, grazing, hydropower) as well as regulating, supporting, and cultural services to the people living in the landscape and beyond. In order to ensure sustainable use of these services, knowledge is needed about both the biodiversity and the values, processes, and structure of the ecosystems. Although a fair amount is known about the biodiversity, including the non-timber forest products (NTFPs) (Kandel et al. 2016; Uprety et al. 2016), knowledge about other factors is limited.

Understanding of the social systems, economy, and ecology of the landscape is poor. The role of local and indigenous communities in the management of ecosystems is little understood. Knowledge about gender disparities in terms of access to and control of natural resources and decision making in overall governance is limited. Comprehensive data are needed on demography, social change in education and health, cultural and spiritual diversity, customary regimes of natural resource management, and indigenous knowledge.

Ecologically, more data are needed on *in situ* biodiversity, agrobiodiversity, population dynamics and biological status of threatened and flagship species of fauna, floral diversity, and wetlands and hydrology. Knowledge about the ongoing change in the landscape is extremely limited, including changes in land use and forest cover; meteorological, hydrological and cryospheric change; the impact of urbanization and infrastructural development on ecosystems; destruction of habitat of focal and flagship species, alteration of avian habitats, and change in the status of aquatic animals; alteration of community composition; changing habitats; shifting tree lines; shifting phenology, including timing of flowering and fruiting, and animal and bird migration; and environmental pollution. More needs to be known about the impact of natural disasters such as landsides and forest fire on ecology, as well as how forest utilization may alter environmental conditions and the environmental functions of forests. There are no models of climate change impacts at landscape level.

The majority of protected areas have not been fully investigated in terms of their biological diversity; several do not even have a complete basic inventory of floral and faunal elements. There is no proper assessment of mammals, especially the flagship species like red panda, in temperate and sub-alpine forests; no assessments of bat populations; and with the exception of butterflies and spiders, invertebrates have been neglected.

There are insufficient economic baseline data on sources and level of rural income, including income from tourism (Pant et al. 2012; Chaudhary et al. 2015). The ecosystem services provided by the landscape have not yet been comprehensively assessed and valued. There are almost no timber or non-timber inventory data. Not enough is known about the economic losses due to wildlife depredation, or the conservation losses due to retaliatory killing of predators and poaching. The extent and economic impact of illegal trade, including cross-border trade, is little understood. Similarly, more needs to be known about the impact on the economy of changing cropping and harvesting patterns, altering pollinator services, pest incidence and susceptibility of agricultural crops, and natural disasters. Socio-economic vulnerability, livelihood options, and related policy aspects have not been sufficiently researched.

Infrastructure and development status

Development is based primarily on agriculture, livestock, and forest production. However, the subsistence economy produces little surplus, and there is virtually no enterprise development based on processing, value addition, branding, packaging, or marketing. Farmers grow cash crops such as fruit, vegetables, and spices; collect non-timber forest products; and produce livestock products such as eggs and poultry for cash income. But the scale of production is small as landholdings are limited. The rural settlements remain dispersed and poorly connected, and the infrastructure for social development such as drinking water supplies, sanitation and health care facilities, schools, and access to modern communication facilities is limited. As a result, the majority of the population

remains socially and economically marginalized. The subsistence economy limits private sector investment in the local economy and public private partnership initiatives are weak.

Agricultural research and extension

There is a system of government-supported research and extension related to natural resources in the landscape, but there is no mechanism that mandates researchers to draw up a research agenda based on the needs and priorities of their clients, the farmers. A systematic approach is needed which requires extension agents to screen extension packages and disseminate those technologies and approaches needed by farmers to improve the management of the natural resources and the ecological integrity of the ecosystems on which they rely. Thus the research and extension support for agricultural, livestock, and forest production systems is not very effective and doesn't help farmers to gain optimal returns from the production systems.

Development of tourism and income sharing

The landscape is endowed with cultural and ecological touristic attractions (Dam 2013). However, with the exception of some parts of Sikkim and Bhutan, their potential as a high value product has not been developed. The capacity of local populations to support tourism is limited, and the benefits from tourism largely accrue to urban companies. Where local people take part in tourism activities, it is mainly as low wage porters and labourers or suppliers of basic provisions. The potential for nature-based eco-tourism, which would employ local people for their local knowledge, remains largely untapped. In many areas, tourism as an economic activity is unplanned and unregulated.

Poaching and illegal trade of flora and fauna

Poaching and illegal trade of flora and fauna have been reported in the landscape, especially parts of the greater one-horned rhinoceros, tiger, leopard, snow leopard, bear, and musk deer; birds such as the Himalayan monal (*Tragopan satyra*) and Tibetan snowcock (*Tetraogallus tibetanus*); and floral species such as *Cordyceps*, *Fritillaria*, *Saussurea*, and *Neopicrororhiza*.

Transmission of disease

Wildlife and livestock use overlapping habitats which facilitates transmission of disease from wildlife to livestock and vice versa. For example, local people in KL-Nepal reported the death of 100 blue sheep in 1995/96 from an eye disease which was common in domestic yak at that time.

Conflict between statutory and customary institutions

Some of the areas within the landscape face conflicts between customary and modern practices in natural resource use. For example, transhumance grazing has traditionally been practised in much of the high altitude grazing lands in the landscape. Over the years, conversion of some of the gazing areas into community forests and protected areas has negatively affected the local communities whose economy depends on transhumant livestock. There are also conflicts between the state and local communities over ownership of lands regulated by customary institutions such as kipat – a traditional form of communal ownership in Nepal.

Climate change

There are no precise records of temperature change for the landscape, but an analysis of climatological data from 1997 to 2000 carried out for the whole of Nepal indicated overall warming with an increased rate at higher elevations, while in Bhutan, surface air temperature data showed a warming of 0.5°C between 1985 and 2002. There are no clear trends in annual precipitation, with increases reported at some sites and decreases at others, and there are no scientifically validated data available for the KL on glacier dynamics or wind/storm intensity and pattern.

Rises in temperature, changes in precipitation patterns, and changes in glacier and storm dynamics are expected to have both positive and negative impacts on ecosystems and the socioeconomy. Globally, the World Meteorological

Organization, predicts that 20–30% of species are likely to face a higher risk of extinction because of the rise in temperature. In the alpine and subalpine ecosystem, projections indicate the possibility of conversion of *Quercus-Betula* forest into 'Krummholz-type' comprising species such as *Rhododendron*, *Salix*, and *Syringa*; while ungulate species, Himalayan pica, and high value medicinal plants are expected to become more vulnerable. Cool-moist forests are expected to see a decline in the populations of species of *Mantesia*, *Ilex*, and insectivorous plants causing habitat specialists like red panda, blood pheasant, microorganisms, and associated fauna to become vulnerable. In the temperate cloud forests, populations of endemic orchids, lichen, and moisture-loving floral and faunal species will dwindle. Agricultural ecosystems will lose traditional varieties of rice, beans, and citrus and experience an increase in pest incidence; cereal crops and vegetables will become more vulnerable.

Wetlands are expected to experience a change in water levels due to changes in the pattern of precipitation and glacier melting, as well as a rise in water temperature. As a result, populations of insects and aquatic vertebrates will change, which will affect the food chain. Fresh water ecosystems will experience an increase in vegetation biomass, a rise in silt load, and a change in biodiversity, all of which will make large aquatic mammals such crocodiles, river dolphins, and wild buffalo, as well as migratory bird species, more vulnerable. Riparian ecosystems will experience a change in the composition of alluvial grasslands, which will make riparian-zone loving birds and mammals vulnerable. Ephemeral streams dry up, which will make herpetofauna vulnerable. The sediment load in rivers is expected to grow drastically, affecting water quality. Dams, canals, and waterways may become clogged by silt, with removal entailing high costs.

It is thought that the changes in weather will negatively affect human health through factors like a reduction in water quality and increase in water-related diseases, such as diarrhoea, and vector-borne diseases, such as cholera, malaria, and dengue fever. Failure of food security strategies may also lead to an increase in malnutrition.

Landscape management framework at transboundary level

The transboundary landscape approach to conservation and development involves management of ecoregions that transcend the boundaries of protected areas as well as the national political boundaries of countries sharing a landscape. However, there are a host of national cross-border problems in the landscape including illegal trade of wildlife products and high value medicinal plants, cross-border pastoral and transhumant practices, restrictions on transboundary tourism, transboundary environmental problems associated with mining, illegal timber harvesting activities, waste disposal problems, cross-border environmental pollution by pesticides and herbicides, and problems in border trade related to customs barriers. These problems are both interrelated and related to different sectors. Thus at the national level, policies and regulations are required that ensure complementarity among sectoral policies. At present, individual country level policies are often not complementary and there is insufficient coordination among the different sectors. At the landscape level, there is a need for a framework that enables countries to adopt complementary management principles, standards, and regulatory frameworks to manage the ecoregions that cut across the national political boundaries. There are already some policies, and regulatory, management, and cooperation frameworks available at the bilateral level that facilitate transboundary trade and commerce, address illegal transactions of natural resources, promote transboundary tourism, resolve transboundary grazing issues, enable transboundary movements of fauna, mitigate transboundary pollution problems, mitigate transboundary environmental problems associated with mining, and manage transboundary natural disasters. But, they need to be strengthened and mainstreamed.

Long term research and monitoring

The KL has been identified as a data deficit area, with limited sources of the socio-economic, environmental, physical, and biological data required for long-term analysis. There are few long-term monitoring stations or research centres, no system for systematic collection and archiving of socioeconomic data, and no trusted platform or mechanism for sharing data among the interested stakeholders. Long-term consistent monitoring of conservation and development interventions and their impact on ecosystems and livelihoods is a prerequisite for any programme in order to assess change and, where appropriate, modify the interventions.

Research and development capacity

The countries that share the landscape are at different stages of development and have different capacities and investment priorities for research and development. Capacity-building actions aim to increase the capacity of institutions, governments, businesses, and the public to prepare appropriate interventions and investments. Complementary regional approaches will be required for capacity strengthening, including research and assessment, monitoring, extension, training, and exposure visits. Education and training of stakeholders, including policy-level decision makers, is important to ensure successful assessment of vulnerabilities and planning of adaptation activities, as well as for the implementation of adaptation plans. It will be imperative to build the capacity of key stakeholders in different aspects of research and development including the use of models in assessments at national and regional levels.

The Kangchenjunga Landscape Conservation and Development Strategy: 2016–2036

The conservation and development opportunities and challenges in the landscape are numerous (ICIMOD 2015). Strategic actions need to be identified and implemented to overcome the challenges and capitalize on the opportunities. The strategic actions suggested for the KL RCDS are shaped by a set of guiding principles, which led to a mission, vision, goal, and outcomes, and five strategies and key actions, as described in the following.

Guiding principles

Ecosystem–based approach to conservation and development

It is now realized globally that socioeconomic progress of any civilization relies on the services provided by a mosaic of ecosystems; and that furthering and sustaining progress requires a healthy ecosystem. Ecosystems cross political boundaries leading to ecological, social, and economic interdependence among areas and countries. Adopting an ecosystem approach as a framework for the planning and management of ecosystem services at landscape level – with a strategy for the integrated management of land, water, and living resources that promotes conservation and sustainable use in an equitable way – is a necessity, not an option.

Delegates from Nepal providing inputs to conservation and development strategy

Integrated development and conservation

Focussing on conservation rather than development has deprived local communities of economic benefits and weakened their stewardship of natural resources. It is now realized that conservation and development must address people's socioeconomic interests as well as safeguarding the conditions that perpetuate the structure and functions of ecosystems. At country level, conservation and development efforts need to employ a mosaic approach to combine management of areas designated for protection and areas designated for development in order to guarantee sustainable income and nutritional security for the population without degrading the ecosystems.

Connectivity of protected areas

The conventional approach of limiting conservation and development efforts to isolated protected areas has not led to the intended results. The changing paradigm recognizes the necessity of linking protected areas through matrices of conservation corridors with conservation-friendly land uses to facilitate species dispersal and migration. A landscape with protected areas connected by conservation corridors dispenses wider spaces, supports participatory human stewardship, and strengthens ecological viability better than smaller isolated protected areas.

Inclusive development

Every citizen has a right to ecosystem services. However, social, economic, and environmental interests and values differ among the different stakeholders in an ecoregion – men and women, rich and poor, dominant and marginalized social groups, the state, communities, and individuals, and others. Development initiatives must recognize the principles of participation, equity, fairness, and inclusion.

Cross-scale institutions, decentralized governance, and adaptive management

Complementary regional, national, and local level policies and institutions that promote stakeholder partnerships, decentralized governance, participatory decision making, rights of resource users, empowerment of local communities, adaptive management, and others promote better management of conservation and development programmes.

Change, knowledge, and adaption

Climate, social, and economic changes are real but not well understood. Monitoring of the changes following common harmonized methodologies is a necessity for capacitating communities to adapt to changes through both community-based and ecosystem-based adaptations.

Transboundary cooperation

Ecosystems transcend national boundaries, creating social, economic, and ecological interdependence. The flow of natural resources and commodities, migration of species, trade and commerce, illegal cross-border trade, and others require cross-border cooperation for coordinated planning and management of conservation and development interventions. In recent years, many global conventions such as the CBD and the United Nations Framework Convention on Climate Change (UNFCCC) have recognized that ecosystems are contiguous across political boundaries and the impacts of drivers of change, including climate change, are also felt across boundaries, and they have strongly advocated transboundary cooperation as an amicable way of tackling regional challenges.

Mission, vision, goal, outcome, and outputs

Mission

Men, women, and children of the KL enjoy improved well-being in a healthy ecosystem with richer biodiversity.

Vision

A transboundary landscape where the social and economic well-being of beneficiaries is ensured and ecological and cultural integrity is maintained.

Goal

The KL is better conserved and managed for sustaining ecosystem goods and services to improve livelihoods and enhance ecological integrity, economic development, and socio-cultural resilience to environmental changes.

Outcome

Improved cooperation among Bhutan, India and Nepal for sustainable and inclusive ecosystem management in KL for enhanced and equitable livelihoods benefits, contributing to global sustainable development agendas.

Outputs

- Integrated strategies for local livelihoods are developed /further strengthened and promoted
- Integrated community-based tourism schemes further strengthened and implemented
- Action plans for ecosystem management are developed/ implemented/further strengthened
- Integrated schemes for coping with human-wildlife conflicts (HWC) are implemented and further strengthened
- Ecosystem-based incentive mechanisms developed and implemented
- Mechanisms for long-term environmental and socioecological monitoring strengthened
- RCF for KL developed and endorsed by KL member countries
- Regional platform established and made functional for KL
- Contribution made to relevant national, regional and global agenda setting processes
- Knowledge products on KL developed and communicated.

Strategies and key actions

Strategy 1: Promote diversified eco-friendly and more productive livelihood options for local communities

Local economies are supported by agriculture, horticulture, livestock production, timber and wood resources, medicinal plants and non-timber product trade, tourism, off-farm employment, and small scale industries. The actions suggested below will be taken to improve the economy of local communities.

Actions

- Diversify livelihood options of beneficiaries through tourism and production of horticultural, and aromatic and medicinal plants;
- Enhance agricultural, horticultural, livestock, forest, and agroforestry production through technological and agricultural extension inputs;
- Promote small and medium enterprises, cottage industries, value addition, cooperatives, and markets for agriculture, livestock, and forest products;
- Promote efficient environmentally-friendly sustainable production and use of energy;
- Explore the possibility of setting up a crop/livestock insurance programme to compensate for wildlife depredation;
- Strengthen local culture and traditions as well as crafts, skills, and practices related to agriculture, livestock, agroforestry, forest resources, and other natural resources;
- Strengthen research and technological support to enhance the productivity of agricultural, livestock, and forest production systems.

Strategy 2: Strengthen ecosystem management including protected areas, conservation corridors, and ecosystems outside protected areas

Actions under this strategy will improve management of the protected areas as well as link the protected areas to each other through conservation corridors. The actions will expand habitat for species, making them more resilient, and allowing them to adapt better to climate change. The expanded habitat will improve the ecosystem functions of both the protected areas and the conservation corridors: nutrient recycling, energy flow, hydrological functions, food web, and others will improve. In addition, biodiversity outside the protected areas, both natural and domesticated, will be managed. The actions include the following.

Actions

- Strengthen the conservation effectiveness of protected areas by linking them through conservation corridors and implementing community-based conservation plans within them;
- Promote community-based systems to manage problems related to poaching, overgrazing, environmental pollution, forest fire, unsustainable use of flora and fauna, habitat alteration, human-wildlife conflict, endemic species, threatened species, invasive species, and others in the landscape;
- Enhance management of national forest, soil and water conservation, grazing management, habitat restoration, agroforestry, private forestry, community forestry, and others in the conservation corridors, protected areas, and other areas;
- Implement management plans for important plant and bird areas outside the protected areas;
- Strengthen infrastructure for more effective management of protected areas and conservation corridors;
- Enhance scientific knowledge on ecological communities, species, genetic diversity, flora and fauna, ecosystem functions and services, and agrobiodiversity.

Strategy 3: Access to information and monitoring environmental and socio-ecological changes

Comprehensive and coherent biological, physical, social, and economic data are the key to long-term analysis of the impact of climatic and non-climatic changes on the socio-ecological systems and planning and sustainable development of ecosystem services. The actions summarized below will be taken to improve long-term monitoring in the KL.

Actions

- Strengthen collection, analysis, management, and sharing of meteorological, hydrological, and cryosphere data;
- Operationalize a system of measurement, analysis, and documentation of demographic, economic, and social changes;
- Set up a system to measure, analyse, and document changes in the structure of different terrestrial and aquatic ecosystems;
- Operationalize a valuation of ecosystem services from different ecosystems.

Strategy 4: Strengthen regional transboundary cooperation and actions

The ecoregions in the KL in which the flagship, keystone, focal, umbrella, migratory, and vulnerable species occur cut across the political boundaries of the three countries that share the landscape. Maintaining viable populations of such species in the KL will involve management of the ecoregions based on a common management principle and framework. This strategy will be realized by taking the actions summarized below.

Actions

- Establish a transboundary cooperation platform among the partner countries;
- Operationalize a regional platform to resolve cross-border issues of trade of natural resources, illegal wildlife poaching, illegal trade of wildlife products, transboundary migration of wildlife, forest fire, livestock diseases, and others;
- Design and apply common methodologies and frameworks for regional assessment of climate and non-climate changes, and management of ecosystems, connectivity corridors, and others;
- Develop a regional database and share research findings and good practices regionally;
- Implement transboundary landscape management plans for the management of ecoregions and migratory species.

Strategy 5: Strengthen the capacity of strategic actors/stakeholders

The landscape approach to management of conservation and development is new and will involve developing the capacity of all stakeholders to create and implement a landscape management plan. The required capacity will be built by taking the actions suggested below.

Actions

- Enhance the capacity of stakeholders in social mobilization, resource management planning, research and extension, conflict resolution, policy formulation, enterprise development, conservation planning, human-wildlife conflict management, adaptation to climate and non-climate changes, and others;
- Strengthen the technical capacity of stakeholders in soil and water conservation, agroforestry management, forest management, product processing and value addition, agriculture, livestock production, forestry, and horticultural production;
- Strengthen the capacity of stakeholders in transboundary cooperation, resolving cross-border illegal trade problems, cross-border wildlife migration, and others;
- Raise awareness about unsustainable natural resource use, illegal wildlife trade, poaching, policy change, new technologies, improved natural resource use practices, success stories, and others;
- Strengthen the capacity of stakeholders for effective monitoring and evaluation of programmes and projects.

Implementation

The landscape approach to conservation and development involves integrated planning and management of both publicly and privately owned natural resources. In each country, to ensure that local communities own the implementation of the strategy, the institutional set up to formulate and implement management plans will be formed by community-centred, cross-scale institutions and organizations, as shown in Figure 6. In other words, government agencies, non-governmental entities, academic institutions, and the private sector will support local communities in the formulation and implementation of management plans related to forest, protected areas, agriculture, water resources, grazing resources, and mineral resources in the landscape. Every country will set up a national coordination mechanism and ensure integrated and participatory planning and implementation of the country plans.

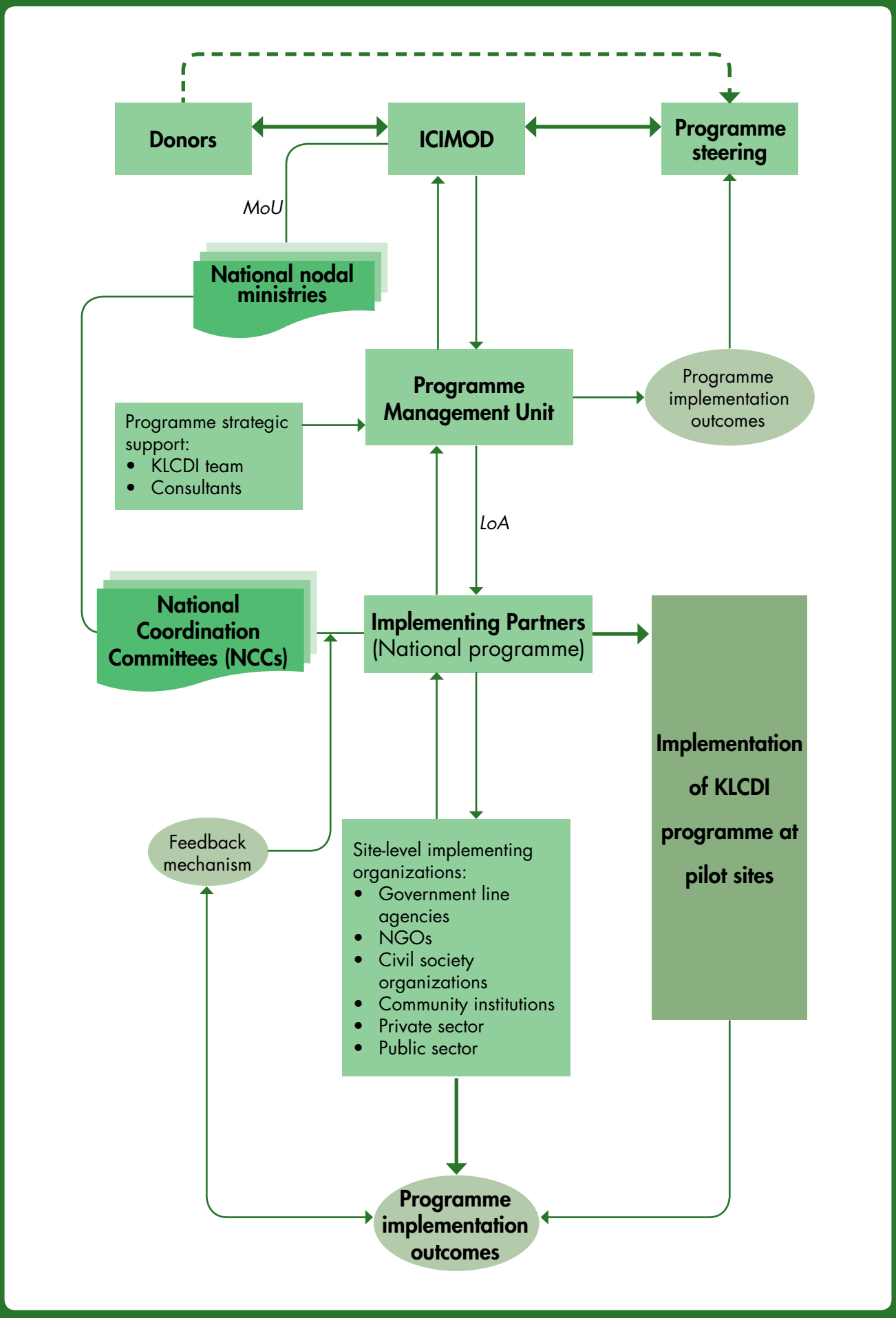
The RCDS will be implemented collectively by government agencies, non-governmental organizations, and the private sector in the three countries, together with ICIMOD and donor organizations as per the RCF (Annex 1). Two types of plan will be prepared and implemented: one at national level and the other at regional level. The national level plans will analyse issues and problems specific to each country, and design and implement country-specific interventions to translate the strategy into actions.

The regional level plan will focus on regional issues to engage relevant national agencies to deal with cross-border problems affecting conservation and development; promote joint research and training programmes; facilitate exchange of data, best practices, and technologies across the landscape through national and regional platforms; support development of regional database and information systems; and establish platforms for regional cooperation and cross-border learning.

ICIMOD will coordinate and facilitate the planning and implementation of country-level and regional plans including risk assessment and mitigation strategies. It will provide technical support to the countries in defining issues and problems and formulating and implementing country-level plans. Efforts will also be made to bring the private sector into the programme as key stakeholders, especially for local and ecosystem-based economic development activities. ICIMOD will also support countries in the capacity building of local communities and implementing agencies; provide innovative research topics to generate new knowledge; develop methodologies/standards for long-term monitoring of climate and non-climate changes; and others.

ICIMOD will facilitate formulation of the regional level plan and establishment of a transboundary platform for countries to resolve regional problems, share experiences and knowledge, articulate the mountain conservation agenda for global policies, and others. The donor communities will provide financial support for the implementation of conservation and development plans in the countries as well as for the regional level plan. ICIMOD will also mobilize financial resources for country-level and regional plans.

Figure 6: **KLCDI implementation mechanism**



Monitoring and Evaluation

Scope and purpose

Given the nature of issues and challenges Kangchenjung Landscape Conservation and Development Initiative (KLCDI) is trying to address, the overall environmental, socioeconomic and geographical context in which KLCDI is being implemented and the landscape of actors involved in the implementation of this initiative, it is highly important to carry out a deeper analysis of the element and pathways thereby developing a clear Theory of Change (ToC) for KLCDI. ToC as part of program planning and evaluation are important because they create a common understanding of the long-term goals, how they will be reached and how progress will be measured along the way. Participatory theory of change and impact pathways for KLCDI has been developed – refer to further references on theory of change narrative (Annex 2). This type of transformative analysis helps us to identify the pathways of change, the type of actors and stakeholders involved in the project, implementation strategies and associated desired changes in the landscape conditions. It also helps to prepare and execute a monitoring and evaluation support system that contributes tracking of results and facilitate learning from the implementation of the program. KLCDI theory of change and impact pathways will be frequently revisited for its applicability and referred to throughout KLCDI programme cycle.

Aiming at translating RCDS agreed for KLCDI, country specific five yearly plans will be formulated by ICIMOD and its implementing partners. Following theory of change and impact pathways developed for KLCDI, monitoring and evaluation (M&E) systems will be designed and put in place thereby ensuring that the RCDSis implemented and desired results from the implementation of KLCDI is achieved. Monitoring will focus on supervision and review of progress of implementation of activities associated with outputs and outcomes. Evaluation will put in place systems for KLCDI to remain effective, efficient, relevant, and achieve sustainability and desired impacts. Evaluation will also provide an assessment of desired impacts achieved by KLCDI in the landscape.

Monitoring mechanism

Based on the participatory theory of change and impact pathways developed for KLCDI – refer to further references on theory of change narrative (Annex 2), a logical framework (LFA) has been developed for KLCDI – (Annex 3). KLCDI-LFA will provide initial basis to establish a monitoring system and develop associated tools to monitor KLCDI progress against agreed results at different levels. Preparation of activities for the logframe will consider the main actions listed under different strategies in the RCDS. The implementing partners will implement the country-specific annual operational plans. Progress against implementation of operational plans will be monitored by the implementing agencies and the progress reviewed by ICIMOD using planning and review tools. The implementing partners will report on the progress against output and outcome indicators using ICIMOD reporting tools and mechanisms.

Evaluation mechanism

The participatory theory of change and impact pathways and associated LFA developed for KLCDI will be used as foundation instruments to establish a relevant and rigorous evaluation basis to evaluate KLCDI. On the basis of theory of change and impact pathways and KLCDI-LFA, relevant evaluation designs will be identified and baseline will be established accordingly. Evaluation designs and associated baselines will be established by engaging independent evaluators and experts from the field. Towards this end Strategic Planing, Monitoring and Evaluation (SPM&E) will provide necessary backstopping.

References

Chakraborty, S., (2015). 'Human-Animal Conflicts in Northern West Bengal: Losses on both sides'. *International Journal of Pure and Applied Bioscience* 3(3), 35-44.

Chaudhary, R.P., Uprety, Y., Joshi, S.P., Shrestha, K.K., Basnet, K.B., Basnet, G., Shrestha, K.R., Bhatta, K.P., Acharya, K.P., Chettri, N., (2015). *Kangchenjunga Landscape Nepal: from conservation and development perspectives*. Ministry of Forests and Soil Conservation (MoFSC), Government of Nepal; Research Centre for Applied Science and Technology (RECAST), Tribhuvan University; and International Centre for Integrated Mountain Development (ICIMOD). Kathmandu, Nepal.

Chettri, N., Shakya, B., Lepcha, R., Chettri, R., Rai, K.R., Sharma, E., (2012).' Understanding the linkages: climate change and biodiversity in the Kangchenjunga landscape'. In Arrawatia, M.L., and Tambe, S. (eds) *Climate Change in Sikkim: Patterns, impacts and initiatives*. Pp 164-184. Government of Sikkim, India.

Chettri, N., Sharma, E., Shakya, B., Bajracharya, B., (2007). 'Developing Forested Conservation Corridors in the Kangchenjunga Landscape, Eastern Himalaya'. *Mountain Research and Development*. 27(3): 211-214.

Chettri, N., Shakya, B., Sharma, E., (2008). *Biodiversity Conservation in the Kangchenjunga Landscape*. ICIMOD, Nepal.

Dam, S., (2013). 'Growth of Tourism Industry in North East India with Special Reference to Sikkim'. *Tourism Recreation Research*, 38(2), 175-188.

ICIMOD, (2015). *Proceedings of 3rd Regional strategic consultative meeting on the Kangchenjunga Landscape Conservation and Development Initiative*, ICIMOD, Kathmandu, Nepal, 23—24 February 2015. Kathmandu: ICIMOD.

Kandel, P., Gurung, J., Chettri, N., Ning, W., Sharma, E., (2016). 'Biodiversity research trends and gap analysis from a transboundary landscape, Eastern Himalayas'. *Journal of Asia-Pacific Biodiversity*, 9(1), 1-10.

KLCDI (in preparation) Kangchenjunga Landscape Conservation and Development Initiative. Feasibility Assessment Report – Regional Synthesis, prepared by ICIMOD, NCD, GBPNIHESD, RECAST, and MoFSC. Kathmandu, Nepal: ICIMOD

Pant, K.P., Rasul, G., Chettri, N., Rai, K.R., Sharma, E., (2012). *Value of forest ecosystem services: A quantitative estimation from the Kangchenjunga landscape in eastern Nepal*. ICIMOD Working Paper 2012/5.Kathmandu: ICIMOD.

Phuntsho, K., Chettri, N., Oli, K.P., (2012). *Mainstreaming community-based conservation in a transboundary mountain landscape – Lessons from Kangchenjunga*. ICIMOD, Kathmandu, Nepal.

Rana, L.N., (2008). 'Biodiversity status in the potential conservation corridors of the Kangchenjunga landscape: a distribution model of flagship and indicator species'. In Chettri, N., Shakya, B., and Sharma, E., (eds) *Biodiversity Conservation in the Kangchenjunga Landscape*. ICIMOD, Nepal. Pp 31-37.

Secretariat of the CBD, (2004a). *Decision adopted by the conference of the parties to the convention on biological diversity at its seventh meeting*. URL https://www.cbd.int/doc/decisions/cop-07/cop-07-dec-11-en.pdf (accessed 11 December 2016).

Secretariat of the CBD, (2004b). *Biodiversity issues for consideration in the planning, establishment and management of protected area sites and networks*. Montreal, Secretariat of the Convention on Biological Diversity. (CBD Technical Series No. 15).

Sharma, E., Chettri, N., Gurung, J., Shakya, B., (2007). *Landscape approach in biodiversity conservation: A regional cooperation framework for implementation of the Convention on Biological Diversity in Kangchenjunga Landscape*. ICIMOD, Kathmandu, Nepal.

Sharma, M., Areendran, G., Raj, K., Sharma, A., Joshi, P.K., (2016). 'Multitemporal analysis of forest fragmentation in Hindu Kush Himalaya—a case study from Kangchenjunga Biosphere Reserve, Sikkim, India'. *Environmental monitoring and assessment* 188(10): 596

Uprety, Y., Poudel, R.C., Gurung, J., Chettri, N., Chaudhary, R.P., (2016). 'Traditional use and management of NTFPs in Kangchenjunga Landscape: implications for conservation and livelihoods'. *Journal of Ethnobiology and Ethnomedicine*, 12(1): 19

Further references

Conservation and Development Strategy Document, Bhutan, 2014

Conservation and Development Strategy Document, India, 2014

Conservation and Development Strategy Document, Nepal, 2014

Feasibility Assessment Report, Bhutan, 2014

Feasibility Assessment Report, Nepal, 2014

Feasibility Assessment Report, India, 2014

Kangchenjunga Landscape Feasibilty Assessment Report, 2017

Theory of Change Narrative for KLCDI, 2015

High level delegates from India, Bhutan, Nepal and ICIMOD at the third KLCDI Regional Workshop

Annex 1: Regional Cooperation Framework agreed by the Participating Member Countries

Preamble

1. *Recognizing* the vital role of the Hindu Kush Himalaya as a water tower and repository of cultural, ecological, and biological diversity; and the significant contribution to the well-being of mountain and lowland communities and adjacent regions;
2. *Considering* that the Hindu Kush Himalaya harbours biodiversity elements from four global biodiversity hotspots comprising a large number of rare, endemic, and threatened species of flora and fauna, with habitats of universal significance that are increasingly under threat from anthropogenic activities and environmental changes, including climate change as articulated in the IPCC 4th and 5th reports;
3. *Also considering* that biodiversity resources are integral to the lives and livelihoods of mountain women and men in the Hindu Kush Himalaya, and that sustaining the ecosystem services (provisional, regulating, cultural, and supporting as defined by the Millennium Ecosystem Assessment) that emanate from the region is critically important to the well-being and economic prosperity of the people in the region and beyond;
4. *Further recognizing* the global initiatives, assessments, agreements, *inter alia* Agenda 21 of the United Nations (UN) Commission on Sustainable Development, the CBD Programme of Work on Mountain Biodiversity (Decision VII/27, 2004), the Strategic Plan of the CBD including the Aichi Biodiversity Targets (2011–2020), the Nagoya Protocol on Access and Benefit Sharing (ABS), the UNFCCC and the Kyoto Protocol, the UN General Assembly Resolutions (in particular UNGA 62/196) on Sustainable Mountain Development, the Sustainable Development Goals, the Convention on the Elimination of All Forms of Discrimination against Women, the Millennium Ecosystem Assessment, the Global Biodiversity Outlook-4, the Global Environmental Outlook-5, and Rio+20 recommendations;
5. *Also considering* that key national policies such as the National Biodiversity Strategy and Implementation Plans, National Adaptation Plans of Action, National Environmental Policy, and others, which envisage bilateral and transboundary cooperation and seek to promote collaborative actions between countries;
6. *Recognising* the need for transboundary landscape management under the 'ecosystem approach' through regional cooperation in ecosystems that maintains biological diversity, natural resources, ecosystem services, nature dependent livelihoods, and the shared/common cultural heritage within the KL which covers portions of Bhutan, India, and Nepal;
7. *Further recognising* the value of the RCF in providing a platform for cooperation and common understanding on transboundary landscape issues in the KL region and facilitating a regional approach to conserve the irreplaceable cultural and natural landscape;
8. *Referring* to the KL KLFAR 2017 and its delineated areas covering parts of eastern Nepal, the whole of Sikkim, parts of Darjeeling, Jalpaiguri, and Alipuduar districts in West Bengal and parts of western Bhutan, and the KLCDS prepared during the preparatory phase of the KLCDI;
9. *Having gone* through a consultative process among the relevant governments and institutions of Bhutan, India, and Nepal to reach consensus on mission, vision, goal, and objectives for ecosystem management in the KL;

10. *Further recognising* that the knowledge, innovations, and practices of indigenous and local communities need to be taken into account and that their participation in conservation and sustainable use and fair and equitable benefit sharing of mountain biological diversity can be enhanced;
11. *Based upon* the efforts put in by Bhutan, India, and Nepal with a facilitating role by ICIMOD to promote regional cooperation for the conservation and sustainable utilization of the biological and cultural resources and associated traditional knowledge including the collection, analysis, exchange, and dissemination of long-term environmental, ecological, climatic, and biodiversity datasets for the KL;
12. The *KL Member Countries*, Bhutan, India, and Nepal, hereby agree to endorse the KL RCF and to work towards the implementation and achievement of the vision, goal, and objectives of the RCF and the KLCDI, and also agree that ICIMOD shall facilitate the implementation of the RCF.

Mission, Vision, Goal and Objectives

Mission

Men, women, and children of the KL enjoy improved well-being in a healthy ecosystem with richer biodiversity.

Vision

A transboundary landscape where the social and economic well-being of the beneficiaries is ensured and ecological and cultural integrity is maintained.

Goal

The KL is better conserved and managed for sustaining ecosystem goods and services to improve livelihoods and enhance ecological integrity, economic development, and socio-cultural resilience to environmental changes.

Objectives

1. To improve economic well-being of women and men, particularly of disadvantaged groups in the KL through promoting eco-friendly and productive livelihood options.
2. To enhance ecosystem services in the KL through community based improved ecosystem conservation and management.
3. To improve natural resource governance and benefit sharing mechanisms in the landscape - kept as it is from RCF document.
4. To improve scientific and technical cooperation including knowledge and information sharing among academics, practitioners, and policy makers for informed decision making.
5. To strengthen regional cooperation among participating regional member countries for transboundary landscape management in the KL.

Kangchenjunga Landscape – Regional Cooperation Framework (KL-RCF) Process

The objectives of the KL-RCF will be realized by adopting, *inter alia*, the following processes:

1. Bringing together policy makers, scientists, natural resource managers, and communities on a common multitiered platform for sharing knowledge on applying ecosystem management and transboundary approaches for biodiversity, environmental, and cultural conservation; for enhancing livelihoods and the adaptation capacity of local communities; and for improving the socioeconomic status of disadvantaged groups
2. Identifying policy issues related to transboundary cooperation and promoting adoption of ecosystem management approaches with particular reference to the mountain biodiversity provision and goals of the CBD at the regional level
3. Fostering partnerships and dialogue for science and knowledge development, policy uptake, scaling out of innovations and sustainable and relevant practices, and capacity strengthening at all levels

4. Promoting a collective regional voice in global platforms of multilateral environment agreements such as the CBD, IPCC, inter-governmental platform on biodiversity and ecosystem services (IPBES), and more.

Kangchenjunga Landscape – Regional Cooperation Framework Principles

The KL-RCF is based on the following eight principles:

1. *National sovereignty:* All KLCDI activities will be built upon priority actions defined by the individual countries in the technical documents and will not impinge upon the national sovereignty of the respective countries;
2. *Iterative consultation and participatory management:* All KLCDI activities will be built upon the collective strength of different actors and stakeholders in the landscape and will adopt an iterative participatory consultative approach;
3. *Equity and inclusiveness:* All activities in the KLCDI will look into opportunities, participation, and equity, including integration of gender and socially and economically vulnerable groups in programme design, planning, implementation, monitoring, and evaluation;
4. *Sustainability:* All KLCDI activities will be designed to complement existing efforts by countries at policy and practice levels;
5. *Partnerships and synergy:* All KLCDI activities will be built upon the collective roles and responsibilities of a wide range of strategic, development, science, knowledge, and implementing partners;
6. *Ecosystem management:* All KLCDI activities will adopt the 'ecosystem approach' where the focus will be on maintaining ecosystem functions and the flow of ecosystem goods and services, while ensuring that people are an integral part of biodiversity conservation and management interventions;
7. *Transboundary cooperation:* All KLCDI activities will generate outcomes at the landscape level which are envisaged through regional collaborative efforts leveraging resources, expertise, and experiences;
8. *Knowledge sharing and evidence-based decision making:* All KLCDI related knowledge will be shared using national and regional platforms, giving due acknowledgement and credit to all data, information, and knowledge generated as appropriate, and will contribute to an evidence-based decision making process.

Kangchenjunga Landscape – Regional Cooperation Framework Mechanism of Implementation

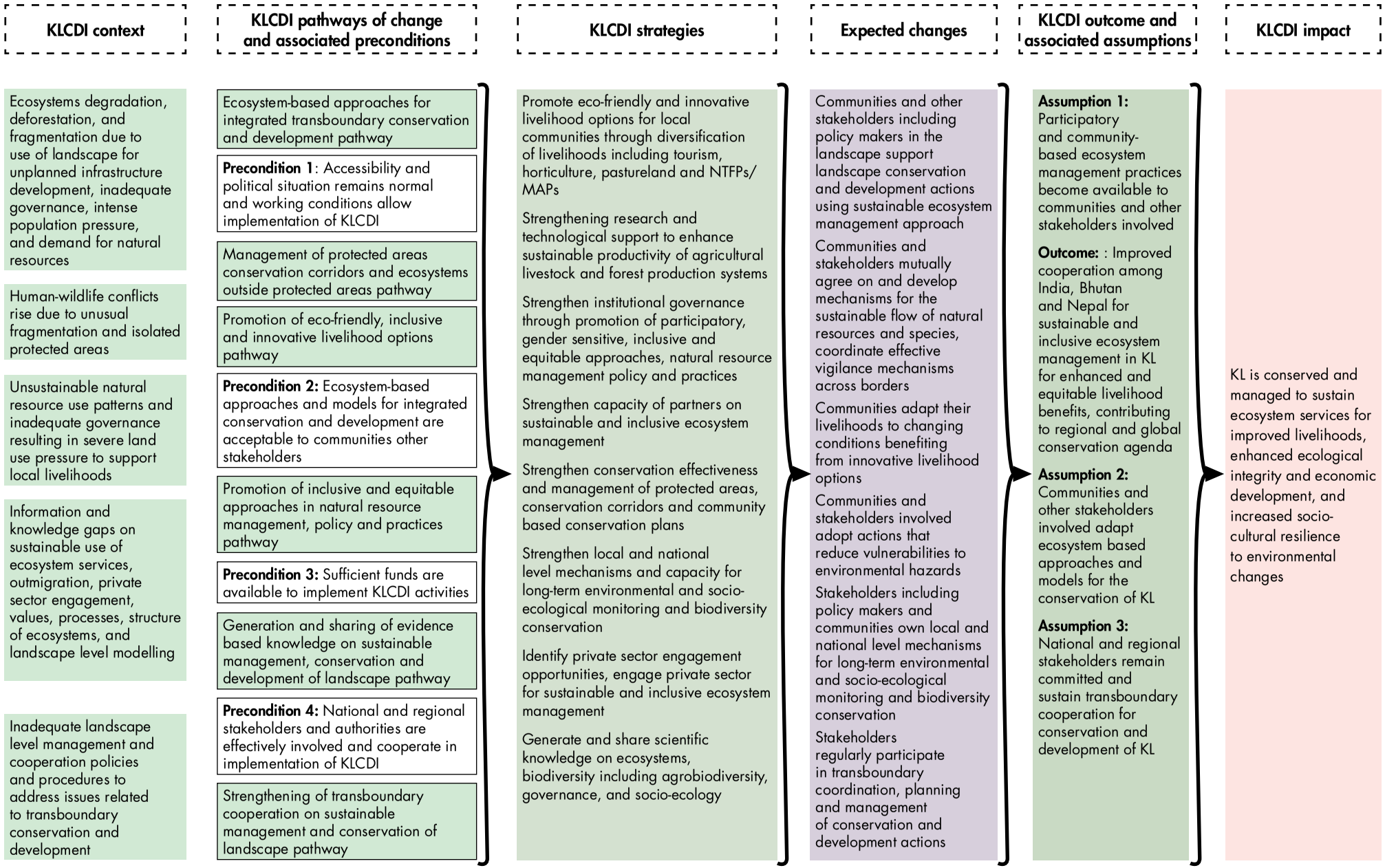
The following mechanisms will be established to achieve the goal and objectives of the KL-RCF, with facilitation from ICIMOD through a consultative and participatory process:

1. A Regional Coordinating Body (RCB) will be formed for the discussion, facilitation, and implementation of the KL-RCF to enhance regional cooperation. The roles and responsibilities of the RCB will be determined at the first RCB meeting, but should ensure that monitoring and evaluation at the regional level is part of the Terms of Reference (TOR) for the group. In order to achieve the goal and objectives stipulated in the RCF, a nodal institute and major partners and stakeholders relevant to the implementation of the RCF will be identified by each country.
2. The RCB will establish two different Regional Working Groups (RWGs) to work at a bilateral level between India and Bhutan and India and Nepal for facilitation and implementation of the RCF, and specifically the goals and objectives of the KL RCDS, facilitating enhanced regional cooperation for conservation, environmental monitoring, and long-term ecological research.
3. The RWGs, with a direct link to the national committees, will facilitate a regional knowledge sharing platform for the implementation of the KL RCDS.
4. The RWGs will facilitate regional capacity building for transboundary conservation, environmental monitoring, and ecosystem management.
5. The RWGs will promote regional collaboration for ecosystem management which will be encouraged through awareness raising and fundraising activities.

'Actions must be taken on the ground' Manfred Seebauer, CTA-GIZ

Participants of the Regional Conservation and Development Strategy and Regional Cooperation Framework

Annex 2: Theory of Change and Impact Pathways Schema for Kangchenjunga Landscape Conservation and Development Initiative (KLCDI)



Annex 3: Logframe for KLCDI Programme Implementation Plan

Goal (Impact)		Indicators		
Improved conservation and management for the KL for sustaining ecosystem goods and services to improve livelihoods and enhance ecological integrity, economic development, and socio-cultural resilience to environmental change.		Percentage of women, men, and children benefited from integrated ecosystem management approaches in the KL Percentage of women and men with improved livelihoods through ecosystem-based economic development Strengthened regional platforms for resolving transboundary issues Number of policies influenced by lessons learned through implementation of KLCDI		
Outcome level results		**Objectively verifiable indicators**	**Means of verifications**	**Risks and assumptions**
Overall outcome Improved sustainable and inclusive ecosystem management in KL for enhanced and equitable livelihood benefits, contributing to regional and global conservation agendas through regional cooperation.	**Outcome 1** Economic well-being of women and men in the KL enhanced	At least six value chains (including tourism) and relevant enterprises up-scaled in KL Percentage increase in income from diversified livelihood options in pilot sites Percentage increase in number of women and men involved and equitably benefited from diversified livelihood options in pilot areas	Situational Analysis Report(s) Baseline report Partner reports KLCDI evaluation reports Documents, instruments, frameworks, and guidelines developed regarding regional cooperation Evidence of knowledge products being used for decision making purposes	**Assumption 1** Participatory and community-based ecosystem management practices become available to communities and other stakeholders involved **Assumption 2:** Communities and other stakeholders involved adapt ecosystem based approaches and models for the conservation of KL **Assumption 3:** National and regional stakeholders remain committed and sustain transboundary cooperation for conservation and development of KL
	Outcome 2 Ecosystem management and conservation of the KL improved through inclusive and equitable benefit sharing of natural resources, community-based approaches, and economic valuation and incentive mechanisms	Improved ecosystem management of at least nine pilot areas including protected areas/conservation corridors/sites of international significance in the landscape Percentage reduction in the incidence of human-wildlife conflict Percentage of women and men equitably benefited through ecosystem-based incentive mechanisms		
	Outcome 3 Local and national level mechanisms and capacity strengthened for long-term environmental and socio-ecological monitoring and biodiversity conservation in the KL	Number of functional sites for long-term environmental and socio-ecological monitoring and biodiversity conservation Number of institutions with strengthened capacity of organizations in using long-term environmental and socio-ecological data for ecosystem management and biodiversity conservation Functional platform for data and knowledge sharing		
	Outcome 4 Regional cooperation on conservation and development strengthened among participating countries – Bhutan, India, Nepal	Number of regional platforms, mechanisms and instruments, frameworks, guidelines, operationalized for engaging stakeholders to shape policies and practices on landscape approaches and mechanisms Number of contributions made to regional and global agenda-setting processes, including Nagoya Protocol, Program of Work on Mountain Biodiversity, IPBES, World Commission for Procted Area (WCPA), and Global Landscape Forum (GLF)		
Output level result	**Objectively verifiable indicators**		**Means of Verifications**	**Risks and Assumptions**

Output 1.1 Integrated strategies for local livelihoods are developed/further strengthened and promoted	Integrated strategies for at least six value chains and relevant micro-enterprises are identified, developed/further strengthened or implemented by local institutions (government and private together with local communities) in three participating countries Number of women, men and marginalized groups involved and equitably benefiting from value chains and relevant micro-enterprises	Situational Analysis Report(s) Baseline report Partner reports Reports on capacity building events Documents related to sustainable tourism plans and strategies KLCDI evaluation reports	**Assumptions 1:** Sufficient funds are available to implement KLCDI activities **Assumption 2:** Accessibility and political situation remains normal and working conditions allow implementation of KLCDI in the landscape **Assumption 3:** National and regional stakeholders and authorities cooperate in the implementation of KLCDI
Output 1.2 Integrated community-based tourism schemes further strengthened and implemented	Number of sustainable tourism plans/strategies developed and implemented by local communities through local partners, and private sector in at least three sites in Bhutan, India and Nepal Sustainable tourism strategy at landscape level is developed and piloted in the transboundary context Number of women and men involved benefiting from sustainable tourism		
Output 2.1 Action plans for ecosystem management are developed/ implemented/further strengthened	Existing ecosystem management practices of at least nine pilot areas including protected areas/conservation corridors/sites of international significance analyzed, gaps identified, action plans prepared and implemented in the landscape Inventory of biodiversity and associated knowledge systems conducted in a participatory manner with local communities in selected pilot sites (takes into consideration existing data) Integrated action plans that consider equitable benefits from natural resources developed and implemented for ecosystem management with local communities in pilot areas	Situational Analysis Report(s) Baseline report Partner reports Reports on biodiversity inventory Documents related to integrated action plans on ecosystems management KLCDI evaluation reports	
Output 2.2 Integrated schemes for coping with human-wildlife conflicts (HWC) are implemented and further strengthened	HWC related to large and small mammals addressed and minimize in at least three pilot sites in the landscape Number of integrated schemes developed and implemented with local communities for pilot sites related to HWCs Number of female/male trained in coping mechanisms to HWC through number of capacity building programs	Situational Analysis Report(s) Baseline report Partner reports KLCDI evaluation reports	
Output level result	**Objectively verifiable indicators**	**Means of verifications**	**Risks and assumptions**
Output 2.3 Ecosystem-based incentive mechanisms developed and implemented	Ecosystem valuation conducted and incentive mechanism scheme developed and implemented in at least three identified pilot sites Number of women and men involved in developing ecosystem-based incentive mechanisms	Ecosystem valuation report(s) Baseline report Partner reports KLCDI evaluation reports	
Output 3.1 Mechanisms for long-term environmental and socio-ecological monitoring strengthened	Number of thematic areas, for example, forest, wetland, rangeland and sites for long-term monitoring and socio-ecological monitoring in the landscape identified Number of trained human resource (female/male) in number of partner institutions developed for long-term monitoring and socio-ecological monitoring Number of trained human resource (female/male) in number of partner institutions developed to integrate long-term monitoring and socio-ecological monitoring data for developing conservation and management plans A knowledge and data sharing platform established among participating RMCs Number of knowledge products jointly developed and published regarding the identified thematic subject areas	Situational Analysis Report(s) Baseline report developed for identified sites Partner reports KLCDI evaluation reports Knowledge sharing platform Knowledge products	

Output level result	Objectively verifiable indicators	Means of verifications	Risks and assumptions
Output 4.1 RCF for KL developed and endorsed by KL member countries	Three member countries endorse RCF for its implementation	RCF document(s)	
Output 4.2 Regional platform established and made functional for KL	Regional Steering Committee (RSC) formed Number of transboundary issues discussed in RSC meetings and resolved At least five transboundary exchange visits organized with minimum participation of two members (female/male) per participating country Two regional knowledge sharing workshops conducted One regional planning and review workshop conducted annually KLCDI communication strategy developed and shared among partners KLCDI web portal developed Updated data and information available on KL portal used by partner organizations in three countries	Documents, frameworks, and, guidelines developed on regional cooperation Exposure visit reports Workshop reports KLCDI evaluation reports	
Output level result	**Objectively verifiable indicators**	**Means of verifications**	**Risks and assumptions**
Output 4.3 Contribution made to relevant national, regional and global agenda setting processes	Present lessons from KL in at least three global for a (e.g., CBD, WCPA or GLF) At least one position paper on the relevant issues developed and presented on regional and global forums Number of citations in relevant international forums and their documents	Knowledge products developed Peer review articles published Back to office reports after participating in the regional and global forums KLCDI evaluation reports	
Output 4.4 Knowledge products on KL developed and communicated	At least three regional/landscape level multidisciplinary knowledge products developed and shared At least three peer-reviewed research papers of transboundary nature published jointly with regional partners At least six country-specific knowledge products on KL developed and disseminated		

International Centre for Integrated Mountain Development
GPO Box 3226, Kathmandu, Nepal
Tel +977 1 5003222 **Fax** +977 1 5003299
Email info@icimod.org **Web** www.icimod.org

ISBN 978 92 9115 453 1